THE BEAUFORT SEA, MACKENZIE DELTA, MACKENZIE VALLEY, AND NORTHERN YUKON: A BIBLIOGRAPHICAL REVIEW

Prepared for the Office of the Northern Research and Science Advisor, DIAND

Arctic Science and Technology Information System
THE BEAUFORT SEA, MACKENZIE DELTA, MACKENZIE VALLEY, AND NORTHERN YUKON: A BIBLIOGRAPHICAL REVIEW

Prepared for the Office of the Northern Research and Science Advisor, DIAND

Arctic Science and Technology Information System
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>111</td>
</tr>
<tr>
<td>A - GEOGRAPHY, GEOMORPHOLOGY, AND CARTOGRAPHY</td>
<td>1</td>
</tr>
<tr>
<td>B - GEOLOGY, MINERALOGY, GEOCHEMISTRY, AND PALAEONTOLOGY</td>
<td>6</td>
</tr>
<tr>
<td>C - SOILS AND PERMAFROST</td>
<td>41</td>
</tr>
<tr>
<td>D - OCEANOGRAPHY</td>
<td>55</td>
</tr>
<tr>
<td>E - METEOROLOGY AND CLIMATOLOGY</td>
<td>62</td>
</tr>
<tr>
<td>F - SNOW, GLACIOLOGY, AND HYDROLOGY</td>
<td>64</td>
</tr>
<tr>
<td>G - ICE - Except Glacier Ice and Ground Ice</td>
<td>71</td>
</tr>
<tr>
<td>H - BOTANY</td>
<td>94</td>
</tr>
<tr>
<td>I - ZOOLOGY</td>
<td>104</td>
</tr>
<tr>
<td>J - ECOLOGY - Includes Environmental Protection</td>
<td>134</td>
</tr>
<tr>
<td>K - MEDICINE, HUMAN PHYSIOLOGY, AND PUBLIC HEALTH</td>
<td>138</td>
</tr>
<tr>
<td>L - COMMUNICATIONS AND TRANSPORTATION</td>
<td>138</td>
</tr>
<tr>
<td>M - ENGINEERING AND CONSTRUCTION</td>
<td>145</td>
</tr>
<tr>
<td>N - RENEWABLE RESOURCES</td>
<td>146</td>
</tr>
<tr>
<td>P - MINING</td>
<td>148</td>
</tr>
<tr>
<td>Q - PETROLEUM, NATURAL GAS, AND PIPELINES</td>
<td>151</td>
</tr>
<tr>
<td>R - GOVERNMENT, ECONOMIC CONDITIONS, AND SOCIAL CONDITIONS</td>
<td>224</td>
</tr>
<tr>
<td>S - LAND USE, LAND MANAGEMENT, AND REGIONAL PLANNING</td>
<td>231</td>
</tr>
<tr>
<td>T - NATIVE PEOPLES - Except Archaeology</td>
<td>235</td>
</tr>
<tr>
<td>U - ARCHAEOLOGY</td>
<td>246</td>
</tr>
<tr>
<td>V - HISTORY</td>
<td>252</td>
</tr>
<tr>
<td>W - DESCRIPTION AND TRAVEL</td>
<td>256</td>
</tr>
<tr>
<td>X - GENERAL</td>
<td>257</td>
</tr>
<tr>
<td>Y - MISCELLANEOUS</td>
<td>258</td>
</tr>
<tr>
<td>SUBJECT INDEX</td>
<td>259</td>
</tr>
<tr>
<td>GEOGRAPHIC INDEX</td>
<td>282</td>
</tr>
<tr>
<td>AUTHOR INDEX</td>
<td>290</td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENTS

This bibliography was prepared under a contract from the Office of the Northern Research and Science Advisor, DIAND. The editors wish to thank Raymond Bergeron, Northern Science Coordinator, for his advice and support.
INTRODUCTION

Scope of the Bibliography

This bibliography contains 1547 citations, with abstracts, concerning the Canadian Beaufort Sea region and the Mackenzie Valley.

The bibliography is completely multi-disciplinary, and includes the entire range of subjects contained in the ASTIS database.

The map on the following page shows the geographic limits of the bibliography. The bibliography covers the Canadian sector of the Beaufort Sea, Amundsen Gulf, Banks Island, western Victoria Island, the entire western half of the District of Mackenzie, and the Yukon north of 67 degrees. Information on the Yukon portion of the Dempster corridor has also been included, even though it falls outside the area shown on the map, because of its importance as a transportation route to the Mackenzie Delta.

Documents concerning part or all of the area defined on the map, have, of course, been included in the bibliography. In addition, some documents concerning areas larger than that defined on the map, such as the Northwest Territories or the Canadian Arctic, have also been included in the bibliography if they appear to contain a significant amount of information on the Beaufort-Mackenzie region. Generally, "significant" was considered to be fifty percent or more. There are many documents containing smaller amounts of information on the Beaufort-Mackenzie region which have not been included in the bibliography.

This bibliography was prepared using information in the ASTIS database as of August 1984. It is therefore not a comprehensive bibliography since, generally speaking, ASTIS only contains documents published since the mid-1970's. Hopefully at some future time it will be possible to update this bibliography by adding any documents that have been missed, some selected older documents, and documents published after August 1984.

Organization of the Bibliography

This bibliography has been produced directly from the ASTIS online database. The main section of the bibliography is sorted by ASTIS broad subject categories as shown in the Table of Contents. Documents which apply to more than one broad subject category are listed in the most applicable category, and are cross-referenced in the "See Also" list which appears at the end of other pertinent categories. Within each category documents are sorted by their ASTIS document number.
GEOGRAPHIC LIMITS OF THIS BIBLIOGRAPHY
The Subject, Geographic, and Author Indexes refer back to the main section of the bibliography using a combination of category code and document number. Terms in the Subject and Geographic Indexes are taken from the ASTIS Thesauri. All personal and corporate authors of a document are listed in the Author Index.

Availability of Documents

The last line of most citations (i.e. the last line preceding the abstract) contains a location code indicating where the document may be obtained on interlibrary loan. The standard Canadian interlibrary loan codes are used. A very high percentage of the documents have location code ACU, which indicates that they are available from:

Interlibrary Loans Office  
Room 218, Library Tower  
University of Calgary  
Calgary, Alberta T2N 1N4

Please give the ASTIS document number as well as the full citation when ordering from this source.
A-12106
References.
ACU

Three glaciations with associated marine and glaciolacustrine phases on Banks Island are recognized for the first time. The oldest (Banks Glaciation) affected all but the northwest part of the island; glacial lakes Egina and Storkerson were formed during deglaciation. Ice of the Thomsen Glaciation of pre-Sangamonian age covered the south and east and flowed down Thomsen River valley. The youngest, or Amundsen Glaciation, of probable Early or Middle Wisconsinan age involved two icelobes that impinged on the southeast and southwest coasts creating glacial lakes Raddi, Mask, Rufus, De Salis, Cardwell, and Sarfarsuk at their limit. (Au)

A-12840
(Economic and technical review report - Canada. EPS. Environmental Conservation Directorate, EPS-3-EC-76-3)
ACU

This report documents the remote sensing data up to 1975 available at the National Air Photo Library (NAPL) covering the Mackenzie Delta - Beaufort Sea - Herschel Island - Sachs Harbour. Guidance is provided on how the original data may be retrieved and an example of the data retrieval procedure is given. (Au)

A-19510
References.
ACU

DPW undertook ... to study the shore erosion occurring at Tuktoyaktuk and to develop solutions to arrest further degradation of the shore. The program included literature research; review of available data; consultations; field measurements and investigations; and research on alternative solutions. The investigations revealed that in the arctics where ice rich soils and massive ice abound within the soil mass, thawing of permafrost and ice caused by the summer temperatures and the summer sea conditions is a principal and addltional cause of shore erosion to those usually encountered in the southern regions. (Au)

A-31879
References.
ACU

... Some of the rock slides are close to a Holocene fault scarp and may be related to past earthquake activity. ... At several localities at least two generations of slide material can be recognized. All major sturzstroms originated by failure above inclined bedding plane surfaces, ranging in dip from 13-40 deg. Prediction of reach or excessive travel distance of dry sturzstroms is not a simple matter and one has to consider the effect of slide mass, fall height, topographic constraints, and lithology. The best method of predicting reach in a potential sturzstrom situation is comparison with documented sturzstroms in similar geologic, climatic, and topographic settings. (Au)

A-33537
References.
ACU

Field work was conducted in 1977 on the Ram Plateau, located along the eastern front of the Mackenzie Mountains, Northwest Territories, approximately 160 km west of Fort Simpson. The purposes of this study, then, were threefold: (1) to determine the recent flood history of Ram River and its tributaries; (2) to study the periods of movement of slumps and debris avalanches along the tributary streams; and (3) to establish any relationships, particularly temporal, between flooding and mass-wasting. These objectives were accomplished through tree-ring analysis of trees affected by flooding and mass movement. (Au)

A-30031

... The northern Yukon's most interesting contrast is between its unglaciated areas - a major portion of the three percent of Canada which remained free of ice in the last Ice Age - and those which have been glaciated. The unglaciated landscapes of this area in fact differ so greatly from all the rest of Canada, (except for adjacent parts further south in the Yukon Territory) that many landforms are found nowhere else in the country. The unglaciated terrain has also enabled the preservation of remnants of Canada's biological and historical past: sediments of the northern Yukon have, in recent years, revealed many of the oldest and most significant archaeological and palaeontological sites in all of North America. (AU)


In August 1963 Dr. H. Gabrielse, of the Geological Survey of Canada, established five lines of marked boulders on what is now believed to be a large ice-cored rock glacier near Tungsten, Northwest Territories. The boulders were aligned with survey targets located on the rock walls of the valley in which the rock glacier is located. The distances from the snout of the rock glacier to eight forest trees along its perimeter were measured and blazed into the trees. In July 1980, we visited the rock glacier and resurveyed the marked boulders and the rock glacier's snout in order to establish the rate and nature of movement of the rock glacier over the past 17 years. (AU)


In late glacial time the disintegration of the Laurentide Ice Sheet resulted in the deposition of erratics, moraines, and various ice-contact sediments in the Hepburn Lake map area. During the ice retreat, Coppermine River valley south of the mouth of Kendall River became ice free and was occupied by a high-level (370 m. a.s.l.) glacial lake which drained through Kamut Lake channel and Sloan River valley into Great Bear Lake. As a result of further ice retreat, the glacial lake expanded into the valley of Simal Lakes. This lower phase of glacial Lake Coppermine (approximately 310 m. a.s.l.) drained westward through Dismal Lakes and Deese River valleys to Great Bear Lake. Preliminary palynological studies of a 4-m-thick sequence of organic-rich sediments show important vegetation changes between 8400 and 3200 years ago. (AU)


Data on late Quaternary sea levels in the Beaufort Sea are extremely limited, yet the sea level chronology in this area is of some importance for studies of continental ice loading, submarine permafrost and ice scour, and deltaic sedimentation. The evidence suggests that deviations from published eustatic curves have occurred in the region, and indeed the concept of local correspondence with a worldwide eustatic pattern appears to be outmoded. A hypothetical history for the Mackenzie Delta is proposed which includes limited isostatic depression due to late Wisconsin ice, minor uplift, and renewed subsidence due to forebulge collapse or sediment loading. A mid-Wisconsin transgression of the order of 10 m higher than present sea level is suggested by evidence in the Mackenzie Delta area and in north Alaska, but no evidence for sea level higher than present since the late Wisconsin has been found west of Cape Bathurst. Coastal morphology, radiocarbon and archeological dates, and plausible mechanisms suggest a recent and perhaps continuing regional submergence. The tidal record at Tuktoyaktuk is insufficient to resolve the contemporary trend of sea level. (AU)
A-61775

Collapse karst is widespread in the Franklin Mountains, Colville Hills and Great Bear Plain between Great Bear River and 67 degrees N. . . .

Integrated surface drainage is limited or lacking over portions of the karst area. Hydrologic measurements indicate that subsurface runoff may be as high as 40 mm per year or about 15% of the annual precipitation and that rainfall rates as low as 6 mm per day can initiate recharge to the karst-water system. . . . Seasonal flooding of karst depressions may cause problems for future engineering developments in the region. . . . The karst-water system is extremely vulnerable to contamination from the surface because of the close spacing of high-rate recharge points and the unfiltered nature of the recharge. Once a contaminant has entered the karst-water system, rapid subsurface transport will make containment, recovery and cleanup after an accidental spill difficult or impossible. (AU)

A-90042

The general objective of this study was to describe vegetation and terrain along a proposed Polar Gas pipeline route . . . . Only the main pipeline route was investigated . . . . The more specific objectives of the 1980 work were to: (i) describe and photograph the major repetitive vegetation types along the proposed route; (ii) group the observed types into at least two levels of classification; (iii) describe relationships between vegetation type boundaries and landforms, surficial materials, topographic position on slopes, streams, ponds, drainage patterns, and late summer snow banks; (iv) record information on degree of cover by vegetation, vegetation height, species composition of vegetation types, depth of soil organic matter and active layer depth of each site sampled; (v) describe and photograph the main landform types and surficial materials along the proposed route; (vi) describe and photograph conspicuous surface expressions of unstable terrain; (vii) document any rare or unusual vegetation or terrain features along the proposed route. This report outlines methods used during the study, the main terrain features in terms of physiography, terrain types and surficial materials, the main vegetation types present along the route, examples of topographic sequences of vegetation types, and some of the main terrain and vegetation highlights observed near the proposed route. . . . (AU)

A-86655

A-103152

A-102689

A-107899

This videotape survey of the coasts of the Northwest Passage, between Amundsen Gulf and Lancaster Sound through Viscount Melville Sound, was undertaken . . . . to provide a complete and continuous coverage of the shore zone for use in spill training, contingency planning and countermeasure operations . . . . The tapes were edited to remove poor footage and to provide a set of tapes that are in a logical sequence. . . . The audio commentary that has been provided for the edited tapes describes the physical shoreline character and appropriate cleanup countermeasures or strategies for each section of coast. (AU)

A-108006

This videotape survey of the coasts of Amundsen Gulf and Dolphin and Union Strait was undertaken for Dome Petroleum Ltd. to provide a complete and continuous coverage of the shore zone for use in spill training, contingency planning and countermeasure operations. The survey was carried out in September 1981 using a high-wing twin-engine aircraft . . . . The audio commentary that has been provided for the edited tapes describes the physical shoreline character and appropriate cleanup countermeasures or strategies for each section of coast. The edited tapes, therefore, contain relevant information to supplement the visual shore-zone coverage and to provide a comprehensive description of individual sections of coast. (AU)
This videotape survey of the coasts of the Beaufort Sea, between Demarcation Point and the Batsille Islands, was undertaken for Dome Petroleum Ltd. to provide a complete and continuous coverage of the shore zone for use in spills training, contingency planning and countermeasure operations. The original survey was carried out in August 1980, using a high-wing single-engine aircraft. A second survey was undertaken in September 1981 to provide additional coverage, using a high-wing twin-engine aircraft. The audio commentary that has been provided for the edited tapes describes the physical shoreline character and appropriate cleanup countermeasures or strategies for each section of coast. The edited tapes therefore contain relevant information to supplement the visual shore-zone coverage and to provide a comprehensive description of individual sections of coast. (Au)

Impacts of the dredging program upon marine and terrestrial mammals and birds are expected to be limited to possible avoidance reactions in some instances, and to some species. With respect to harbour activities and the overwintering of the drilling fleet, the possibility of an oil spill during fuel transfer or due to a shipping accident appears to offer the greatest concern. In this regard, an oil spill contingency plan has been developed to ensure adequate response and protection of the environment, should such an incident occur. On the basis of the information contained in this report, it is our conclusion that the proposed project can proceed as currently envisaged without causing lasting, significant, undesirable long-term impacts upon the environment of the area. This report serves to describe the projected overwintering harbour and all activities associated with the construction and early operations of the proposed facility. It also provides the most detailed description of the existing environmental features of McKinley Bay and the surrounding area that is possible with existing information, and examines all of the potential environmental implications of the overwintering facility and associated activities. (Au)


The stratigraphy and morphology of alluvial terraces in the lower Porcupine Valley permit the definition of twelve river stages, each marked by distinctive surface characteristics, sediment composition, and regional gradient. Terraces that exhibit characteristics suggestive of extremely high discharge...formed at times when the Porcupine River at the Ramparts acted as an overflow outlet for glacial lakes in northern Yukon Territory which had been impounded by the Laurentide Ice sheet. Terraces capped by sediment suggestive of relatively low discharge meandering streams, and which were strongly affected by Coleen River drainage, probably formed when glacial-lake overflow did not occur. Ten radiocarbon dates on alluvial deposits from the lower Porcupine River range from greater than 35,000 to 2,350 yr B.P. When combined with geomorphic interpretations on terraces in Alaskan and in northern Yukon Territory, these dates...
A-136280
References.
ACU

The author delivered some background information on the state of hydrography in the Arctic by listing the Canadian Hydrographic Service's Arctic priorities and mentioned some of the methods by which they hope to accomplish their objectives. (AGT15)

A-136999
NSFMD

Strudel scours are craters as much as 20 m wide and 4 m deep, that are excavated by vertical drainage flow during the yearly spring flooding of vast reaches of fast ice surrounding arctic deltas; they form at a rate of about 2.5/square km/yr. Monitoring two such craters in the Beaufort Sea, we found that in relatively unimpacted areas they fill in by deposition from bedload in less than 3 years. In a 20-m-wide sector, an exposed strudel scour trapped 360 cubic m of bedload during two seasons; this infilling represents a bedload transport rate of 9 cubic m/yr/m. This rate should be applicable to a 4.5-km-wide zone with equal exposure and similar or shallower depth. Within this zone, the transport rate is 40,000 cubic m/yr, similar to estimated longshore transport rates on local barrier beaches. On the basis of the established rate of cut and fill, all the delta-front deposits should consist of strudel-scar fill. Vibracores typically show dipping interbedded sand and silts of organic material draped over very steep erosional contacts, and an absence of horizontal continuity of strata - criteria that should uniquely identify high-latitude deltaic deposits. Given a 2- to 3-year lifespan, most strudel scours seen in surveys must be old. The same holds true for ice gouges and other depressions not adjusted to summer waves and currents, although these features record events of only the past few years. In view of such high rates of bottom reworking of the shallow shelf, any human activities creating turbidity, such as dredging, would have little effect on the environment. However, huge amounts of transitory material trapped by long causeways planned for offshore development would result in major changes in the environment. (AU)

A-139041
ACU

Sixteen representative beaches along the southeastern Beaufort Sea are described and illustrated from the standpoint of morphology, erosion, and sediment transport. This is part of a larger fisheries research program (Department of Fisheries and the Oceans) which is designed to gain information on the sensitivity of these beaches to erosion and oil contamination. Detailed textural analysis on 46 beach samples reveals the undercutting action of waves on shore cliffs that are undergoing thermal desiccation and slumping; sediment is removed by the waves and transported easterly by oceanic longshore currents towards Amundsen Gulf or to local sediment sinks lying east or west of the beach source. A strong beach armour of coarse pebbles, cobbles, and a few boulders characterizes most beaches on the mainland. Beaches on the barrier islands are mainly sand. Removal of beach armour should be conducted in the Beaufort Sea. This activity, plus the anticipated follow-up exploitation phases, has created a high-priority requirement for accurate hydrographic surveys and charts of the area. Because of unique geomorphological characteristics of the ocean floor, an extensive review of existing depth measurement instrumentation and techniques has been undertaken. New systems and procedures are evolving, and an effort to achieve Soviet coverage of 'corridors' within the Beaufort Sea. This paper describes systems, procedures and survey results to date. (AU)

A-139032
ACU

Detailed study of glacial landforms has allowed a sequence of ice retreat maps to be produced for Wollaston Peninsula showing frontal and/or areal stagnation of full ice cover. Frontal retreat consists of a sequence of end moraine fragments and ice marginal outwash terraces and fans that can be traced across central Wollaston Peninsula. These features indicate that free drainage occurred to the west coast during this frontal retreat. Little evidence exists for damming of glacial meltwater. Areal stagnation produces large tracts of hummocky moraine when active ice became detached from extensive thin, cold-based, upland ice. ... The glacial landforms are arranged as a regular sequence representing an energy profile across a former ice stream. This arrangement of landforms supports the concept of complete ice cover for Wollaston Peninsula as do landform arrangements on the adjacent landmass to the south of Dolphin and Union Strait (Melville Hills). The till deposited by this latest glacial advance can be traced continuously across the upland on Wollaston Peninsula. Stratigraphic sections show only one transgressive regressive marine sequence that relates to this glacial advance. The 300 m end moraine ice limit previously proposed for Wollaston Peninsula represents an ice position ending in the sea well short of the full glacier cover. If this moraine represents the Late Wisconsinan limit, a second marine limit should be evident - a prediction that is not borne out by field studies. (AU)
prevented, and finer granular material should be removed with utmost precaution, particularly in those areas where replenishment is slow or perhaps where the loss cannot be replaced by wave action or longshore currents. (Au)

See Also: B-16194, B-38873, B-52682, B-67334, B-85332, B-118840, B-118867, B-120521, B-139007, C-57509, C-102614, C-122548, C-123682, C-126850, F-37850, F-121622, F-121630, G-6832, G-85227, H-112941, I-123242, I-135631, J-105889, Q-69264, Q-114650, Q-116157, Q-118206, Q-124192, Q-132535, R-89273, W-138177

B - GEOLOGY, MINERALOGY, GEOCHEMISTRY, AND PALEONTOLOGY

B-566
1 portfolio: ill., maps (fold.), plates, microfiches (in pocket); 28cm.
(Paper - Canada. Geological Survey, 77-33)
ISBN 0-660-01519-6
References.
ACU

This paper describes 333 lithologic units, 304 fossil facies, and locates 1571 geochemical samples. This is the second of three papers describing Lower Cambrian strata in the Mackenzie Mts. Most of the strata are located in the middle carbonate belt, a belt flanked on the northeast by an inner detrital belt and on the southwest by an outer detrital belt. Two grand cycles (clastic-carbonate pairs) recognized earlier in the strata are divided into half cycles and traced laterally into the present sections. Data from these sections, plus that from 10 previously described sections, are combined and interpreted in a facies distribution fence diagram. (Au)

B-3735
1 portfolio: tables, maps (part. fold. in pocket); 28cm.
(Paper - Canada. Geological Survey, 77-32)
ISBN 0-660-01530-7
References.
ACU

Airborne gamma radiation surveys are not easily correlated with published geological maps particularly in the swamplike, lake-ridden, glaciated terrain of the western Canadian Shield. This study shows how large volumes of airborne data can be displayed in a simple format which provides both mapping and exploration geologists with information not easily obtained from the original data. Eleven lines or part-lines from a gamma-ray survey of the Hearne Lake area were chosen as test lines, and airphotos were used to identify outcrops of each rock type and the distribution of overburden, swamp and water along each line. Geological maps were used to locate the test lines and to provide a listing of the rock types in the area. With this information, it was possible to calculate the average radioelement characteristics of each rock type and to group the rock signatures into a number of rock classes. Zones of anomalously high radioactivity often cross lithological boundaries and may be considered useful indicators for uranium exploration. ... (Au)

B-4510
Geophysical evaluation of granular material resources, Tuktoyaktuk Harbour, Northwest Territories / Hardy (R.M.) and Associates Limited. Canada. DIAND.
Prepared for Dept. of Indian Affairs and Northern Development.
ACU

This report outlines the results of a geophysical survey of Tuktoyaktuk Harbour, N.W.T., as requested by the Department of Indian Affairs and Northern Development (DIAND), and represents the second phase of a granular materials inventory conducted for the Tuktoyaktuk area. The first phase of the study encompassed an area within a 48 km (30 mile) radius of Tuktoyaktuk, and included an investigation of granular deposits on land, near shore and offshore. The geophysical survey provided bathymetric data, and subbottom profiles of near surface stratigraphy, representing lower and higher density materials. Maps of bathymetric contours and of low density material isopachs were prepared from the geophysical survey data. Based on a geologic assessment of the study area, it is assumed that the low density materials are silts and clays, while the higher density materials are sands and gravels. (Au)

B-4693
Structures induced by granite diapirs in the Archaean greenstone belt at Yellowknife, Canada / implications for Archaean geotectonics / Drury, S.A. [Edmonton, Alberta]: Boreal Institute for Northern Studies, [1977].
14 p.: maps; 24cm.
(Contributions - Alberta. University. Boreal Institute for Northern Studies, no. 48)
(Journal of geology, v. 85, no. 3, May 1977, p. 345-358)
References.
ACU

A sequence of major and intermediate scale folding episodes within a crustal superstructure of Archaean volcanics and sediments is related to various phases of rise and lateral expansion of large diapirc granitic plutons. As well as producing folds in the superstructure the evolution of these granitic masses imposed structural modifications upon one another. The movement of granitic diapirs occurred after the granites had crystallized. The dominant tectonic influence over the complex structural patterns of greenstones in the Slave Province is therefore suggested to have been vertical movements associated with granitic plutonism, rather than lateral forces. However, the dominant vertical tectonics of such Archaean greenstone/granite terrains may be related to much larger scale lateral deformation of relatively thin Archaean continental lithosphere. (Au)

B-6777
Toronto : Bird and Hale Ltd., [1978]. 208 leaves: ill., tables, maps; 28cm.
Cover title.
Prepared for the Dept. of Indian Affairs and Northern Development.
ACU
Nine potential granular deposits located two to four miles south of N.W.T. Highway No. 5 between miles 11 and 17, from the junction of Highway No. 2 and Highway No. 5, were investigated. This investigation involved the excavation of 67 test pits using a track-mounted 3/4 cubic yard backhoe. All field investigation was conducted during the winter months to avoid the severe access difficulties imposed by the surrounding muskeg conditions. However, the existence of heavy frost in a surficial strata of bouldery granular material prevented excavation of some test pits, particularly in the Mile 17 south deposits. This hindered accurate determination of aggregate quality and quantity in some areas. Preliminary laboratory analyses was conducted on all of the granular samples in our Hay River field laboratory. These analyses involved dry sieve analysis and visual examination, for the selection of representative or unique samples which were sent to Toronto for further analyses. Petrographic and wet sieve analyses were conducted on all of the samples that were subsequently sent to Toronto. In addition, organic impurity determinations were conducted on those samples that exhibited potential for use in cement mortar or concrete. (Au)

B-14370
References.
ACU
The stratigraphy and structure of the Summit Lake area in Nahanni map area ... has been outlined previously .... This report presents additional information and modifications of the stratigraphy, and a stratigraphic cross-section from Mackenzie Mountains southwesterly into Selwyn Basin ... (Au)

B-14435
ACU
... In the Mazenod-Faber lakes area of the Martan River map area a belt of dacite-trachydacite ash flow tuffs with intercalated dacite flows and mudstone was outlined, along with masses of subvolcanic dacite to rhyodacite porphyry intrusions that are the intrusive equivalents of the ash flows. Younger plutonic rocks are described and their mode of intrusion suggested. In the Riviere Grandin area the stratigraphy of two sequences of volcanic and sedimentary rocks is outlined. A major unconformity at the base of the Hottah Lake sequence was mapped and the extent of the basement beneath the unconformity was defined. ... (Au)

B-15385
ACU
Four grebe fossils of presumed late Pleistocene age are reported from the Old Crow Basin. They include one Red-necked Grebe (Podiceps grisegena), two Horned Grebes (Podiceps auritus) and an unidentified grebe (Podicaps sp.). Three of the specimens have a minimum age of approximately 10700 years BP. (Au)

B-16195
References.
ACU
The book is divided into three parts: Part A is concerned with establishing a regional geological background; Part B includes descriptions of the geology at each locality to be visited; Part C is a collection of articles of geographic and economic interest. ... (Au)

B-16365
References.

ACU

The main showing on the prospect is structurally controlled and occurs in siliceous dolostone near the top of the folded and faulted Coppercap Formation, directly beneath an unconformity separating two local members of the Sayuniel Formation (Rapitan Group). The copper was emplaced in tectonically fractured dolostone, precipitated from solutions that may have descended from copper-bearing conglomerates in the Sapfilm Group above the unconformity, or ascended from weakly mineralized carbonates below. ... (Au)

B-16390
Precambrian biota from the Little Dal Group, Mackenzie Mountains, northwestern Canada / Hofmann, H.J.; Aitken, J.D. (Canadian journal of earth sciences, v. 16, no. 1, Jan. 1979, p. 150-166, ill., figures) References. ACU

Well preserved Precambrian algal microfossils and megafossils have been recovered in the northern Mackenzie Mountains from several levels and localities in a basinal, limestone-dominated rhythmite formation of the Little Dal Group. The microbiota includes the filaments Archaeotrichium, Taenium, and Siphonophycus, and the sphaeromorph acritarchs Kildinella, Trachysphaeridium, Nucellopsphaeridium, and Chuaria circularis. ... (Au)

B-16411

In the Sekwl Formation, carbonate breccia beds interbedded with slope sediments are interpreted as submarine sediment gravity flows that formed a two-layer deposit during a single transport event. They are intermediate between true slump and turbidites and may initiate by slumping down the continental slope and rise. Textural characteristics of the deposits are a function of downslope transport distance. ... (Au)

B-16810
Geology and petrochemistry of lower Achebian (2.4-2.0 Ga) alkaline plutonic and hypabyssal rocks in the East Arm of Great Slave Lake, Northwest Territories / Badham, J.P.N. (Canadian journal of earth sciences, v. 16, no. 1, Jan. 1979, p. 60-72, figures, tables) References. ACU

Two alkaline igneous complexes and three lines of dikes formed breccias were emplaced in the East Arm of Great Slave Lake during the lower Proterozoic. ... One of the intrusions, the Easter Island dyke, was rotated subsequent to emplacement such that both top and bottom are now exposed. Field and petrographic data are indicative of progressive differentiation along (i.e., up) a subduction zone in the continental slope and rise. The differentiation history of the early gabbros of the Blechford Lake complex is similar. ... (Au)

B-20249

Yorath and Norris (1975) have made considerable use of geophysical data to support their ideas concerning the extension of the structural and stratigraphic framework of the Mackenzie Delta region onto the adjacent continental shelf. The present writer is of the opinion that insufficient attention has been given to the inherent ambiguity of the geophysical data. ... The following comments regarding the interpretation of the gravity, magnetic, and seismic data are made with the intention of providing different avenues of thought for the reader ... (Au)

B-21245

... The purpose of the drilling and sampling program was to determine the nature and characteristics of the sea bottom sediments, and to assess their general suitability for support of offshore oil drilling platforms and construction of artificial islands. The description and classification of the sea bottom sediments encountered during the investigation program are presented, together with the results of field and laboratory testing. The sea bottom sediments west of Kugmallit Bay consist essentially of clay and silt. The bottom sediments located east of Kugmallit Bay consist essentially of fine to medium sand. Relic permafrost was encountered in some of the exploratory holes at depths ranging from 20 ft. to 70 ft. below the sea bed. The significance of the permafrost relative to the support of artificial islands and offshore drilling platforms is discussed. ... (Au)

B-21253
Geological sampling and analytical program - Beaufort Sea / Lerand, M.M. (Calgary : Distributed by APUAI, 1971. 4 microfiches : 11x16cm. (APOA project no. 4 : Geological analysis of ocean floor samples. Report, no. 1) Appendices. ACU, NFSMO

The project consisted of studies of the palynology, micropaleontology, organic geochemistry, mineralogy and sedimentology of the sea bottom soil samples obtained at eleven locations in the Beaufort Sea during AP0A Project 3. ... (Au)

B-21610
Rare-earth and other trace element data bearing on the origin of Archaean granitic rocks from Yellowknife, Northwest Territories / Drury, S.A. (Canadian journal of earth sciences, v. 16, no. 4, Apr. 1979, p. 809-815. Figures, table)
References

ACU

Trace element data, including rare-earth elements, for six granitic rocks and two metasediments from the Archaean granite-greenstone terrains of Yellowknife, Northwest Territories are presented. Three granodiorites from the synkinematic Western and South-eastern Slave province show similar Rb/Sr, Th/Rb, and K/Rb to many high level granodiorites, but are enriched in Ba. Their rare-earth element (REE) patterns show enrichment of light REE relative to heavy REE, and lack Eu anomalies. These features, together with Sr isotope data, are compatible with their origin by partial melting of mantle depth garnet-bearing basaltic source rocks, and little if any detectable fraction of the rising magma. ...(Au)

B-24546

Gravel inventory survey, Richards Island and adjacent areas / Mollard (J.D.) and Associates Limited.

[Calgary : Distributed by APOA, 1972].
3 microfiches: figures, maps, tables; 11x16cm.

(APOA project no. 42: Mackenzie Delta gravel inventory. Report)

ACU, NFBMO

The proposed study includes a review of all available pertinent geological reports and maps, including relevant GSC data; to obtain: 1. Best estimates of probable quantities of minerals in evidence of field drilling and testing; 2. Appraisal of quality of materials from a commercial-use standpoint; 3. Discussion of problems of development along with alternative methods of development; 4. Location of places to field test and suggestions for procedures for field testing. (Au)

B-26018

A trilobite zonation of Middle Ordovician rocks, southwestern District of Mackenzie / Ludvigsen, R.

98p. : ill., figures : 28cm.

(Bulletin - Canada. Geological Survey, 312)

ACU


Appendices.

Bibliography: p.48-52

ACU

The upper Sunblood, Esbataottine, and lower Whittaker Formations in the southern Mackenzie Mountains, southwestern District of Mackenzie, have yielded many collections of well preserved silicified trilobites of Middle Ordovician age (Chazyan to Shermanian/Eodien; late Llanvirnian to late Caradocian). Based on occurrences of 41 species of bryohurid, cheirurid, and encrinurid trilobites and on presumed phylogenetic relationships among six species of Bathyrurus, eight species of Caeluraunnella, and eight species of Caelurus (and Whittakertes), a sequence of nine assemblage zones is established. This is the first macrofaunal zonation of the Middle Ordovician interval in western North America. ... Twenty new species are described. ...(Au)

B-28521

Mesozoic and Tertiary geology of Banks Island, Arctic Canada: the history of an unstable craton margin / Miall, A.D.

1 portfolio : ill. (part. fold. in pocket), maps, photos. ; 29cm.

(Memoir - Canada. Geological Survey, 387)


ACU

More than 80 per cent of the surface area of Banks Island is underlain by Mesozoic and Tertiary rocks, the maximum thickness of which probably does not exceed 3000 m (10,000 ft). ... gravity and subsurface data show that the basin is divisible into a series of structural lows and highs, including Banks Basin, Big River Basin, Cardwell Basin and Storkerson Uplift. These structural elements have been in existence at least since the Early Cretaceous, as shown by facies and palaeocurrent trends. ...(Au)

B-34371

Metasedimentary cordierite-gedrite rocks of archean age near Yellowknife, Canada / Kaminiemi, D.C.

(Precambrian research, v. 9, 1979, p. 289-301.
111., figures, tables)

References.

ACU

Archean metasedimentary rocks near Yellowknife comprising metagreywacke and meta-argillite, form broad aureoles around granite plutons. Cordierite-gedrite greywackes constitute an important metamorphic horizon within the aureoles. The chemical composition of the cordierite-gedrite greywackes, from Yellowknife compare well with greywackes reported from other localities. The cordierite-gedrite rocks and rocks free of these minerals have slight compositional differences which are thought to be of sedimentary origin and are the main controlling factors in the formation of coexisting gedrite and cordierite. (Au)

B-38873

Pleistocene mammals of the Yukon Territory / Harington, C.R.


(Canadian theses on microfiche, no. 34359)


Appendices.

Bibliography: p.988-1051

ACU

This study is based on a collection of approximately 14,000 Pleistocene vertebrate fossils ... Most of the ice age mammal material described has come from the Dawson and Old Crow areas ... Ten orders, 19 families, 44 genera and 64 species of mammals have been identified. ... Approximately 40% of the species which occupied the Yukon during the ice age are extinct, and about 60% no longer occur in the region. ... An estimated 75% of the species (mainly cold-adapted) were derived from Eurasia or Beringia, while 25% (mainly dry, scrub grassland species) seem to have been derived from southern North America. ... (Au)

B-38938

The age and orthid fauna of the lower Whittaker Formation, in the southern Mackenzie Mountains, Northwest Territories / Wigington, R.J.S.


(Canadian theses on microfiche, no. 36337)


Appendices.

Bibliography: p.102-106

ACU

The lower Whittaker Formation (Ordovician) contains an abundant and silicified brachiopod fauna, the study of a portion (the Order...
Ortital) of which is the purpose of this
thesis. A taxonomic study of the orthids was undertaken. The Lower Whittaker
Formation, which has yielded 12 genera and 28
species of orthids, shares a number of taxa in
common with several well studied Late
Ordovician faunas in several parts of mid and
western North America. Twenty-eight species of orthids are described, of which nine are
new. (Au)

B-39420
The Imperial formation, northeastern Mackenzie
Mountains, N.W.T. / Robb, P.F. Edmonton
Western Microfilm, 1960. 1 microfilm reel : ill., maps, photos. : 35mm,
Appendices.
Bibliography: p. 41-44.

Provenance, depositional environment and
paleoecology of the Imperial formation were
determined by means of a petrological and
detrital study of four sections in the
northeastern Mackenzie Range. The
Imperial Formation is entirely marine and was
deposited in a warm, shallow sea. Terrestrial
organic material indicates the presence of land
at some intermediate distance to the west or
northwest. (Au)

B-39730
Lower Cretaceous and Jurassic rocks of McDougall
Pass area and some adjacent areas of
north-central Richardson Mountains, northern
Yukon Territory and northwestern District of
Mackenzie, N.W.T. (NTS-116P/9 and 116P/10) : a
reappraisal / Jeletzky, J.A.
35p. : ill., figures (1 fold in pocket), maps,
photos. : 28cm.
(Paper - Canada. Geological Survey, 78-22)
References.

ACU
Jurassic and Lower Cretaceous rocks of the
McDougall Pass area of north-central Richardson
Mountains include (ascending order): a. The 70
to 100 m thick, shallow marine Bug Creek
Sandstone of mid-Bajocian to early Callovian age. b. Mid-Callovian to Barremian
Twitya Formation which is largely argillaceous
in the northeastern part of the area. In the
southwest the Husky is largely arenaceous
. . . c. The Late Hauterivian to Late Barremian
Upper shale-siltstone division overlaps the
Husky Formation disconformably and probably
regionally discordantly. The normally
interlayering lower sandstone and Coal-bearing
divisions are absent by nondeposition. The area
evidently formed part of strongly uplifted
cretal zone of the Rat Uplift of Aklavik Arch
from the early Valanginian to mid-Hauterivian...
. d. Only small, 15.5 to 100 m thick
depositional remnants of the Upper sandstone
division occur in the McDougall Pass area.
These shallow marine rocks do not exhibit major
facies changes anywhere in north-central
Richardson Mountains. Therefore the whole area
must have remained tectonically inactive in the
early Aptian. (Au)

B-39934
The Lower Cretaceous Atkinson Point Formation (new
name) on the Tyktuyatuk Peninsula, N.W.T.: a
coastal fan-delta to marine sequence / Dixon, J.
(Bulletin of Canadian petroleum geology, v. 27, no. 3, June 1979, p. 163-192, ill., figures)
Appendix.
References.

ACU

The Aptian to Lower Albian conglomerate and
sandstone of the Atkinson Point Formation (new
name) were deposited over a limited area on the
northwest flank of the Aklavik Arch. An initial
regressive depositional phase produced
conglomerate-sandstone cycles of braided-stream
origin. . . An uppermost braided-stream
terminating braided-stream deposition and marine
sandstone rapidly overlapped and overstepped
earlier deposits. The area of limited distribution of the conglomerate-sandstone
cycles, their braided-stream origin, the local
source of the conglomerate clasts, and regional
palaeogeographic trends point to an origin of the
cycles on a fan-delta grading laterally
into a marine environment. (Au)

B-40282
Fold fabrics and emplacement of an Archean
granitoid pluton, Cleft Lake, Northwest
Territories / Fyson, W.K.
(Canadian Journal of Earth Sciences, v. 17, no.
3, Mar. 1980, p. 325-332, ill., figures)
References.

ACU
The axial-plane foliation of early-phase folds in
calcareous-wacke is commonly obliterated by a
secondary, regional, crenulation cleavage or schistosity and quartz segregation layering.
Nevertheless, remnants are preserved as quartz
inclusion trails in biotite porphyroblasts. . .
Evidently the trails reflect trends existing
before emplacement of the pluton. Later
regional compression across the secondary
cleavage apparently deflected folds around the
pluton and thus displaced the porphyroblasts.
These, however, were "locked" in orientation by
the cleavage forming by a process of quartz
diffusion. In a 10 square km area near the
pluton, the secondary cleavage is less
pronounced and dips at shallower angles than
elsewhere. This suggests a modification to the
regional strain such as expected above a
satellite pluton rising during formation of the
cleavage. (Au)

B-40436
Re-definition and subdivision of the Rapitan
Group, Mackenzie Mountains / Elsbacher, G.H.
ISBN 0-660-01523-4
References.

ACU
The Proterozoic Rapitan Group of the Mackenzie
Mountains has been subdivided into four
formations, from bottom to top as follows:
Sayunei, Shezal, Tiktya, and Keele. The Keele
Formation has been included in the redefined
Rapitan Group because of a gradual transition
between the Tiktya Formation and facies
variations of the Keele Formation. Thickness
changes, facies patterns, and sedimentary
environments suggest that the basal Sayunei
Formation was deposited in fault controlled
basins. It consists of maroon or green
siltstone and argillite and is interbedded with
sharpplast-siltstones shed from tectonic
scars. The Shezal Formation consists of
glacial-marine diamicrites deposited in a
relatively shallow marine environment. The
Tiktya Formation is composed of shale and
sandstone laid down on an unstable prograding
shelf. The Keele Formation is a varied
assemblage of cycles of carbonates and clastics
which was deposited on shallow-water banks. It
grades laterally into deeper-water facies
comprising mass-flow deposits. The role of
contemporaneous faulting during the initial
stages of Rapitan deposition is significant in the
appraisal of stratabound copper and iron
deposits of the Mackenzie Mountains. (Au)
B-45300

The upper part of the Bear Rock, the Funeral and the lower part of the Hume Formations are described using information obtained from a study of the Dahadinni M-43A well. Paleontological and stratigraphic evidence suggests that these formations range from lower to Middle Devonian. In the Dahadinni well, the lower part of the Hume Formation and the upper part of the Funeral Formation are duplicated by a fault. The presence of several fractured zones and steeply to vertical dipping intervals in the Bear Rock Formation and the anomalously thick section of the Evaporitic member in the well suggest that the lower part of the Bear Rock Formation is repeated by folding or faulting. ... (Au)

B-45375

Coral faunas from 254.9-345.4 m above the base of the type section of the Ogilvie Formation on Mount Burgess, and from parts of other Ogilvie sections, are shown to be equivalent to late Eifelian coral faunas of the Hume Formation of western district of Mackenzie, and its correlatives in southwestern District of Mackenzie and northeastern British Columbia. ... (Au)

B-45713

The East Arm, Great Slave Lake, is the site of a Proterozoic elastic wedge over 15 km in thickness. The wedge contains five major volcanic sequences which have not been previously examined in detail. The present study attempts to detail the petrology and chemistry of the lavas in order to test and elaborate on the current interpretation of the East Arm as the failed arm of a triple-rift system. ... (Au)

B-45842

The Upper Proterozoic Rapitan Group in Mackenzie Mountains is a dominantly glacial-marine and marine clastic succession totalling nearly 2,700 m. Its basal contact is a regionally significant unconformity. In addition to its unusual stratigraphic characteristics, the Rapitan includes extensive hematitic iron deposits, probably the largest in North America outside the Lake Superior region. It is suggested that the iron was precipitated from iron-enriched sea-water under glacial-marine influence. (Au)

B-45921

Lower Cambrian units and the Sekwil Formation exposed in the central and western Mackenzie Mountains, can be described in terms of five major depositional regimes. (1) Slope Deposits ... (2) Oolite Shoal Deposits ... (3) Clastic Deposits ... (4) Shallow Subtidal/Intertidal Deposits ... (5) Tidal Flat Deposits ... Detailed examination of 22 stratigraphic sections, covering an area of 60,000 square km, indicates that in a transit towards the west the five major lithofacies are representative of a coastal plain to continental shelf to continental rise sedimentary sequence formed on a gently subsiding trailing edge structure. ... Mineralization of the Sekwil Formation, in the sections examined is not extensive and, with the exception of late stage dolomitization, is not consistently related to any specific depositional, diagenetic or structural features. (Au)
A 1200 Ma old microflora is well preserved in black shales of the Dismal Lakes Group about 120 km southwest of Coppermine. These shales appear to have formed by a combination of early diageneric silification of calcareous layers and permineralization of non-calcareous layers deposited in a very shallow subtidal or lower intertidal setting on a carbonate platform. The preserved assemblage is largely or entirely of cyanophytic affinity with coccolid forms dominantly in filamentous forms. Many elements of this microflora are morphologically similar to the 1900 Ma old Belcher Islands assemblage and 850 Ma old Bitter Springs assemblage. (au)

B-49840


ACU

The taxonomy and biostratigraphy of pollen, spore, dinoflagellate and acritarch assemblages for the Blush grey shale unit (lower to middle Valanginian) of the Lower sandstone division are described from two outcrops at the northern end of the Richardson Mountains, west of Aklavik, District of Mackenzie. Fifty-five species of pollen and spores and forty-eight species of dinoflagellates and acritarchs are recognized. (au)

B-49880


ACU

Three vein systems with distinct geometry and time relations are located within major ductile shear zones at Yellowknife. En echelon arrays of centimetre width quartz veins initiated at ~45 deg. to the shear zone boundaries and normal to the schistosity during initial translation on the structure. Gold-bearing quartz veins of metre dimensions are disposed parallel to the schistosity, cross cutting early veins. This geometry requires the stress regime to switch from the former orientation such that the maximum principal stress is parallel to the schistosity, and the effective stress normal to the schistosity is tensile. The change of stress orientation is attributed to transient high fluid pressure which generated hydraulic fracturing and correspondingly high values of permeability. Under these conditions the shear zones act as conduits for massive fluid discharge: quartz and gold were precipitated from solutions cooling along the temperature-liquor (T/P) gradient. Late stage lenticular gold-bearing quartz veins of metre dimensions were emplaced as vertical arrays within the shear zones, oriented normal to schistosity. These tension fractures formed when the stress regime reverted to the ambient conditions for stage i veining during a second episode of displacement on the shear zones. (au)
ACU

The morphology and ultrastructure of the Devonian megaspore Nidkitinsporites canadensis is described. The probable function of the sporoderm appendages is discussed, and the systematic affinities of the taxon reviewed. (Au)

B-50528

Wenlockian graptolite reference section, Clearwater Creek, Nahanni National Park, Northwest Territories, Canada / Lenz, A.C. (Canadian journal of earth sciences, v. 17, no. 8, Aug. 1980, p.1075-1086, ill., plates) References. ACU

A sequence of 20 m of Wenlockian graptolite-bearing strata is described from southern Northwest Territories. The sequence is relatively rich in graptolites and represents the best Wenlockian graptolite interval yet known in the Canadian Cordillera, even though the fauna is notably lacking in many of the typical Wenlockian species. (Au)

B-51063


Uranium, thorium and potassium show parallel trends of geochemical enrichment in a differentiated dyke exposed on the Simpson Islands, in Great Slave Lake, Northwest Territories, Canada. The correlation coefficient between U and K2O is +0.985. The proposed petrogenetic scheme includes partial melting (5% or less) of upper mantle, gravitational differentiation of the melt within the upper mantle and progressive intrusions of mafic to felsic fractions into a dilational fracture related to the rifting of the Atapawaski aulacogen 2200 m.y. years ago. (Au)

B-51497


Parallellism is demonstrated between the arcuate structure of the Mackenzie Mountains and certain elements in the deformed pile of sedimentary rocks. The data suggest that the configuration of the northeastern flank of the Proterozoic basin(a), established during the Helikian, preordained the arcuate form of the Mackenzie Mountains. (Au)

B-52540


An assemblage of filamentous microfossils is preserved in black shales of the approximately 1.2 Ga old Dismal Lakes Group from a locality about 110 km west-southwest of Coppermine.

Northwest Territories, Canada. These microfossils occur as empty, 1-13 mm wide, tubular structures which are compressed parallel to lamination. This shale facies assemblage appears to consist entirely of organisms that had relatively thick wrinkles which were highly resistant to degradation and diagenetic alteration. The microfossil assemblage, as well as other Proterozoic shale-facies assemblages, probably are biased toward degradation-resistant taxa and may not be representative of the original microbial communities from which they were derived, nor of the Proterozoic biosphere. Nevertheless, such microfossils offer promise for intercontinental biostratigraphic correlation and provide data useful in understanding the evolution of Precambrian life. (Au)

B-52574

Pleistocene peccary, Platygonus compressus Le Conte, from Yukon Territory, Canada / Beebe, B.F. (Canadian journal of earth sciences, v. 17, no. 9, Sept. 1980, p.1204-1205, ill.) (NYRP contribution, no. 20) References. ACU

A fragmented radius of a late Pleistocene peccary, Platygonus compressus Le Conte, has been recovered near Old Crow, Yukon Territory, Canada. The known northern limit of P. compressus is thus extended approximately 3000 km, from the northeastern United States to north of the Arctic Circle in Pleistocene Beringia, and confirms the cold tolerance of the species. The small size of the specimen supports a theory that small size in P. compressus is correlated with periglacial environment. Although the age of the specimen is uncertain, a mid-Wisconsin age is inferred on the basis of availability of a route of dispersal to Beringia and paleoecological evidence which suggest a largely treeless tundra dominated by sedges and grasses, but with a rich herb component. (Au)

B-52582


Field observation along the Coppermine River valley has revealed extensive deposits related to the presence of a major lake in late-glacial time. Numerous deltas define a water level at approximately 360 m above sea level (asl). It is proposed that this former lake be called Glacial Lake Coppermine. Air-photo interpretation indicates that the valley was dammed by a glacial lobe covering the lowlands north of Coppermine Mountains and Dismal Lakes. During a high phase, the lake drained westward through the Dismal Lakes system to a high-level Great Bear Lake. Organic material, found in sediments infilling a river channel cut into deltaic sediments resting on top of a thick varve sequence, has yielded two C-14 dates: 8400+-80 (GSC-2959) on wood at the base of the channel and 3210+-60 (GSC-2998) on peat at the top of the fill. (Au)

B-52688


An assemblage of filamentous microfossils is preserved in black shales of the approximately 1.2 Ga old Dismal Lakes Group from a locality about 110 km west-southwest of Coppermine.
Organic geochemical analyses have been carried out on samples of the Boundary Creek Formation shale in order to determine its petroleum source potential. Solvent extraction, gas chromatographic analysis, total organic carbon analysis and elemental analysis of the kerogen indicate that this formation is an excellent potential hydrocarbon source rock in regions where it has been subjected to moderate thermal alteration and has, in fact, been the source for oils recovered from three different boreholes in the basin. (Au)

B-52876

ACU

Wells drilled in 1977 from drillships moored in the Canadian Beaufort Sea encountered Tertiary oil- and gas-bearing sands in large syn-sedimentary growth structures within the Rheimann-Mackenzie sedimentary basin. The Beaufort-Mackenzie sedimentary basin contains a thickness of more than 8 km of Tertiary and possible Upper Cretaceous clastic sediments. The Beaufort-Mackenzie basin lies at the junction of the Canada Basin and the continental margins of Alaska and northern Canada. It is believed to have formed as a result of major displacements of faults separating these crustal elements, in conjunction with strike-slip fault movements along the Canadian Cordillera and sea-floor spreading about the Alpha Ridge. (Au)

B-52884

ACU

A detailed petrographic study of the organic material of the Upper Cretaceous Boundary Creek Formation has been used to establish a general picture of a) its depositional environment, b) variation in the type of organic material present, and c) its petroleum source potential. It contains the types and quantities of organic material that would make it an excellent source rock. However, it has not yet been sampled in an area where it is thermally mature enough to realize its full oil-generating potential. (Au)

B-57827

ACU

A gravity map compiled from observations made on the frozen surface of Great Slave Lake shows that the positive gravity anomaly associated with the Yellowknife greenstone belt extends offshore into the North Arm of the lake. Using the geology and rock density determinations on land for control, a three-dimensional geological model comprising a large number of prismatic blocks was derived from the gravity anomalies. According to the model, mafic volcanic rocks of the Kam Formation are generally 3-5 km thick with a maximum thickness of 7 km at the mouth of Yellowknife Bay. Greywacke and mudstone of the Burwash Formation vary in thickness from 1 to 3 km. The presence of granodiorite flanking the belt to the southwest is also inferred from the gravity data. Previous seismic work indicated a greenstone basin with an average thickness of about 10 km. However, reexamination of the seismic records suggests that weak arrivals interpreted as originating from the base of the greenstone belt are more likely to be pulses associated with earlier arrivals. (Au)

B-57851

ACU

Dating of "spilitic" basalts from the Proterozoic Seton formation by the Pb/Pb method yields an age of 1804 ± 23 Ma(±2 sigma). In excellent agreement with Rb-Sr data on the same rocks, when the latter ages are calculated with currently accepted decay constants. It seems unlikely that spilitization could have reset both the Rb-Sr and Pb/Pb systems to yield exactly the same ages with no geologic scatter about the isochrons in either case, and therefore, it may be that the isochron represent the true age of deposition of the lavas. (Au)

B-57860

ACU

Ten Pleistocene fossils represent loons of the species Gavia stellata, Gavia arctica, Gavia immer, and Gavia cf. adamsii are reported from the Old Crow Basin in the northern Yukon Territory, an area which is presently outside the range of G. stellata. Two specimens of G. arctica is from beds that correlate to beds dating >54,000 years BP and are presumed to be of Sangamon interglacial age. Two specimens of G. stellata and one of G. cf. adamsii have minimum dates of about 10,700 years BP. (Au)

B-58068

ACU

Collections of fossil trilobites, ostracods, bryozoa, and conodonts from Chazyan and Blackriveran strate of the southern Mackenzie Mountains are analyzed in an attempt to define biofacies. In terms of areal extent and faunal composition, 0-mode and 2-mode cluster analyses, using Jaccard's coefficient and the unweighted pair-group method of clustering, are employed to delineate five biofacies. The interpretation of sedimentological features and composition of faunal assemblages shows that one nearshore biofacies, three progressively deeper shelf biofacies, and one continental slope biofacies are represented. A plot of biofacies succession through time in each measured section provides added support for the
biofacies interpretations. (Au)

B-58076
References. ACU

Results are reported from 120 oriented samples collected from 40 stratigraphic horizons spanning the Aklitcho River Formation of the Great Slave Supergroup. Thermal demagnetization experiments reveal the presence of multiphase remanence. Difference vectors indicate that the lower blocking temperatures carry a magnetic component attributable to the present field. The remanence remaining above 500-600 deg. C defines two polarity groups, but the two groups are not exactly antiparallel. This is interpreted in terms of a previously recognised widespread magnetic overprint acquired during uplift of the Coronation Belt. A Geysyncline. A statistical procedure is employed to remove this overprint and obtain a best estimate of the original magnetization, which corresponds to a paleomagnetic pole on the western limb of the Coronation loop . . . . (Au)

B-58629
References. ACU

The Fort Smith Belt is an elongate zone, about 200 km x 50 km, extending from the East Arm of Great Slave Lake to northeastern Alberta. The major feature of the belt is that it is one of the most radioactive regions so far recognized in the Canadian Shield. . . . The second characteristic feature . . . is the development of a peripheral zone where U is enriched relative to Th . . . . The radioactive granitoids rocks of the Fort Smith Belt are adjacent to uranium-thorium occurrences in the nearby Proterozoic Nonacho sediments but whether or not a genetic relationship exists between the two situations is uncertain. (Au)

B-58688
References. ACU

The results of isotopic analyses on 12 whole rock samples ranging in composition from diorite to granodiorite are given . . . . Eleven sample points are collinear defining an isochron of age 2472 ± 31 Ma, initial Sr/Sr 87/86 = 0.7036 ± 0.0014 and MSWD 1.37. Samples in the rock units all fall on the isochron within experimental error except for sample number 8, one of three samples analyzed from the foliated granodiorite/tonalite/diorite unit . . . . We conclude from these results that we are unable to discriminate between the times of emplacement of these three bodies using the Rb-Sr whole rock approach and that the best age for the bodies sampled is the combined eleven point isochron age previously detailed. The results of sample number 8 document at least one location where the isotopic system has been disturbed. . . . (Au)

B-58700
References. ACU

The results of isotopic analyses on twelve whole rock samples and two mineral separates from the Wilson Island Group volcanics are given in Table 2 . . . Localities are listed in Table 3 . . . The initial Sr/Sr 87/86 ratio for the isochron of 0.7048 ± 0.0008 is somewhat higher than would be expected for rocks derived directly from the mantle at that time, indicating a secondary isotopic equilibration. The isotopic results for six samples of Wilson Island Group sandstone, presented in Table 1, do not form an isochron and are plotted in Figure 3 for comparison with the isochron obtained on the volcanics. (Au)

B-58718
References. ACU

. . . presents the results of isotopic analyses on ten whole rock samples from the Cotterill Lake granites, which were collected in 1973 . . . Nine of the resultant sample points are collinear and yield a Rb-Sr isochron of age 2932 ± 126 Ma, initial Sr/Sr 87/86 = 0.7027 ± 0.0019 and MSWD 1.16, which is shown on an isochron diagram . . . Sample point number 10 falls somewhat below the line defined by the other nine samples. (Au)

B-58854
References. ACU

Conodonts have been recovered from two sections through the Cambrian-Ordovician boundary beds of the upper Rabbitkettle Formation, near the headwaters of the Broken Skull River, western Mackenzie Mountains . . . . data suggest that lithofacies associations and biofacies developments in conodont distribution may prohibit detailed conodont-based correlations of Cambrian-Ordovician boundary beds. (Au)

B-60160
References. ACU, NPSMO

Baseline levels of the chemical carcinogen benzo(a)pyrene were measured in arctic sediments. Levels were highest in samples from the Mackenzie River delta and adjacent areas of the Beaufort Sea. The distribution of carcinogen did not correspond to the location of inhabited areas - a natural rather than a man-made source for polycyclic aromatic hydrocarbons in arctic sediments is indicated.
B-60178
Radionuclide dates on some Quaternary mammals and artifacts from northern North America /
References.
ACU, NSM
Nine radionuclide dates on five genera of Quaternary mammals from northern North America are discussed. Of particular interest are: (a) a 29,000-year-old artifact from the Yukon Territory; (b) the first evidence that steppe mammoths ... occupied eastern Beringia during the peak of the Wisconsin glaciation; (c) dates indicating that salmon anthropods... and Yukon short-faced bears ... occupied the Yukon-Alaska region in mid-Wisconsin time; (d) dates indicating that bisons... lived near the arctic coast of the Northwest Territories, and tundra muskoxen ... lived in the western Yukon in late postglacial time; and (e) dates suggesting that tundra muskoxen have occupied the central Canadian Arctic Islands for the last 7000 years. (Au)

B-60281
Lithostratigraphic and hydrogeochemistry of uranium and associated elements in the Tombstone Batholith, Yukon, Canada / Olade, M.A.
References.
ACU
...As part of a uranium reconnaissance program, a geochemical study of the batholith was undertaken utilizing rocks, stream sediments and waters to investigate physical and chemical processes affecting primary and secondary dispersions in an alpine glaciated, high latitude environment in the northern Canadian Cordillera. ... (Au)

B-62103
References.
ACU
The discussion and reply generated by the original article by Altkin, Ruelle, and Cook revolve around the important regional implications of the "anomalous" geologic relationships at the Nite prospect, and differ in interpretation. The first article supports the interpretation that the Nite prospect records a transfer of thrust displacement from a bedding-plane location beneath or possibly low within the Coppercap Formation to a bedding-plane location low in the Sayanul. The second article discusses alternate mechanisms for the Nite folds, "such as slumping or transfer of thrust displacement during Laramide deformation." (ASTIS)

B-62111
References.
ACU
Results are reported from 59 stratigraphic horizons spanning an aggregate of some 2000 m of sedimentary rocks of the Great Slave Supergroup, mostly located in the Kahochella Group. Partial demagnetization experiments and vector differences indicate that the magnetization involved is multicomponent, with a well-defined overprint masking an underlying magnetic component. The overprint has now been recognized in many formations of the Great Slave Supergroup and is interpreted as having been acquired in response to uplift and cooling following orogeny in the Coronation Geosyncline. It corresponds to a paleomagnetic pole ... Removal of the overprint reveals the underlying, presumed primary, magnetization ... The ages of these poles cannot be fixed precisely, but the available data suggest that the "primary" remanence was acquired about 1.8 Ga, and the overprint about 1.7 Ga. The two poles thus help define the Precambrian polar wander curve for Laurentia. In particular they help define the so-called Coronation loop, which reflects the response of Laurentia to the major orogeny in the Coronation Geosyncline. (Au)

B-64254
ACU
The organic fraction of a set of borehole drill cuttings and core samples representing fluvio-deltaic, delta front and prodelta marine environments of deposition from the Upper Cretaceous-Tertiary of the Beaufort-Mackenzie Basin in northern Canada has been subjected to organic carbon analysis; extraction with benzene/methanol; open-column chromatographic fractionation into saturates and resins, gas chromatographic analysis of the saturate fraction including quantification of the n-alkanes and isoprenoids; and kerogen isolation. Implications of this study are: (1) The classical petroleum generation sequence of heavy oil, oil, condensate and gas with increasing thermal alteration must be modified to include an early stage of condensate generation. (2) Organic facies do not necessarily correspond with sedimentary facies or depositional environments, and therefore, the delta plain sandstone reservoirs of this basin are as likely to be juxtaposed with a source rock as are the delta front sands. (Au)

B-64645
The Early to Middle Devonian Bear Rock Formation in the type section and in other surface sections, District of Mackenzie / Morrow, D.W. Weijer-Drees, N.C. (Paper - Canada. Geological Survey. 81-1A. 107-114, figures, tables)
References.
ACU
Exposures of the Devonian Bear Rock Formation in the Franklin Mountains, including the type section at Bear Rock near Fort Norman, that
were examined during Operation Canol, have been re-examined in more detail. The Bear Rock Formation at the type section is composed of a lower brecciated interval 154.0 m thick and an upper, incompletely exposed interval of bedded, nonbrecciated and unfossiliferous limestone. An intermediate stage in the solution-collapse origin of the Bear Rock breccias was observed north of Great Bear River where mosaic breccias of angular grayish brown dolomite fragments are cemented with coarsely crystalline white gypsum. A new threefold classification of breccia fabrics developed for this study aided in the description of the Bear Rock breccia. (Au)

B-64653

In 1978 the writer assisted S.P. Gordey on Operation Nahanni by measuring and describing a Cambrian stratigraphic section northeast of the South Nahanni River. . . . . The present report describes two more sections . . . that are the result of additional field work in 1979. . . . (Au)

B-64700

Certain revisions of stratigraphic nomenclature for the foreland of Wopmay Orogen are proposed to better reflect the main lithologic divisions and their tectonic settings. The "Recluse Formation" . . . is elevated to a group consisting of three formations: the Tree River Formation, orogenic siltstone; the Fontano Formation, hemipelagic shale; and the Asik Formation, orogenic greywacke. It is proposed that the term "Epworth Group" be confined to the Odjick and Rocknest formations. [It] comprises the passive-margin sedimentary prism of the orogen. The Akitcho Group, an epicontinental rift-fill assemblage, underlies the Epworth Group. All three groups, plus two formations above the Recluse Formation, the Foxes Lake and Takiyuk formations, may be collectively referred to as the Coronation Supergroup. Regional correlations are presented between the Coronation Supergroup, the Great Slave Supergroup and the Goulburn Group, thus linking the three major Aphelidian basins marginal to the Slave Province. (Au)

B-64718

The north-central part of Wopmay Orogen has been segmented into crudely hexagonal fault-blocks, about 75 km in diameter, that appear to have overridden each other from west to east and have relative displacements measured in kilometres both laterally and vertically. Block thrusting appears to have been superimposed on an ongoing system of conjugate transcurrent faulting in relieving east-west compression. The unusual fault system dates from the second of two collisional orogenies affecting this early Proterozoic continental margin and it deforms an earlier thrust-fold collisional orogeny affecting this early Proterozoic continental margin and it deforms an earlier thrust-fold belt, more familiar in style, that formed during the first collision. Backsliding on the hexagonal block-margin thrusts during post-orogenic extension could account for the graben-like outliers of post-orogenic clasticts that have been a focus of uranium exploration in the area. (Au)

B-64785

The Tuertok Lake Volcanic Complex is one of the best exposed of several volcanic complexes present in the early Proterozoic Akaitcho Group. The complex consists of a 3 km thick basal sequence of mainly pillowd basalt, overlain by several rhyolite volcanic domes. The basals have been divided into nine stratigraphic "units". The lowest unit shows evidence of a brief period of erosion before deposition of the later units. A glocmeroporphyritic dike intrudes the central part of the volcanic complex and may represent a sub-volcanic magma chamber. (Au)

B-64866

This report summarizes highlights of the bedrock geology studied during the 1980 field season, and supplements earlier and more complete descriptions of stratigraphy and structure of the Nahanni area . . . . (Au)

B-65951

This report describes an early Lower Devonian brachiopod fauna and the stratigraphy of the source beds, a richly fossiliferous limestone unit referred to as the 'Delorme' formation that outcrops on Cathedral Mountain, near Virginia Falls on the South Nahanni River, southwestern District of Mackenzie. A part of the report discusses and illustrates the associated conodonts, providing supplementary information on conodont zones represented and an independent dating of the brachiopods. The brachiopod assemblage is representative of a widely distributed Gypidula pelagica Zone, having Old World affinities and being known elsewhere in North America from the northern Yukon Territory, Canadian Arctic Islands, and central Nevada. . . . (Au)
A granitic diapir of batholithic dimension at the rimmed granite. Both of which are cut by basaltic dykes, now amphibolite. The Sitlyok Complex, the group. The Akaitcho Group forms a belt of tonalite gneiss intruded by the oldest, the Sitlyok Igneous Complex. Ipiutak subgroup, the oldest unmet of the Wopmay Orogen. The geology map areas which straddle Zone 30 to 50 km wide and at least 150 km long that has been little prospected for base metals although it is similar to formations hosting Sullivan or MacArthur Type Ag-Pb-Zn sulphide deposits. (Au)

The Akaitcho Group forms a belt

B-67334


References.

ACU

Horton River, which is one of the large rivers of the Northwest Territories, formerly flowed into Harrowby Bay but now discharges into Franklin Bay. The breakthrough shortened the length of the river by nearly 100 km. Three radiocarbon dates for driftwood stranded about 10 m above sea level along the old Horton River channel and one radiocarbon date for a driftwood log found 6 m above sea level near the present mouth suggest a breakthrough date of about A.D. 1600. Since breakthrough, fan-deltas from tributary creeks have segmented the abandoned channel into several large oxbow lakes; permafrost and ice-edge polygons have grown along parts of the abandoned channel; gelifluction lobes have encroached onto the abandoned channel; lower Horton River and its tributaries have been rejuvenated; and Horton River has built a 30 square km delta into the relatively deep water of Franklin Bay. Although the A.D. 1800 date needs further confirmation, it is clear that the site has considerable promise for geomorphic and permafrost process studies in an area of continuous permafrost. (Au)

B-67741


References.

ACU

Fossils remains referred to Arctic Charr ... Arctic Grayling ... Northern Pike ... and Slime Culpin ... were collected from freshwater, sandy-silt deposits at 66 deg. 50 sec. N, 115 deg. 55 sec. W. These may predate the earliest yet known Northwest Territories records of fishes originating from the Mississippian or Beringian refugia approximately between 8400 and 9000 years BP. (Au)

B-67849


References.

ACU

Near Pilot Lake, the east boundary of the Fort Smith-Great Slave Lake radiometric high coincides with the contact of a well-foliated, porphyroblastic, microcline-plagioclase-quartz-garnet-biotite gneiss (Pilot Lake Gneiss) with a hybrid assemblage of quartzite, mica schist, garnet-cordierite gneiss, and minor amphibolite (Variable Paragneiss). Anomalously high concentrations of uranium and thorium are associated with mafic-rich, lenticular bodies with a mineral assemblage biotite + monazite + zircon + ilmenite + hematite + apatite + plagioclase + quartz. The mafic pods occur within both the Variable Paragneiss and the Pilot Lake Gneiss. Corundum and spinel occur in the mafic lenses and sillimanite, kyanite, and
hypersthene in other inclusions in the Pilot Lake Gneiss. Regional tectonic
extrapolations suggest that the pyroxene granulite event was Kenoran and the later
amphibolite event Hudsonian. (Au)

B-70238
Ya-Ya granular resource study, 1975 / EBA
Engineering Consultants Limited. Imperial Oil
Limited [Sponsor].
[Calgary : Distributed by APA], 1975.
12 microfiches : 111., figures, tables; 11x16cm.
(APDA project no. 88 : Ya-Ya Lake gravel
testing program, 1975. Report, no. 1-3)
Appendices.
2 volumes in 3.
ACU, NFSMO

This report presents the findings of an
exploratory drilling program carried out to
evaluate the quality and quantity of borrow
material in the Ya-Ya Lake esker-kame complex
on Richards Island, N.W.T. Becker hammer
drill and Mayhew 1000A rotary rig were used to
obtain surface data. The stratigraphy of this
important source of construction material
has been interpreted from the borehole logs.

The ob6erved negative Bouguer gravity anomaly
is consistent with such a structure. (Au)

B-72311
Petrochemistry of late Aphebian (~1.8 Ga)
calc-alkaline diorites from the east arm of
Great Slave Lake, N.W.T., Canada / Badham.
J.P.N.
(Canadian journal of earth sciences, v. 18, no.
6, June 1981, p.1018-1028, figures, tables)
Appendix.
References.
ACU

The East Arm of Great Slave Lake is a 2.5-1.7
Ga graben connected to the contemporaneous
Wopmay Orogen on the margin of the Archean
(2.5 Ga) Slave craton. It contains three major
groups of sedimentary and volcanic rocks. The
two earlier ones are cut by ~1.79 Ga diorites,
which outcrop over 220 km along the graben.

The diorites were preferentially emplaced as
lacroliths into a horizon of megabrecia
thought to be the product of evaporite solution
and collapse. The diorites are similar down the
entire length of the East Arm. Main phases are
usually plagioclase-hornblende porphyritic,
but younger and possibly high level phases
contain biotite and quartz. the diorites are
calc-alkaline but show no obvious chemical
trends along the graben. They cannot be related
directly to the proposed easterly clipping, late
Aphebian subduction zone that generated the
Wopmay Orogen. (Au)

B-72320
A geomagnetic depth sounding profile across the
northern Yukon and the Mackenzie Delta region,
Canada / Delaurier, J.W. Plct, F. Drury.
M.J.
(Canadian journal of earth sciences, v. 18, no.
6, June 1981, p.1022-1100, figures, tables)
Appendix.
References.
ACU

Geomagnetic depth-sounding data have been
obtained along a profile across the northern
Yukon and the Mackenzie Delta region that
approximately parallels the east-west flow of the
auroral electrojets near the geomagnetic
latitude of 70 deg. N. An internal conductive
zone, in which electric currents are confined
to a north-south direction, is defined by the
large spatial variation of the vertical
component of the time-varying geomagnetic field
and of the horizontal component parallel to the
profile. This conductive zone, with a half
width of about 50 km, correlates with the Blow
Trough, an element of the Beaufort-Mackenzie
Basin, that contains at least 5 km of Mesozoic
and Cenozoic clastic sediments. Model studies
suggest that up to 10 km of conducting
sedimentary materials occur within a
basin-shaped structure and that a conducting
zone (20 km wide) extends this basin to a depth
of 20 km in the Beaufort Sea. This deeper and
closer conducting zone could be the result of
movements along the Rapid Fault array, which
keeps the Blow Trough and which may have
fractured the materials beneath the basin deposits to the
west. The observed negative Bouguer gravity anomaly
is consistent with such a structure. (Au)

B-73708
Upper Devonian-Lower Carboniferous miospore
biostratigraphy of the Imperial Formation,
District of Mackenzie and Yukon / Braman, D.R.
Calgary : University of Calgary, 1981.
331 leaves, figures, plates, tables; 28cm.
(Grant-in-aid - Arctic Institute of North America)
Thesis (Ph.D.) - University of Calgary, 1981.
References.
ACU

The Imperial Formation, an alternating
sandstone and shale sequence of Late
Devonian-Early Carboniferous age, occurs over
large areas of the District of Mackenzie and
Yukon. The miospores which are common and
generally well preserved, are shown to be
useful in correlating the Imperial Formation
from one location to another. Five sections and
one sample locality, which include the Imperial
River, Powell Creek, Mountain River, Arctic Red
River, and Trail River sections and the Lower
Trail River sample locality, are studied. Seven
miospore biozones are recognized and these are
compared to conodont ages determined from
dnaconite limestones within the sections. Two
unconformities are recognized by abrupt changes
in miospore assemblages. (Au)

B-73849
International Precambrian-Cambrian boundary
working group's 1979 field study to Mackenzie
Mountains, Northwest Territories, Canada / Fritzsche, W.H.
41-45, figures)
References.
ACU

During the 1979 field season thirteen Working
Group members studied five stratigraphic
sections in the west-central Mackenzie
Mountains, and selected a tentative boundary
interval within map unit 12 of the Sekwi
Mountain map area in order to focus Canadian
research. Map unit 12 is part of the thick
succession of late Precambrian and early Lower
Cambrian interbedded shale, siltstone and
quartzite, the upper portion of which is mainly
dated by the use of trace fossils. The
overlying late Lower Cambrian succession was
also inspected. These strata belong to the
Sekwi Formation, and consist of platform
carbonates to the east and laterally equivalent
deep and basin deposits to the west.
Trilobites are the principal fossils used in
correlating these younger strata. (Au)


Conjugate transient faults in north-central Wopmay Orogen (Early Proterozoic) and their dip-slip reactivation during post-orogenic extension, Hepburn Lake map area, District of Mackenzie / Hoffman, P.F. (Paper - Canada. Geological Survey, 80-1A, p. 183-185, map)

Conjugate Sets of northeast (right-slip) and northwest (left-slip) transient faults are the youngest structures related to east-west compression in the orogen. Postorogenic east-west extension resulted in dip-slip reactivation of the transient faults and initiation of northerly-trending normal faults in middle Proterozoic cover rocks. (Au)

A preliminary palynological study of the Caribou Hills outcrop section along the Mackenzie River, District of Mackenzie / Iwamidse, N.S., McIntyre, D.J. (Paper - Canada. Geological Survey, 80-1A, p. 197-208, figure, plates)

Fifty-eight samples from the Upper Cretaceous and Lower Tertiary sediments of the Caribou Hills section in the Mackenzie Delta yielded diversified and well preserved microfloras. Four palynological associations have been recognized. By comparison with known assemblages, mainly from Western Canada, Cambonian, Paleocene, Eocene, Oligocene ages are indicated. The microfaunal transition between Paleocene and Eocene appears to be gradational whereas the break between Eocene and Oligocene is distinct. (Au)


If the main northward extension of Canoe Lake Fault, which displaces the Muskox Intrusion (middle Proterozoic), follows the east branch, rather than the west branch as has previously been assumed, the arguments that the Muskox Intrusion must predate the Dismal Lakes Group are circumvented. The west branch requires a sharp bend in the fault, but this is typical of rift faulting today. Therefore, it is possible that the Muskox Intrusion is coeval, even comagmatic, with the Coppermine River basalts. (Au)


This work is an extension of the sedimentological work undertaken in 1970 by the Marine Sciences Directorate (of the former Department of the Environment) and subsequently by the Geological Survey of Canada. The field work began with the Hudson 70 cruise into the Beaufort Sea and was supported with sampling
from other vessels: CSS Baffin, CSS Parizeau, CSS Richardson, M/V Theta, M/V Pandera, with sampling from other vessels. A helicopter was provided for several seasons through the Polar Continental Shelf Project. This study is based on analysis of the heavy mineral fraction of bottom sediments collected during these early cruises and operations from helicopters over the ice. This report describes the mineral species and shows their distribution and origin in order to give a more complete history of sediment deposition in the region. (Au)

B-74039
Stratigraphic cross-section, Selwyn Basin to Mackenzie Platform, Nahanni map area, Yukon Territory and District of Mackenzie / Gordey, S.P.

Nahanni map area is underlain by sedimentary rocks ranging in age from Late Proterozoic to Devono-Mississippian that change facies rapidly across regional lines. Stratigraphic relations of northeastern platform carbonate units (Mackenzie Platform) have been investigated as part of a regional mapping program refining the bedrock geology of Nahanni map area. This preliminary report describes the stratigraphic relationships of the northeastern platform carbonate units and, along with earlier reports on the westerly basin facies (Selwyn Basin), forms a preliminary account of the stratigraphy of Nahanni map area. (Au)

B-74055
Early and Middle Ordovician conodont fauna from the mountain diatreme, northern Mackenzie Mountains, District of Mackenzie / McArthur, N.L. Tiplins, R.S. Godwin, C.I.
(Paper - Geological Survey, 80-1 A, p. 362-368, figures, table) References. ACU

Mafic diatreme cutting lower Paleozoic rocks in the northern Mackenzie Mountains is probable feeder for volcaniclastic sediments described within basin facies rocks of the Misty Creek Embayment by Cecile (1978). Identification of conodonts in the xenoliths of the diatreme was established from the maximum age of the diatreme and in correlating the diatreme with equivalent volcanic strata. (Au)

B-74144

The Upper Proterozoic Windermere Supergroup of the Mackenzie and Warenack mountains, northern Cordillera, was deposited between about 800 and 570 Ma. The margin of the predominantly clastic basin was controlled by faults with a north-northeastern to northwesterly trend. The faults record lifting in the underlying cratonic rocks and were intruded by diabase dykes and sills. Faulting was accompanied by extrusion of basaltic flows and is reflected in pronounced facies and thickness changes of the highest pre-Windermere basin Windermere units (Redstone River, Coppercap, Sayuneq formations). Faulting thus began to disrupt the pre-Windermere basin framework prior to the changeover from carbonate to clastic sedimentation which characterized the base of the Windermere Supergroup. The lower part of the Windermere Supergroup contains the record of a regional glaciation which can also be seen in other parts of the Cordillera. (Au)

B-74420
Stratigraphy and geochemistry of the Akaitcho Group, Hepburn Lake map area, District of Mackenzie: an initial drift succession in Wopmay Orogen (Early Proterozoic) / Godwin, C.I.

The Akaitcho Group consists of 8 to 10 km of metavolcanic and metasedimentary rocks located west of Hepburn Batholith and east of Wintertal Batholith in the central metamorphic core of Wopmay Orogen (Bear Province). Mapping revealed the following generalized stratigraphic sequence: (1) a lower basaltic unit of unknown thickness, (2) 3-4 km of arkotic turbidite with 200-300 m of pelite at the base, intruded by sills of rhyolite porphyry, (3) basalt and rhyolite volcanic complexes, and (4) 1-3 km of pelite and tuffaceous sedimentary rocks, locally with abundant basaltic extrusive and intrusive rocks. The Akaitcho Group is interpreted to be older than and conformably beneath the western Epworth Group. The Akaitcho metavasalts are LREE enriched tholeiites with geochemical similarities to marginal basin basalts. Group II oceanic basalts and continental flood basalts... Its stratigraphic position beneath the lower Epworth Group, a passive continental margin succession, is consistent with the hypothesis that the Akaitcho Group preserves products of initial rifting in Wopmay Orogen. (Au)

B-74470
Nahanni integrated multidisciplinary pilot project: geochemical studies part I : geochemistry and mineralogy of shales, cherts, carbonates and volcanic rocks from the Road River Formation, Misty Creek Embayment, Northwest Territories / Goodfellow, V.D. Jonasson, I.R. Cecile, M.P.

Geochemical and mineralogical studies of Section 44 through the Road River Formation were used to substantiate and define chemically earlier divisions as well as to subdivide further each unit. A period of volcanic activity represented by mafic tuffs and flows in unit RRC in Section 40 was recognized in Section 44 by high contents of TiO2, Na2O and MgO present in leucokase and chlorite, respectively. Associated with this volcanic event are cherts and carbonaceous metalliferous shales, interpreted as resulting from the influx of nutrients and base metals during hydrothermal activity. A second period of volcanism is interpreted to have occurred during the Middle Cambrian in unit RRR. The Lower to Middle Ordovician mafic volcanic rocks and hypabyssal equivalents present in Section 40 are intensely altered, most likely alkali in composition, and characterized by above average contents of F, Pb, Co, As, Sb, Ba, Cu, V, La and Be. The Ba forms clear cleavages of celadon that commonly are situated adjacent to K-feldspar. (Au)
... Although certain marine organisms can accumulate metals many times their content in seawater, it is considered unlikely that this mechanism alone can explain the high levels of certain elements found in the Misty Creek shales. The enrichment in the volcanic rock of some of the same elements found to be high in the interbedded shales and cherts .... supports the view that at least some of the metals owe their origins to hydrothermal fluids expelled onto the seafloor during volcanic activity. This mechanism of metal supply and accumulation is active on ocean ridges and other tectonically active areas where geothermal fluids are supplying elements that are concentrated in the associated sediments. It is the intention of this paper to discuss possible sources of the elements noted above and to suggest mechanisms by which they might be dispersed from presumed spring-vent discharge areas into the sediments of the Misty Creek paleobasin. (AU)
great circles. The mean A direction is at 074 deg., 07 deg. (k=15) and the average of the site poles at 165 deg. E, 02 deg. S (N=5, K=40, A95=12 deg.), close to that of the Coronation suite. Two specimens from a single dyke site yielded an A-type pole similar to that of the Franklin dykes to the east of the Coronation suite. (Au)

B-75469

The Taglu Delta represents the final clastic delta wedge of the lower Tertiary Reindeer Formation before burial under a thick marine mudstone succession. Specific depositional subenvironments can be identified from core material and include delta front, distributary mouth bar, distributary channel, crevasse splay and interdistributary bay. Integration of core interpretations with geophysical log data points to a three dimensional depositional framework to be established. Lobate distribution of sands and the prominance of channel sands points to a river-dominant delta. The character of the channel deposits suggests that some channels may have been abandoned. A relatively thick sequence of lower delta plain deposits also points to a moderate to strongly subsiding receiving basin and/or rapid delta compaction. Sands from the various subenvironments are predominantly quartz and chert. Other, less common, components include plagioclase, muscovite and clasts of limestone, volcanic rock, schist, coal and shale. Two main source areas seem likely for the Taglu delta, one to the south and the other as far west as Alaska. (Au)

B-75485

The desmoceratid genus Pachygrycia n.gen., an external homomorph of Sonneratia Bayle 1918, represents the earliest Albian? amonite fauna yet recognized in the Mackenzie River drainage of Northwest Territories, northern Yukon Territory and from Banks Island, District of Franklin. This widespread, regionally zonal fauna is correlated tentatively with the basal part of the European Leyerieria Tardeforcata Zone. The new genus is interpreted as a derivative of a still unknown boreal Beudanticeratinae stock. That Grantzioceras-like stock also gave rise to such taxa as Grantzioceras inflay, Cleoniceras Parona and Bonarellis str., Neosaynella Casey and Grycia inflay. All these taxa comprising the subfamily Cleoniceratinae as amended by the writers are removed from the family Hoplitididae H. Doubille 1890 and assigned to the family Desmoceratidae Zittel 1869. A northeast Asian origin is suggested for the Cleoniceratinae as amended. (Au)

B-79790

Fossils of the broad whitefish, the longnose sucker, ... and the burbot, ... are reported for the first time from North America and a freshwater sculpin, ... for the first time from Yukon Territory. The known fossil occurrence of the Arctic grayling, ... in North America is extended from 32000 to about 60000 years BP. These six fossils represent about one sixth of the present-day Yukon freshwater ichthyofauna of 35 species. These fossils provide a major test for the method of determining glacial refugia based on geographic variation of morphological or protein characters. They confirm that these taxa were present prior to and presumably survived the Wisconsinan glaciation in a Beringian refugium. The occurrence of these fossils, all subarctic or subarctic-boreal species known at present in the same area, does not suggest a paleoenvironment greatly different from the present one. (Au)

B-80543

Archean ignimbrites are rare, but a number have been reported from the Slave Province. An excellent example is exposed along the west shore of Yellowknife Bay immediately east of Giant Mine. Dominant supracrustals at Yellowknife include 10,000 m of massive and pillow basalts (Kam Formation) in the west and graywacke and slate (Burwash Formation) to the east, major units which cover hundreds of square kilometers. ... The ignimbrite, its associated pillow flows and thin-bedded cherty sediments suggest complex allogenic volcanism at the termination of the Kam Formation deposition by which time there had been shalowing of the western part of the basin in which the Kam and Burwash Formations were deposited. The ignimbrite section is a most complex part of the Kam-Jackson Formation contact zone that has been fortuitously preserved by faulting. (Au)

B-80659
Regional metallogeny of the northern cordillera : biostratigraphy, correlation and metallogenic significance of biomarine occurrences in the Macmillan Pass-Howards Pass region yield conodont faunas that define two principal intervals of barite deposition in the lower Earn Group and one in the upper Earn Group. The oldest is of late Middle Devonian age, the next is early Upper Devonian, and the youngest is of upper Early
Correlations between the Sunblood, Esbataottine 8-81515 and Whittaker formations, assigned to the Esbastaottine and Whittaker correlating stratigraphically with the entire formatons. The structural relations suggest that initially upright folds were tilted and overturned during a phase of regional E-W over-turning, similar to that which formed the Cleavage. Strain modifications leading to the overturning are apparently due to upper-level movement outward from fan axes accompanied by uplift or tectonic plutons. Intracrystalline cleavage, strain modifications leading to the over-turning could account for the predominance of westerly over-turning. (Au)


Early Proterozoic and Archean rocks east of the Wopmay Fault Zone, are involved to a greater or lesser degree in one or both collisional orogenies of Wopmay Orogen. The Carousel Massif, an anticline cored by Archean basement, is a disharmonic fold structure in the Asial fold-thrust belt that formed during the first collision. To the west, the Hohburn Batholith is composed of over 40 discrete plutons in the northern part of the area, each with a different deformation of the first collision event. The magmatic plutons vary in composition from hornblende-diorites to biotite-granites and locally contain abundant partly resorbed supracrustal xenoliths. Intrusive age relationships and the extent of development of a metamorphic fabric indicate at least two periods of emplacement for both granite and tonalite plutons. West of the batholith the structural style of the Akitcho Group is dominated by early east-verging recumbent folds at all metamorphic grades investigated, from andalusite-muscovite schists to kyanite-granulites. The present Akitcho Group map pattern is controlled by a series of faults outlining crustal blocks formed during the second collision event. Emplacement of one of these crustal blocks has juxtaposed rocks containing bathozone 6 and bathozone 3 mineral assemblages. The westernmost Akitcho Group is characterized by a set of north-south fault blocks marking major breaks in the structural and metamorphic map patterns. Together these blocks constitute the Wopmay Fault Zone. (Au)


Cloos Nappe is a recumbent, eastward-verging, refolded anticlinorium that exposes thick submarine bimodal volcanics and sediments, stratigraphically beneath the Akaitcho Group, near the east side of the Hohburn Metamorphic-Plutonic Belt (Zone 3) in the 1.9 Ge Wopmay Orogen. The rocks are correlative with the Akitcho Group, exposed in the west half of Zone 3, and are interpreted as rift-basin deposits related to crustal stretching prior to break-up along the west margin of the Archean Slave Province. The nappe structures in the Akitcho Group in Zone 3 may have formed when listric normal faults developed during crustal stretching were rejuvenated as thrusts, re-thickening the crust and shortening the depositional prism, during early stages of the first collision that affects the margin. (Au)
A preliminary account of the internal stratigraphy of the Rocknest Formation, foreland thrust-fold belt of Wopmay Orogen, District of Mackenzie / Grotzinger, J.P.  
(Paper - Canada. Geological Survey, 82-1A, p. 117-119, figures)  
References.  
ACU

Five measured sections of the Rocknest Formation in the northeastern part of the foreland thrust-fold belt of Wopmay Orogen are described. Three of these sections are representative of shelf facies of the Rocknest Formation, one represents the slope facies, and one shows a transition from shelf to slope facies. The Rocknest Formation is subdivided into five informal members that are correlated over the shelf. The subdivision applies only to the shelf sections. (Au)

Quantary geology of upper Coppermine river valley, District of Mackenzie / St.-Onge, D.A. Guay, F.  
(Paper - Canada. Geological Survey, 82-1A, p. 127-129, figures)  
References.  
ACU

Perched deltas of coarse gravel at an average altitude of approximately 365 m a.s.l. indicate that the lake occupied Coppermine Lake valley as far south as 65 degrees 40'N. A deposit of poorly varved silt and sand deformed by large slumps suggests that, during its maximum extent, the lake occupied Point Lake basin which was a glacier calving bay. (Au)

Felsic domes and flank deposits of the Back River volcanic complex, District of Mackenzie / Lambert, N.B.  
(Paper - Canada. Geological Survey, 82-1A, p. 159-164, figures)  
References.  
ACU

Two of the 23 felsic domes in the Back River cauldron subsidence complex (of Archaean age) illustrate a small composite dome, the roots of a dome, and coarse epiclastic deposits derived from the domes. The Crutch Lake dome is a composite body that evolved during two main stages of effusion beginning with the eruption of a rhyolite dome. A dacite dome rose through and largely destroyed the previous dome. Mass wasting produced banks of coarse debris on the flanks of the domes and lahars carried debris for distances of 1500 m off the east side. The rhyolite body at Thlewyo Lake is the root of a dome that rose along the outer ring fracture system and through a succession of greywacke and siltstones. Extensive rhyolite breccias are the products of destruction of this dome and represent debris flows that travelled for 4500 m into the adjacent sedimentary basin. (Au)

Synvolcanic intrusions in the Cameron River volcanic belt, District of Mackenzie / Lambert, N.B.  
(Paper - Canada. Geological Survey, 82-1A, p. 165-167, figures)  
References.  
ACU

Swarms of amphibolite dykes and sills, that form up to 35% of the total volume of the Cameron River volcanic belt, intrude the granitic basement but not sediments that are adjacent to or overlie the volcanics. They are an integral part of the volcanic stratigraphy. The dykes mark extensive linear fracture systems, along the margins of a fault bound basin, that were the conduits along which magma rose and fed lavas at the surface. As magma shifted progressively to fractures farther from the edge of the basin, lavas effused at the surface and the volcanic pile spread laterally from east to west. The present volcanic belt reflects the width of the original belt, not its thickness. Regional deformation deformed the belt against the granitic block which bound the basin on its eastern side. (Au)

The Narakay volcanic complex: mafic volcanism in the Hellikian Hornby Bay Group of Dease Arm, Great Bear Lake: A preliminary report on depositional processes and tectonic significance / Ross, G.M.  
(Paper - Canada. Geological Survey, 82-1A, p. 329-340, figures)  
References.  
ACU

The Narakay Volcanic Complex is a sequence of mafic pyroclastic rocks within shallow marine strata of the Hellikian Hornby Bay Group. Depositional environments of the sedimentary rocks range from shallow shelf (above storm wave base) to supratidal and marginal marine. Fluctuations in relative sea level correspond closely with established trends for Hornby Bay Group strata in the eastern part of the basin. An unconformity near the top of the sequence in the Narakay Volcanic Complex involves juxtaposition of volcanic basement rocks of unknown age and Hornby Bay Group rocks, syndepositional faulting, and deposition of autochthonous paraconglomerates. This unconformity may correlate with the local unconformity found between the Hornby Bay and Dismal Lakes groups. Pyroclastic rocks are composed of tuffs and agglomerates deposited on the flanks of maar-like tuff cones. The tuff cones were partly preserved in graben-like structures although most underwent some erosion with dispersal of epiclastic debris by storm surge and run-off. The entire Narakay Volcanic Complex is cut by an east-trending swarm of dykes. The composition of the dyke rock and the pyroclastic fragments is nearly identical, suggesting that they may have been derived from the same magma source. The dyke orientation implies a north-south extensional regime which corresponds with the north-northwest facing geometry of the Dismal Lakes Platform. The dykes record the period of regional tectonic stress which occurred at the time of deposition of the Hornby Bay Group and the beginning of deposition of the Dismal Lakes Group. (Au)

Ogilvie Mountains Project, Yukon: Part A: a new regional mapping program / Thompson, R.I. Roots, C.F.  
(Paper - Canada. Geological Survey, 82-1A, p. 403-411, figures)  
References.  
ACU

The Ogilvie Mountains Project is a long term regional mapping program, initiated in 1981, to provide comprehensive maps accompanied by detailed stratigraphic and structural analyses for Dawson (116 B,C), Lac de Gras (106 D) and Nash Creek (106 C) map areas. The stratigraphic theme of this report reflects our 1981 effort to establish a stratigraphic framework for the north-central part of the Dawson map area (116 B,C). Special attention was directed toward the description of volcanic assemblages, preparation of the role of volcanism during the evolution of the region. (Au)
B-81701
Ogilvie Mountains Project, Yukon; Part B:
Volcanic rocks in north-central Dawson map area
/ Roots, C.F.
(Paper - Canada. Geological Survey, 82-1A, p. 411-444, figures, table)
References.
ACU

Volcanic rocks are an integral stratigraphic component of the Dawson map area (NTS 116 B,C) and provide an excellent opportunity to assess the role of volcanism during Late Proterozoic through Early Paleozoic evolution of the region. This is a preliminary account of the stratigraphic and structural setting of several volcanic complexes within the north-central part of the Dawson map area and serves as the framework for more detailed studies that will begin in 1982. ... (Au)

B-81710
Geology of the Fort Smith map area (east half), District of Mackenzie / Bostock, H.H.
(Paper - Canada. Geological Survey, 82-1A, p. 419-420, figures)
References.
ACU

Geological reconnaissance of the Fort Smith map area (75% of the part between the 110th and 111th meridians. The geology within this area is closely related to that described for the western half of the sheet (Bostock, 1981) and the data described here are presented as an extension of the initial report on the west half of the sheet. (Au)

B-81752
Geology of the Mactung pluton in Niddery Lake map area and some of the plutons in Nahanni map area, Yukon Territory and District of Mackenzie / Anderson, R.G.
(Paper - Canada. Geological Survey, 82-1A, p. 299-304, figures)
References.
ACU

Two major plutonic suites were distinguished on the basis of lithology, inclusion abundance, structure and intrusive style in the study areas. A megacrystic suite consists of small, composite, inclusive-free, alkali feldspar megacryst- and biotite-bearing granite and quartz monzonite plutons (Mactung and Pelly River plutons). The suite without megacrysts consists of a larger, homogeneous, hornblendic- and biotite-bearing granodiorite and quartz monzodiorite pluton with relatively abundant inclusions (South Nahanni River pluton). Few characteristics distinguish members of the megacrystic suite associated with tungsten-bearing skarns from those devoid of tungsten. (Au)

B-83437
Controls of lead-zinc mineralization, Pine Point district, Northwest Territories, Canada / Kyle, J.R.
References.
ACU

Lead-zinc ore bodies in the upper part of the Pine Point carbonate barrier complex are localized in paleosolution structures that developed as the result of post-middle Givetian subaerial exposure. Sulfide-filled dolines host pyritic ore bodies, and macropores and stratagraphic permeable zones contain tabular ore bodies. Sulfides are concentrated in these transgressive paleosolution structures that acted as natural bypasses between aquifers and loci for mixing of fluids of different character. Complex ore textures indicate rapid early sulfide precipitation followed by slower sulfide growth. Evidence for both sulfide-carbonate equilibrium and disequilibrium conditions suggests fluctuations in ore fluid composition, perhaps related to periodic supply of reduced sulfur. District and ore body metal distribution patterns may reflect the nature and movement of mineralizing fluids. (Au)

B-85103
Age and stratigraphic-tectonic significance of Proterozoic diabase sheets, Mackenzie Mountains, northwestern Canada / Eisbacher, G.H.; Evans, P.D.
Appendix
References.
ACU

Diabase dikes and sills were intruded during a Late Proterozoic phase of extensional tectonics in the northern Canadian Cordillera. The emplacement of the diabase sills and dikes may be related to either of two volcanic events in the region, one documented, the other inferred. In either case, emplacement of the diabase at approximately 770 Ma is close to the boundary between the Mackenzie Mountains Supergroup and the overlying Windermere Supergroup, precedes a regional glaciation (Shezal tillite), and reflects a strong accentuation of the west-facing Cordilleran migrocline. (Au)

B-85111
Rb-Sr isochron ages, magmatic 87Sr/86Sr initial ratios, and oxygen isotope geochemistry of the Proterozoic lavas and gabbros of the east arm of Great Slave Lake, Northwest Territories, Canada / Goff, S.P.; Baadsgaard, H.; Muehlenbachs, K.; Scarfe, C.M.
Appendix
References.
ACU

Two Rb-Sr isochrons from the oldest (Wilson Island Group) and one of the youngest (Pearson Formation) Proterozoic volcanic units of the East Arm of Great Slave Lake give dates and initial ratios of 1810 + 19 Ma, 0.7051 + 0.0008, and 1890 Ma, 0.7050 + 0.0004, respectively. These dates restrict the Great Slave Supergroup entirely to the Aphiobian. The Pearson Formation date is interpreted as magmatic, but it is considered to be rapidly followed by a significant metamorphic and tectonic event within the area. Both the above suites and the volcanic formations of intermediate age have undergone metamorphism up to and including epidote-amphibolite facies. The estimated initial 87Sr/86Sr ratios of the magmas, both from clinopyroxene separates and isochrons, indicate a mantle origin for the early tholeiitic mid-Aphiobian diabase (0.7016-0.7017), Union Island Group diabase (0.7021-0.7030), Middle Island Group diabase (0.7050-0.7054) and especially the Pearson Formation tholeiitic basalt (0.7080) both show the effects of significant crustal contamination. The evidence for the Wilson Island Group is less decisive but appears to indicate a mantle origin. (Au)

B-85332
Cretaceous and Tertiary stratigraphy and paleogeography, northern Interior plains, District of Mackenzie / Yorath, C.J.; Cook, D.G.
The late Proterozoic Rapitan Glaciation in the Mackenzie Mountains ... This report describes the Cretaceous and Tertiary stratigraphy and palaeogeography of a large area in northwestern District of Mackenzie. This report is based primarily on studies of surface exposures. No detailed examination and description of subsurface samples has been undertaken, but the report, nonetheless, incorporates subsurface information from published and unpublished sources which are acknowledged at appropriate places in the text to follow. The report modifies stratigraphic relationships, nomenclature and areal distributions of rock units illustrated previously by Yorath (GSC Open File Report 336, 1976). (Au)

B-87912

The banks of the Porcupine River near Old Crow in the unglaciated part of the northern Yukon consist of about 55 m of interbedded fluvial and lacustrine gravels, sands, silts, and clays. This sequence was sampled closely for paleomagnetic analysis and the sediments were found to possess a natural remanent magnetization (NRM) that is stable in direction with mean destructive fields of 200-300 Oe (16-24 kA/m). Therefore, good paleomagnetic data can be obtained from sediments that have been subjected to permafrost conditions, although some samples show disturbance of NRM directions by cryoturbation. Sedimentological, palaeobotanical, and paleomagnetic data all support the presence of a major unconformity in the middle portion of the sedimentary sequence. This unconformity lies at the top of the transition that closes the reversed episode so that the sediments below it are likely older than 700,000 years. These results demonstrate that paleomagnetic studies on the sedimentary sequences exposed in the many isolated sites within the Old Crow region should greatly facilitate their correlation and indirect dating, affecting thereby our understanding of the recent geological history of this anthropologically important area. (Au)

B-87963

The Rapitan Group comprises a sequence of marine, glacimarine, and possible glacial sediments outcropping in the Mackenzie and western Cordillera. The Rapitan Group lies not far below the Precambrian-Cambrian boundary and overlies rocks judged to be about 0.8 Ga old. Except locally, the basal contact is distinctly unconformably marked the last major faulting event before the Paleozoic Era. An early, local(?), glacial advance (Mount Berg) was separated by an interval of time (Sayunei). On nearly every continent late Proterozoic glacial and glacial marine sequences, commonly bearing iron formations of hydrothermal origin, were deposited following major faulting episodes. This suggests that global(?), glaciation(s) followed widespread continental breakup. The development of new seaways in combination with extensive continental circulatory patterns and weather systems. Glaciation in the late Proterozoic was the likely consequence of these factors. (Au)

B-87971

The Little Dal Group ... consisting mainly of non-clastic strata, accumulated uninterrupted in an epicratonic setting. Depositional strike followed the concave-southwestward tectonic arc of Mackenzie Mountains. Southward thickening is demonstrable for most formations. Early in the history of the group, facies differentiation was pronounced, between a high-energy carbonate platform and a basin (epicratonic), with the facies boundary cutting across the long-term isopach trend. Once depositional relief was smoothed by sedimentation, it did not recur to any marked degree. ... Refinement of Little Dal stratigraphy permits delineation of an unconformity within strata formerly assigned to the group, here recognized as the base of the overlying "copper cycle". (Au)

B-87980

Two possible correlations have been suggested between the Proterozoic sequences of the Mackenzie and western Cordillera. The northern Cordillera of Canada. Crucial to these correlations is the possible existence of an unconformity at some point immediately above, or near the top of, the Little Dal Group in the Mackenzie Mountains Supergroup. Paleomagnetic results from the Little Dal Group sediments, the overlying Little Dal lavas, and diabase sills in the older Tsezotene Formation suggest that there is a major discontinuity at some point below the lavas. ... (Au)

B-87998

Athapuscow Aulacogen is a deformed east-northeast-trending basin, 270 km long by at most 80 km wide, of little-metamorphosed early Proterozoic sediments. An early period of extension, followed by an interacting plate boundary, is present in the rocks exposed in and around the East Arm of Great Slave Lake, Northwest Territories.
the stratigraphy of the aulacogen consists of two relatively formable sequences separated by a regional angular unconformity. The younger sequence (the LaBlne Group) is virtually unmetamorphosed and consists of alluvial fanglomerate, locally with basalt flows, and pebbly fluvial sandstone. The older sequence (Great Slave Supergroup) subgreenschist in grade and records a grand transgressive-regressive cycle... Aulacogen is an outstanding example of a multi-stage intracratonic basin, controlled at virtually every stage by events occurring at nearby continental margins. When compared with Phanerogonic basins, the following very tentative and qualitative differences seem to emerge: 1. Thermally driven subsidence seems less; 2. Tectonically driven subsidence seems more; and 3. Collisional cracking of the subducting plate to permit tholeiitic magnetism in the foreland basin is more common. These conclusions are consistent with the idea of a somewhat hotter mantle and consequently thinner lithosphere in the early Proterozoic. (Au)

B-88005

References:
ACU

The Kilohigok Basin is a large intracratonic feature covering more than 7,000 square km and hosting up to 7,000 m of Goulburn Group strata. The Kilohigok Basin is correlative in age with the Coastal Group of the Wopmay Orogen and Great Slave Supergroup of the Athapscou Aulacogen. Initial shallow marine to nonmarine sedimentation, centred about the Axial Zone, was accompanied by development of extensive stromatolite reef complexes on paleotopographic highs. Following a period of minor (?) uplift and erosion, increased uplift in the source areas to the south and east supplied sands and gravels to extensive braided rivers which spread these clastics down the Axial Zone and across the flanking platform. Periodic shallow marine deposition on the floodplain was overwhelmed by renewed fluvial sedimentation during this phase of accumulation, which gradually decreased as the basin and source areas stabilized. (Au)

B-88013

References:
ACU

The LaBlne Group outcrops along the western margin of Wopmay orogen at Great Bear Lake and rests on a deformed and metamorphosed... sterile basement complex. It is overlain by rocks of the mainly rhodochrosite Sloan Group. Syn- to post-volcanic clutons of the Great Bear batholith intrude both groups. From Echo Bay northward to Hornby Bay the LaBlne Group is... interpreted to be the remains of a large stratovolcanoes. Overlying and in part interfingered with the stratovolcanoes, are several major ash-flow tuff sheets... it is concluded that the LaBlne Group represents an early Proterozoic volcanic arc developed upon continental crust. Preserved stratovolcanoes and other high-level volcanic strata indicate that the LaBlne Group was erupted into a basin which was subsiding concurrently with eruptions. The basin was probably generated in a wrench zone related to oblique convergence. (Au)

B-88021

References:
ACU

The Hornby Bay and Dismal Lakes groups are a middle Proterozoic succession of terrestrial and shallow marine sedimentary rocks deposited over the northern margin of the early Proterozoic Wopmay Orogen. Lithologic sequences and facies patterns within both groups reflect the response of sedimentation to changes in the loci of uplift and/or subsidence, and syndepositional normal fault activity. The two groups represent two terrestrial siliciclastic to marine carbonate cycles of deposition, each in excess of 1.5 km thick. Comparison of Dismal Lakes Group with the Ellice, Farby Bay, and Kenuyay formations of the Elu Basin reveals a close lithologic and tectono-depositional correlation indicating that both areas represent remnants of a more extensive Helikian shelf. (Au)

B-88030

References:
ACU

Paleomagnetic results are reported from some 300 redbed horizons in the Athapscou aulacogen and Kilohigok Basin. These formations are commonly multistage, requiring the recognition and removal of recent and ancient overprints before original primary remanences are revealed. The poles deduced from these formations form a group off the west coast of South America... the Lower Coronation Pole... indicates that for much of its sedimentation history the Coronation Geosyncline occupied tropical latitudes... which is compatible with the abundance of stromatolites and the occurrence of evaporites. In addition to this Lower Coronation Pole, there is a widespread overprint, thought to be associated with uplift and cooling in the Coronation Geosyncline... The pole obtained from the western River Formation... lies off the west coast of Africa, some 80 degrees from the Lower Coronation Pole... One tentative interpretation of this discrepancy... is... that it... represents a time gap of perhaps as much as 300 Ma. The results from the Stark and Toonah formations are aberrant, possibly because of a local tectonic rotation. This suggestion has been tested by collecting new material from the Stark Formation in an area thought to be undisturbed... Since the samples were collected in ordered stratigraphic sequences it has proved possible to delineate geomorphic polarity zones. The magnetic character of these ancient sedimentary basins is thus beginning to emerge... (Au)

Field studies in 1971 and 1978 outlined a relatively large, subcircular, high-level plutonic complex at the south edge of the Slave Province. Radio-geochemical samples give ages of the order of 2150 Ma. ... This study documents progressive changes in major and minor element concentrations in the intrusive rocks. ... (Au)


Two cogenetic monzonitic laccoliths, one hosting uraniferous actinolite-apatite-magnetite veins, were sampled for a comparative petrochemical study as an aid to understanding the genesis of the veins and to provide guidance for exploration of other similar intrusions in the east arm of Great Slave Lake. The results reveal that the two bodies are very similar in chemical and mineralogical composition. They show a small compositional range and a calc-alkaline differentiation trend. They are subalkaline in character but locally show effects of alkali metasomatism. ... (Au)


Previous sulfur isotope data for the Lower Devonian Bear Rock Formation and the Upper Cambrian Saline River Formation in the District of Mackenzie, N.W.T. have been supplemented by additional sulfur isotope analyses as well as delta 180 determinations on sulfates from outcrops, drill cuttings, and cores. Whereas the mean delta 34S value for the Bear Rock Formation is lower than that of the Saline River Formation (+ 17.8 ± 1.8 per mille, versus...
Analysis of multicomponent magnetization of the Little Dal Group, Mackenzie Mountains, Northwest Territories, Canada / Park, J.K. (Journal of geophysical research, v. 86, no. 8, June 10, 1981, p. 5134-5146, figures, tables) References. ACU

A paleomagnetic study on 14 red limestone sites of the Helikian Little Dal Group, 'basinal sequence' (Mackenzie Mountains, Northwest Territories) resolved five magnetizations using thermal and alternating field treatment with vector analysis. One magnetization (C) with low unblocking temperatures is probably a goethite weathering component of Cretaceous age. It gives a direction of 261 degrees ... and a pole at 60 degrees N, 170 degrees E. Two other closely related magnetizations (A, B) probably carried by magnetite ... and hematite, respectively, yield directions of 265 degrees, -29 degrees ... and 264 degrees, -26 degrees ... with a combined pole at 16 degrees S, 141 degrees E. ... The two remaining magnetizations are a normal, and a reverse component recognized in most specimens have a combined direction of 273 degrees, +9 degrees ... and a pole at 3 degrees S, 138 degrees E ... C and A are pre-folding (before Paleocene or pre-late Cretaceous) with A suggested to be primary. A and B lie close to a recently proposed pole track for the late Helikian and Hadrynian and evidence suggests a magnetization age for 4 of 900 to 950 Ma. (Au)
north and 40 km south of Echo Bay. The JD class contains small quartz vein deposits at 535 + 164 and 1092 + 115 Ma. At Mount Lake, pitchblende in Heiltsuk sandstones overlying the batholith is 1076 +– 96 Ma old. Polymetallic veins at Mazanod Lake are 457 +– 26 Ma old. Pitchblende in a plant quartz vein at the Ray-rock mine is 511 +– 86 Ma old. Small pitchblende veins east of the batholith along the Coppermine River are between 400 and 660 Ma old. (Au


Compressed cylindrical remains of probable trace fossil affinities are described under the taxon Paleosyclmus ferrovittatus n. sp. The structures are preserved as orangy tinted, reddish brown, rectilinear to curvilinear ribbons of iron oxide several centimetres long, several millimetres wide, less than 1 mm thick, and surrounded by an argilaceous envelope. They occur along bedding planes in greyish olive weathering mudstone interbedded with glauconitic quartz sandstone in the Backbone Ranges Formation straddling the Precambrian-Cambrian boundary. These are associated with other fossils similarly preserved by iron oxides, including "Helmintichnites meeki" Walcott and Planolites montanus Richter. (Au


At Point Lake, District of Mackenzie, granitic basement at some distance from the unconformity with the overlying approximately 2670 Ma Yellowknife Supergroup has been dated by T.E. Krogh using the U-Pb method on zircon, at 3152 Ma. This report presents results of a U-Pb study on zircon from the same granite but collected at a locality only a few hundred metres from the unconformity. These results differ from those of Krogh in that a very large common lead component of Archean age was found in the zircon as well as an indication that the zircon had undergone an additional lead loss/uranium gain event. We interpret the combined results as indicating emplacement of the granite at 3152 Ma followed by zircon radiogenic lead loss/uranium gain together with gain of common lead near the unconformity at the time of original unroofing of the granite (prior to 2670 Ma). The last event affecting the U-Pb zircon systematics was lead loss at about 166 Ma. These results confirm that the granite is basement and not an unroofed synvolcanic pluton. (Au


Replicate sediment and seawater samples were taken from July 1977 to September 1977 at ten drill sites in the Beaufort Sea for trace metal analysis. Baseline values were obtained for copper, zinc, cadmium, lead, chromium, mercury and iron in sediment, seawater and zoobenthos. No sites showed anomalously high values. Furthermore, no values were obtained that could be considered significantly different from those of unpolluted seawater, sediments or benthos in other parts of the oceans. The analysis of variance on the seawater and sediment data showed that while the trace element composition of seawater at all stations could be considered the same, only at Kuguhlik A75 could the sediment be considered homogeneous with respect to trace elements at the 5% significance level. Sediments for all sites showed very similar 0.5% N HCl extractable trace metal fractions although element to element extractabilities varied widely. Diversity and abundance of zoobenthos were determined for each site and were similar to previously published values. (Au


U-Pb dating of single zircon grains from a graywacke of the Point Lake area of the Archaean Slave Structural Province in Canada indicates that this sediment is derived from two sources: (1) the ancient shield (parts of which are at least 3100 Ma old), which is the basement of the Slave Province supracrustal rocks; and (2) younger rocks (about 2700 Ma old). This implies the creation of large amounts of acidic to intermediate rocks during the 2700 Ma event. It also indicates that magma generation and intracontinental sedimentary basin formation and deepening are strongly related. (Au


The Proterozoic stratigraphic column of the Mackenzie Mountains is dominated by two main successions, the platformal "Mackenzie Mountains Supergroup" beneath, and the Windermere-equivalent Rapitan Group and younger strata, of rift-depression and slope origin, above. These two main successions are locally separated by an unconformity-bounded succession, the "copper cycle." An important question is whether the copper cycle is more closely related in time and in origin to the older or the younger main succession. Determination of the paleomagnetism of the
basaltic lavas locally preserved at the top of the Little Dal Group (top of the Mackenzie Mountains Supergroup) and comparison of their remanence directions with those published for other rocks bearing on the question were thought to be one way of shedding light on this question. Alternatively, is assumed to represent the magnetization acquired on crystallization of the lavas. If this assumption is correct, the significant difference from the direction LD-A0 = 265 degrees, I = 26 degrees, alpha 95 = 4 degrees) reported elsewhere for strata low in the Little Dal Group suggests either that the lavas significantly postdate the group or that significant movement of the North American plate occurred during accumulation of the 2 km or so of platform strata between the lower Little Dal beds and the lavas. The new results presented here also admit the conclusion that the Little Dal lavas do not represent the same igneous events as diabase intrusions dated at about 770 Ma that cut the lower Little Dal. (AU)

B-107433

In this paper, we propose a four-fold subfamilial division of the Pterygotopoidae, review and provide diagnoses and illustrations of established pterygotopoid genera, and introduce three new genera of eomonomorphic trilobites. In dating eastern North American pterygotopids, we have relied heavily on the regional biostratigraphic framework of Sweet and Bergstrom (1976). Many of the pterygotopids treated in this work came from the lower Tsetuiteau Formation of the western District of Mackenzie. Ludvigsen (1979c) presented a trilobite zonation of this interval from exposures in the Whitehorse Ranges. The southern Mackenzie Mountains ... (This article discusses revisions which) remove some previous age anomalies of a few trilobites on the W. Planatus zone. (AU)

B-107603

The Misty Creek Embayment, a 100 x 150 km, northwest-trending, rectangular, early Paleozoic basin, is surrounded on three sides by the Upper Cambrian-Lower Ordovician Franklin Mountain Formation, and the upper Ordovician-Lower Silurian Mount Kindel Formation, both platform dolostones. These dolostone units define two distinctly different positions of the embayment, the Mount Kindel indicating embayment boundaries about 30 km west of those defined by the Franklin Mountain Formation. These dolostones are thick bedded, recrystallized, and locally preserve shallow water features, such as oolites, birdseye texture, mudcracks, and bioturbation. To the south the embayment opens into the Selwyn Basin across the Niddery basin high. ... The embayment is interpreted as a submerged, fault-bound basin on the basis of geometry, linear facies belts, and alkaline volcanism. Several bedded barite occurrences are noted in Hess River, Duo Lake and Cloudy Formations; and phosphorite occurrences at locations in the Hess River Formation. Shale units show base metal anomalies are the recommended exploration targets. The embayment is comparable in many aspects to the correlative Richardson Trough. Facies relationships and basin geometry of the embayment therefore may be useful for subsurface exploration adjacent to the trough. (AU)

B-108162

Sampling of the sea bottom around the East Tarslut N-44 artificial island and the South Tarslut borrow area was performed in September 1981 in order to determine the distribution and community association of the macroinvertebrates and certain chemical and physical properties of the sediments and bottom water. Analyses of sediment were made for particle size, total organic carbon, nitrogen, carbon and polyaromatic hydrocarbons, hexane extractable compounds and (selected) trace metals. Salinity of bottom water was also measured. ... Biomass and population densities were generally greater at stations located 500 m and 3,000 m from the artificial island than at the stations located 50 m from the island. A qualitative analysis by the microfiches : figures, tables : 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWE24) References. Appendices. ACU

At the borrow site. two types of sediments between the lower Little Dal beds and the lavas. The new results presented here also admit the conclusion that the Little Dal lavas do not represent the same igneous events as diabase intrusions dated at about 770 Ma that cut the lower Little Dal. (AU)
Surface sediment samples were collected at the McKinley Bay and Tuk Channel dredging sites before the initiation of dredging operations. They were analysed for total iron, copper, zinc, chromium, nickel, cadmium, lead, beryllium, arsenic and mercury; total PCB's, DDT and DDE; total organic carbon; hexane extractable oil and grease; and sediment particle size distribution. A marine contamination is required. Accordingly, a scope of work was developed for the area; nomenclature has been reviewed and the geological history elucidated. (Au)

B-109320
Preliminary assessment of seismic and sedimentary behavior of sand islands during earthquakes. A sampling program was conducted at McKinley Bay, during dredging operations to estimate the environmental impact of dredging and the disposal of dredge spoils at sea by measuring the spatial and temporal variation of the following selected water properties: 1. conductivity - temperature, 2. dissolved oxygen, 3. transmissibility, 4. pH, 5. suspended particulate matter. At the time of sampling, the dredge ship was operating just south of the mouth of McKinley Bay. All measurements were made on a ship-of-opportunity basis from the 'YJ-15'; a vessel from the Zenn Verstrop support fleet. This report summarizes and describes all collected data. (Au)

B-109332

The Jurassic-Lower Cretaceous succession in the subsurface of the Mackenzie Delta area consists of alternating sandstone- and shale-rich lithostratigraphic units. Shale-rich units include the Husky, McGuire, Siku (new name), Mount Goodenough and Arctic Red Formations. Sandstone-dominant units include the Bug Creek Group and Martin Creek, Kasik (new name), Rat River and Atkinson Intertong formations. The Martin Creek, McGuire and Kasik Formations comprise the newly defined Parsons Group. Nine depositional-episodes occurred in the Early Jurassic to Albian, each represented by a basinward prograding lens of clastic sediments (depositional-complex). Several of the episodes were interrupted by periods of uplift and subaerial erosion, resulting in major regional unconformities. During depositional-episodes 1 and 3 ... sedimentation was limited to the southwestern part of the Mackenzie Delta but in the following episode deposition expanded southwards and eastwards. In the Early Albian (depositional-episode 8, Arctic Red Formation) there was further expansion of the depositional basin and the strandline migrated well to the south of the Mackenzie Delta area. During each of the depositional-episodes the main source of clastic sediment was to the south and southeast but during certain periods in depositional-episodes 7 and 8 ... a local northerly source area existed. (Au)
E-tertiary sedimentation in the southern Beaufort exploration in the Beaufort-Hackenzie Basin. Sediments has been of major importance and has km to the continental shelf.

Petroleum Geologists. of the five deltaic cycles. riuMely the delta of excess of 400,000 cubic km of sediment.

Hauterivian. The source of clastic sediment was predominantly from a southerly direction but existed. During the late Oxfordian to Aptian area became the site (Arctic geology and geophysics...)


References. ACU

Over 2500 m of upper Oxfordian to Albian age, Mackenzie Delta are known to be present in the subsurface of the Mackenzie Delta area. These rocks were deposited during at least six major depositional episodes. Marine conditions prevailed during most of the episodes, with one major phase of alluvial sedimentation in the late Valanginian-early Hauterivian. The source of clastic sediment was predominantly from a southerly direction but during the late Hauterivian-early Barremian and Aptian a local northerly source probably existed. During the late Oxfordian to Aptian depositional episodes, the basin margin tended to oscillate across the NE-SW-trending Ekimo Lakes Arch. A major basin expansion occurred at the end of the Aptian and the Mackenzie Delta area became the site of mid- to outer-shelf mud deposition during the Albian.


References. ACU

Five Tertiary deltaic cycles have been identified in the Beaufort-Mackenzie Basin. These cycles added approximately 90,000 square km to the continental shelf, and deposited in excess of 400,000 cubic km of sediment. The five deltaic cycles are indicated for older Jurassic rocks in northern Alaska. Transcurrent movement in either direction on the Kaltag Fault can neither be supported nor rejected by the Jurassic record in northern Alaska. Hypotheses of counter-clockwise rotation of northern Alaska away from Arctic Canada are not supported.

The Hadrynian Rae Group of the Coronation Gulf area consists predominantly of a shallow-water succession of fine-grained sandstones, siltstones, dolomites and shales that accumulated in a broad, NNW-facing basin. Earlier correlations suggested that the group is equivalent to similar rocks in the Richardson Islands area of southern Victoria Island and in the Jameson Islands at the north end of Bathurst Inlet. The dolomite-dominated unit is correlated with the diabase sills, which make up the bulk of the islands in Coronation Gulf, has been traced from the type area at the Rae River north of Coppermine to Victoria Island. A basal quartzite in the group, initially recognized in northern Bathurst Inlet has been traced westward into the lower part of the Rae Group, thus the earlier interpretation of Rae sediments in the Bathurst Inlet region. Worn burrows, but more importantly trilobite tracks, in the uppermost two units of the initially-defined Rae Group demonstrate that these two at least are Cambrian in age, and that a redefinition of the Rae Group is required. Paleocurrent data from the underlying Husky Creek Formation of the Coppermine River Group suggest the formation was deposited in a generally southwest-trending valley during a pause(s) in extrusion of the
Geology, Red Rock Lake and eastern Calder River map areas, District of Mackenzie: the central Wopmay Orogen (early Proterozoic), Bear Province, and the eastern Archean Slave Province / St.-Onge, M.R. Lalonde, A.E. King, J.E.


References.

ACU

B-111929

Mount Harper complex, Yukon: early Paleozoic volcanism at the margin of the Mackenzie Platform / Roots, C.F.


References.

ACU

The Mount Harper complex in the Ogilvie Mountains consists of 105 square km of undeformed volcanic rocks lying between two thick dolostone units of late Proterozoic and early Paleozoic age. Volcanic stratigraphy indicates three periods of mafic volcanism separated by two effusions of intermediate and felsic composition. Pillowed and massive lava flows comprise more than two thirds of the volcanic pile; subaerially deposited rocks form less than one tenth. Most breccias were formed by fracturing and shattering of crystalline flows, with pyroclastic and laharian deposits locally present. Quartz-phryric lavas, ignimbrite and felsic breccias occur near the top of the pile. Pebbly mudstone and volcanic arenite are locally intercalated with the volcanic rocks. Three fault sets affect the complex. Block faulting at the edge of the platform may have caused conglomerate deposition and initiated volcanism. Northwest-striking sets appear related to dyke swarms and structural adjustments late in the volcanic history. Other faults are associated with the regional Mesozoic compressional regime. Trace sulphide occurrences were found in the mafic volcanic rocks. (Au)

B-111937

The external contacts of Wopmay Orogen, Point Lake and Kikerk Lake map areas, District of Mackenzie / Hoffman, P.F.


References.

ACU

Some results of recent field work are briefly discussed as they pertain to the following topics: (1) north-south stratigraphic continuity of the Precambrian continental-terrace wedge, (2) stromatolite elongation, paleowind direction and global polarity during deposition of the Rocknest dolomite shelf, (3) taphonomy for primary argonitic mineralogy of the Rocknest Formation, (4) attempted quantitative paleoecology of the upper continental slope, (5) eastward migration of forereef flysch, (6) nature of basement involvement in Aslak Fold-Thrust Belt, (7) relation of thrusting to the foredeep molasse, (8) mysterious basement-involved cross folding of regional extent, (9) normal faults associated with late transcurrent faulting, and (10) the first reported minor lead-zinc vein mineralization in Rocknest dolomite. Future field work is outlined. (Au)

B-111988

Investigations in the vicinity of Mount Sedgwick, Yukon Territory / Tell, R.T.


References.

ACU

...The objective of the 1982 work was to obtain geological and geochemical information for this area which lies within the eastern part of the proposed ...[northern Yukon National Park.] The 1982 investigations comprised: (a) a study of local geological relationships and reported mineral occurrences; (b) the collection of stream sediments samples to increase the density of geochemical data

... The Bluefish Caves site, located on a scarp of Devonian limestone in the northern boreal forest of the Yukon, has yielded pollen-bearing sediments in addition to abundant palaeontological and some archaeological data. A pollen diagram based on samples of late-glacial loess overlain by Holocene humus shows two main pollen assemblages, the lower dominated by herbs and dwarf shrubs and the upper by spruce and alder. Based on these results, but also drawing on recent findings from other sites in N. Yukon, we offer the following reconstruction of the vegetation history of the region. The vegetation of the late-glacial period, from 16,000 to 12,000 BP, was a sparse herb tundra on upland surfaces and a complex of sedgegrass marshes with willow on lowlands. There was a notable change in cover at the beginning of the Holocene when spruce forest spread to all upland surfaces except the highest ridges, and paludification in the lowlands resulted in the spread of bog and mire communities. (Au)
shallow-level mafic-ultramafic layered intrusion in the northwest corner of the Bear Province of the Canadian Shield. To date, radiometric, paleomagnetic, and geochemical evidence has produced only equivocal results concerning the age of the Muskox intrusion relative to overlying Coppermine River Group basalts and Mackenzie diabase dykes. Stratigraphic redefinition of and structural relationships to the volcanic sequence of the intrusion provide the best available evidence for the age of the Muskox intrusion. Syndepositional uplift and normal faulting within uppermost Dismal Lakes Group strata were most pronounced near the exposed roof of the intrusion. At least 70 m of sediments was deposited after this initial disturbance, but before emplacement of the Coppermine River Group basalts (which heralded the main emplacement event). This thickness of sedimentary strata implies a period of several hundred thousand years between the two igneous events. These results support earlier contentions that the Mackenzie igneous event, comprising emplacement of Mackenzie dykes, Coppermine River Group basalts, and the Muskox intrusion, was a coherent mafic igneous event that occurred approximately 1200 Ma ago, with the Muskox intrusion as a locus. (Au)

B-120261
Proterozoic aeolian quartz arenites from the Hornby Bay group, Northwest Territories, Canada: Implications for Proterozoic aeolian processes / Ross, G.M. (Precambrian research, v. 20, no. 2/4, June 1983, p. 149-160, figures) References. ACU

The Hornby Bay Group is a Middle Proterozoic 2.5 km-thick succession of terrestrial siliciclastics overlain by marine siliciclastics and carbonates. A sequence of conglomeratic and arenaceous rocks at the base of the group contains more than 500 m of mature hematic quartz arenite interpreted to have been deposited by migrating aeolian bedforms. Bedforms and facies patterns of modern aeolian deposits provided a basis for recognizing two sequences of aeolian arenites. (Au)

B-120278

In this paper we demonstrate the presence of an extensive tephra layer across Alaska and the Yukon Territory, the first widespread tephra of Pleistocene age to be documented in this area. We call this unit the Old Crow tephra, as our initial studies were on samples from the Old Crow region of the northern Yukon. We present comprehensive evidence for a time gap of at least several thousand years between the widespread tephra samples and comment on the stratigraphic significance of the deposit. (Au)

B-122246
Geothermometry and geobarometry applied to early Proterozoic "S-type" granitoid plutons, Wopmay Orogen, Northwest Territories, Canada / Pattison, D.R.M. (Contributions to mineralogy and petrology, v. 79, no. 4, 1982, p. 384-404, figures, tables) References. ACU

Many of the "S-type" granitoid plutons that comprise Hepburn and Ventzal Batholiths of the early Proterozoic Wopmay Orogen contain garnet, biotite and rarely cordierite and sillimanite. The garnet, cordierite and sillimanite are interpreted to be relict crystals brought up from the depth of origin of the magma. Two methods of geothermobarometry were applied to ten samples from the two batholiths ... The geothermobarometers successfully distinguished between granitoid rocks that were generated at depth and those that were formed by anatexis of country rocks near the level of emplacement. (Au)

B-122734

Two northwest-trending, coeval, mid-Cretaceous ... plutonic belts in the southeastern Selwyn Mountains are characterized by the presence or absence of hornblende as an essential mineral.
The northeastern belt comprises granite or granodiorite with common or abundant hornblende. The southwestern belt consists of granite with common biotite, minor muscovite and little or no hornblende. Plutons in either belt may be: small or large; composite or homogeneous; massive linedate or foliated; megacrystic or equigranular. Inclusion mineralogy and the abundance and type of intraplutonic dykes differ for each group. Tungsten skarns are associated with some plutons lacking hornblende. Satellite intrusions near, or marginal phases within, these plutons contain combinations of andalusite, garnet, tourmaline and/or muscovite apparently as primary accessory minerals. Geochemistry for these phases in the Mactung pluton indicates they are also anomalously rich in tungsten (8-12 ppm). (Au)

B-122939
Interpretation of a gravity profile over a contact zone between an Archean granodiorite and the Yellowknife Supergroup using an interactive computer program with partial automatic optimization / McGrath, P.H. Henderson, J.B. Lindia, F.M. (Paper - Canada. Geological Survey, 83-18, p. 189-194, figures) References. ACU

An interactive computer program with partial automatic optimization is described that is used to calculate the anomalies of 2 1/2-D refel model sources. As an example, a gravity profile is presented across an Archean basin margin complex involving granitoid, metavolcanic and metasedimentary rocks at Yellowknife. On the basis of the gravity model it is shown that the volcanics, which cut across only at the margin of the basin, extend to a depth of 2 to 3 km (depth determinations shown to be very sensitive to the density contrasts used) and are continuous for a distance of about 15 km into the basin below the metasediments which occupy the main portion of the basin. Within the basin an inverse relationship between the modelled thickness of the metasedimentary block and its grade of metamorphism is explained by the occurrence of near surface intrusive granitoid plutons in the high grade zone. (Au)

B-123315

The Parsons Group in the subsurface of the Mackenzie Delta area consists of three formations: in ascending order, the Martin Creek, Mcguire and Kamik. A late Berriasian to Middle Hauterivian age is indicated for the group. Sandstone is the dominant lithology in the Martin Creek and Kamik Formations, whereas mudstone is dominant in the Mcguire Formation. Martin Creek strata are interpreted as barrier-island deposits, with offshore, shoreface and lagoonal sediments identified from core material. The Mcguire Formation consists mostly of bioturbated mudstone with thin interbeds of sandstone, and is interpreted to have formed in a nearshore setting. Fluvial-channel, floodplain, lagoon and marsh deposits are present in the lower third of the Kamik Formation. In the upper two-thirds, inner-shelf and litoral deposits are arranged in a series of stacked barrier-island successions. Tidal-delta deposits are interpreted to be present within these barrier-island successions. Rocks of the Parsons Group were deposed during two depositional episodes... the older, Berriasian to earliest Valanginian, episode... and the younger, Early Valanginian to Middle Hauterivian, episode... The final phase of sedimentation was an episodic transgression when several stacked barrier-island deposits were formed. (Au)
The late Tertiary - Quaternary stratigraphic record of the Duck Hawk Bluffs, Banks Island, Canadian Arctic Archipelago, Vincent, J.-S., and Rochon, S.M. (1984). The Duck Hawk Bluffs, of southwestern Banks Island, in the Canadian Arctic Archipelago, record a succession of late Tertiary and Quaternary events. Organic-bearing sediments of solfat, fluviatil, and lucuvin frig orign that overlie the late Cretaceous Kanguk Formation, and the Niocene Bluff Fort Formation record preglacial events of Pliocene and (or) early Quaternary age and are assigned to the Wolf Point Formation. These are covered by interglacial sediments of the Duck Hawk Bluffs Formation, associated with the Banks Glacier, the oldest of the three recognized glaciers to reach the island. These sediments are in turn covered by interglacial sediments (Morgan Bluffs Formation), by marine deposits (Big Sea sediments associated with the Thomsen Glacier), and by younger interglacial sediments (Cape Collinson Formation). Events associated with the early Wisconsinan McCrue Stade of the last or Amundsen Glaciation are recorded in a coastal section east of the Duck Hawk Bluffs. There, marine deposits (pre-Amundsen Sea sediments) are covered by glacial deposits (such as the Ill) of the McCrue Stade. D/L ratios of aspartic acid in fossil wood from the Morgan Bluffs and Cape Collinson interglacial sites vary between 0.22 and 0.31 and 0.12 and 0.13, while Holocene wood is 0.08. A composite section is proposed for these bluffs that record some of the oldest events in the Canadian Quaternary. These various units are correlated with the previously published Quaternary framework for Banks Island. (Au)

B-135399

Laminated and massive sulfide (pyrrhite, sphalerite, galena) mineralization and massive barite - fluorite - galena lenses occur in Upper Silurian - Lower Devonian Road River Formation shales of the Vulcan property along the eastern flank of the Selwyn Basin, Northwest Territories, Canada. The 5 km thick stratigraphic section, ranging in age from Hadrynian through Mississippian, offers insight into the nature of the Mackenzie Platform - Selwyn Basin transition. Abrupt facies changes, synsedimentary faults, debris flows, local unconformities, and the presence of high-potassium mafic flows indicate extensional tectonics during deposition of the Road River Formation. Mineralization resulted from heated, metal-rich basin brines that vented on the sea floor up normal faults. Sulfur-isotope studies indicate that both sulfate and sulfide were derived from the exhalation metallocriferous brine. Sulfur-isotope data also indicate that reduction of sulfate in the brine occurred as a result of organic decomposition, possibly during thermal maturation at temperatures greater than 80 degrees C. Fluid inclusion observations indicate that the brine salinity reached 26 wt. % NaCl for at least a portion of the evolution of the brine system. Cooling of the brine during venting into bottom waters caused initial rapid precipitation of fine-grained barite, resulting in a baritic buildup above vent areas. (Au)

B-134237

Examination of material from both the Frasnian Mackenzie and Devonian zones of Chl and Hills (1976) has yielded large plants, superficially similar to L. constituta and apparently restricted to these zones. The purpose of this paper is to describe and illustrate the new species and to discuss its stratigraphic significance. The material examined is from the Imperial Formation, collected at Imperial River, District of Mackenzie .... (Au)

B-124800

The Bug Creek Group comprises the southeastern basin-marginal arenaceous facies of the Brooks-Mackenzie Basin during Sinemurian through early Oxfordian times. It is a northwestern extension wedge of shelf sandstone and siltstones that grades into a basinal shale facies of the Kingak Formation. The Alnston Creek and Alklavik Formations are two major marine sandstone units each probably storm-wave or tide-dominated, that prograded onto a shallow shelf and which represent regressive phases. Another regressive phase, without a significant sedimentary wedge is represented by the Manual Creek Formation. This is associated with uplift and minor erosion of the basin margin. The Bug Creek Group yields ammonites, bivalves, and other marine macrofauna locally, and a poorly preserved marine microbiota that is only locally prolific. Of this, 24 species of agglutinated foraminifera, 1 species of calcareous foraminifera, 1 species of ostracod, 1 species of radiolarian, 8 species of dinoflagellates, 7 species of spore or pollen, and 2 species of undifferentiated microplankton are figured, none as new species. (Au)

B-124826

Among the most important of geological problems are the mode of formation of Archaean volcanic-sedimentary belts and the identification of factors that caused the deposition of relatively large, or numerous, base metal deposits in some of these belts, but apparently not in others. The Slave Structural Province, with many small volcanic belts, has been less studied and prospected than the Superior Province and some of the other similar Archaean blocks in the world. (Au)
Continued percolation of the brine through the barite mound caused recrystallization of the barite and the deposition of interstitial fluorite and galena. In other areas the dense ore fluid collected in topographic depressions, or brine pools, in which sulfide minerals accumulated under anoxic conditions. Location of hydrothermal vents, paleotopography, and intensity of hydrothermal activity were the main controls on the thickness, distribution, and grade of Vulcan mineralization. (Au)

Deformation and metamorphism of the basement-cored folds. The underside of the thermal culmination is outlined by inverted mineral isograds and is underlain by basement that remained, in part, relatively cold during metamorphism. Emplacement of the Hepburn Intrusive Suite is coincident with upper structural levels within the Calderian thermal culmination and no Hepburn plutons are found in the basement units. Mesoscopic geometry of structures in the Wopmay Fault Zone documents a history of predominantly dextral simple shear with a large component of resolved pure shear. (Au)

Proterozoic Coronation Supergroup is exposed continuously by a major northeast-southwest cross fold to within 25 km of the Wopmay Fault Zone. The extent of Proterozoic overprint on the basement limits is limited to a retrograde chlorite schistosity parallel to, and within 100 m of the unconformity. Overlying the basement are between 300 and 600 m of autochthonous early Proterozoic sediments and mafic volcanics which show relatively little strain. Structure along the high strain domain is high strain ductile domain characterized by several sets of east-verging recumbent folds. The high strain domain is interpreted to be the ductile equivalent of the brittle basal decollement in the Aslik Foreland Thrust and Fold Belt. The Calderian thermal culmination, exposed in oblique section by the late cross fold, has the profile of an east-verging thermal lobe, rooted west of the basement-cored folds. The underside of the thermal culmination is outlined by inverted mineral isograds and is underlain by basement that remained, in part, relatively cold during metamorphism. Emplacement of the Hepburn Intrusive Suite is coincident with upper structural levels within the Calderian thermal culmination and no Hepburn plutons are found in the basement units. Mesoscopic geometry of structures in the Wopmay Fault Zone documents a history of predominantly dextral simple shear with a large component of resolved pure shear. (Au)

References.

ACU

Heavy mineral layers in a pink arkose-quartz-rich conglomerate unit of the Nonacho Group contain notable amounts of U, Th, Sn, Nb, Ta and Au. Enrichment in Th, Sn, Nb, Ta and to a lesser extent in U is related to the detrital dispersal and accumulation of thorite-uranotherite, cassiterite and a suspected but undetected Nb-Ta mineral. These minerals probably originated from sources to the west of the Nonacho basin, in the Fort Smith belt. The clastic minerals are consistently enriched in the heavy mineral layers throughout the arkose-conglomerate unit although Sn appears to be more concentrated towards the base of the sedimentary pile. A decline in the concentrations of the various clastic minerals from south to north is also apparent and reflects increasing distance from source. (Au)

B-139940


References.

ACU

Extensive areas of the Redrock Lake region are covered by surficial sediments, which have been grouped into these categories: till, outwash, glaciolacustrine silt, deltaic gravel, and sandy alluvium. Except for recent alluvium, the deposition of the sediments is related to the overriding of the Redrock Lake area by two ice streams originating to the east, and to the subsequent downwasting of this ice mass. The regular spacing of “glaciofluvial corridors” every 10 to 12 km testifies to the enormous amount of water that resulted from ice melting. The abundance of outwash, minor diamictic ridges, stony ice contact glaciolacustrine rhythms, and the absence of major moraines suggest the gradual downwasting of an ice mass with no significant readvance pulses. (Au)

B-139017


References.

ACU

Based on field work in the 10,000 square km Yellowknife pegmatite field, the gross mineralogical, textural, and structural characteristics of the pegmatite series and granites, possibly related to the pegmatites, are described. Field examination and limited geochemistry suggest that granites, possibly parental to the pegmatites, range in composition from alkali-feldspar granite to granodiorite, although they are predominantly biotite granite and monzogranite. On the basis of mineralogical and structural data, it is not yet possible to define genetic linkage between the pegmatites and individual plutons or plutonic units. (Au)

B-140694

Paleomagnetism of the Mudcracked formation of the Precambrian Little Dal Group, Mackenzie Mountains, Northwest Territories, Canada / Park, J.K. (Canadian journal of earth sciences, v. 21, no. 3, Mar. 1984, p. 371-375, figures, tables)

References.

ACU

A previous study detailed the paleomagnetism of red limestones of the Little Dal Group Basin assemblage, but failed to prove whether the magnetization carried by the red pigment was pre- or post-depositional. The present study on “red” sandstones of the immediately underlying Mudcracked formation, using acid leaching at three sites, revealed a paleomagnetic direction B in the pigments (266 degrees, -17 degrees; seven samples; k = 28; alpha 95 = 12 degrees), which closely agrees with the probable pigment direction of the Basin assemblage (273 degrees, -10 degrees; 12 sites; alpha 95 = 11 degrees). Since a fold test of the B sample directions is significant at the 95% probability level, I suggest that the pigment in both units is pre-folding (pre-Paleocene at latest). (Au)

See Also : A-64807, A-66460, A-113859, A-115878, A-123404, A-123892, A-13004, C-61395, C-61417, C-88850, C-121568, C-121703, C-121711, C-122300, C-123862, C-126895, C-135380, D-15466, D-107174, D-108197, F-131954, G-25526, H-122718, I-108219, I-108570, I-123242, L-21237, P-45691, P-94714, P-94730, P-94749, P-94757, P-94773, Q-2860, Q-39926, Q-44920, Q-83652, Q-83679, Q-107182, Q-107190, Q-108120, Q-112445, Q-114650, Q-116157, Q-124150, Q-132454, Q-132683, Q-139696, Q-22187, U-2519, U-46019, U-83936, U-62693, U-62921, U-84392, U-89079, V-35998, V-71994
Permafrost conditions exist beneath most of the Beaufort Sea shelf area. As a result of large changes in the surface thermal regime in the recent geological past, non-equilibrium conditions are probably found in most areas; hence permafrost is both aggrading and degrading. Permafrost is generally at much higher temperatures offshore than the equivalent permafrost conditions onshore and as a result is much more susceptible to thawing by a thermal disturbance. The occurrence of ice-rich sub-seabottom sediments over large areas of the shelf has been interpreted from seismic data. Such sediments are potentially susceptible to hazardous thermal degradation. Because of low sediment temperatures, natural gas in shallow sediments may be found in the form of clathrate hydrates, which may cause additional technical problems for exploratory drilling. ... (Au)

C-12084


References.

ACU

Ice-bonded sediments are found over much of the Beaufort Sea continental shelf but are absent from many parts of Mackenzie Bay. This reflects Pleistocene climatic conditions which resulted in the growth of permafrost to depths of 600 m or more. The study made use of oil industry reflection records to determine the distribution of these sediments. (Au)

C-14451


References.

ACU

Hummocks (nonsorted circles) are a widely distributed type of patterned ground in the boreal forest region of lower Mackenzie valley and the tundra of the Western Arctic coast. At the top of a hummock the surface of winter heave and summer subsidence is concave down, whereas at the bottom of the hummock it is concave up. In consequence, an upward cell circulation develops, because movement near the top of the hummock and radially outward and movement at the bottom is up and radially inward. (Au)

C-14532

Agricultural potential of certain areas in the Northwest Territories / Rostad, H.P.W. Kozak, L.M. [Saskatoon: Saskatchewan Institute of Pedology, University of Saskatchewan, 1977. (50) leaves : map (part. fold. in pocket), tables : 28cm.

(Publication - Saskatchewan. University. Saskatchewan Institute of Pedology, S 175) References.

ACU

This report is based on previous soil surveys of 1966, 1973, 1976 and 1977. Studies on soil capability for agriculture and grazing, climate, soils, and agricultural potential are conducted in the Slave River Lowlands, Upper Mackenzie, and Mackenzie River areas, and Hay River area. (ASTIS)

C-14540


(Publication - Saskatchewan. University. Saskatchewan Institute of Pedology, S 175) References.

ACU

This survey was conducted as part of a project to inventory and assess the soil and climatic resources for agriculture in the Territories. ... The areas surveyed were selected on the basis of a preliminary evaluation of the climate, native vegetation, current land use, and of those areas where agricultural leases were being applied for. This part of the project was concerned with mapping out and reevaluating the soils along the Hay River Valley between the Alberta border and Great Slave Lake. ... (Au)

C-14559


ACU

A survey of the lands along the Liard and Mackenzie rivers was initiated in the spring of 1975 with the objective of characterizing and mapping the soils of the area, interpreting the agricultural capabilities of the soils and providing recommendations for agricultural land use. Consideration was given to other land uses mainly in terms of summarizing existing information, relating that to the soils and pointing out possible areas of land use conflict. ... (Au)

C-15156


References.

ACU

Water from samples representing five cores, collected along the Mackenzie Valley Corridor, was analyzed for its oxygen-18 and tritium contents. ... In all cases, tritium was found only at the surface and no measurable amounts were detected below about 3 meters. Similarly the oxygen-18 contents decreased from about delta oxygen-18 = -23 per mill SMOW at the surface to about delta oxygen-18 = -31 per mill SMOW at depth. ... (Au)

C-15180


References.

ACU

This report is based on previous soil surveys of 1966, 1972, 1975 and 1977. Studies on soil capability for agriculture and grazing, climate, soils, and agricultural potential are conducted in the Slave River Lowlands, Upper Mackenzie, and Mackenzie River area, and Hay River area. (ASTIS)

... A permafrost mapping study was carried out in the southern fringe of the discontinuous permafrost zone near Fort Simpson, N.W.T., using air photo interpretation and electromagnetic resistivity techniques. The occurrence of permafrost in this portion of the discontinuous zone is most strongly influenced by insulating organic layer thickness and/or shading. ... (Au)

C-17395

A variety of electromagnetic (EM) methods have been used to sound permafrost. In this paper we report results using two distinct EM methods: audio-frequency magnetotellurics (AMT) and radio-frequency interferometry. ... (Au)

C-17388

... The test data have been interpreted in terms of secondary creep. Based on this interpretation, the data suggests that undisturbed ice-rich silt at low stress levels creeps at rates less than those reported for ice at similar stresses and temperatures. At higher stresses which ultimately lead to failure the creep rates are similar with ice. ... (Au)

C-17965

The occurrence and distribution of ice-bonded permafrost beneath the sea floor of the Beaufort Sea Shelf have been mapped by seismic techniques. The data for the maps comes primarily from refraction arrivals on front ends of unprocessed marine reflection records supplied to us by the oil industry. ... (Au)

C-17973


Petrolological analysis was performed on massive ground ice transected by thermal contraction cracks, in order to investigate mode of fracture, infill of cracks and interrelationships among fracture paths. Cracks propagated transgranularly through large crystals of massive ice. Sub-boundaries and other dislocation groups may have aided in micro-crack nucleation, and bubbles probably acted as stress concentrators. Fractures were infilled by freezing of bulk water rather than hoar. ... (Au)

C-15793

To study the effect of interrupting flow in the active layer in permafrost regions, an impermeable barrier was constructed in July 1975 across 12m of a 7.1% slope near Chick Lake, N.W.T. To detect possible thermal, hydrologic, and vegetation changes upslope and downslope active layer, water table, and plant cover were measured during the summer of 1975 and 1976. ... (Au)

C-15744

... permafrost was located beneath Shallow Bay and other channels. The conditions under which permafrost can persist, or aggrade and its impact on the channel morphology are discussed. ... (Au)

C-15768

Frozen ground occurs at shallower depths, contains more visible excess ice, and its extent increases from south to north, down the river valley. The main controlling factors appear to be latitude and soil texture. Finer textured soils generally contain more moisture and more ice than coarser soils. Poorly drained sites with a thick cover of peat contain more ground ice than adjacent drier sites. ... (Au)

... The occurrence and distribution of ice-bonded permafrost beneath the sea floor of the Beaufort Sea Shelf have been mapped by seismic techniques. The data for the maps comes primarily from refraction arrivals on front ends of unprocessed marine reflection records supplied to us by the oil industry. ... (Au)

ACU

This paper examines thaw consolidation effects in thawing permafrost at two sites in the Mackenzie Valley, N.W.T. At these sites excess pore water pressures have been measured. A consideration of the geothermal aspects of degrading permafrost is presented and a comparison between predictions and observations offered. Certain extensions to thaw consolidation theory required in a consideration of degrading permafrost are then investigated. (Au)


iv, 12 leaves : figures, table ; 28cm.

(Geothermal series - Canada. Earth Physics Branch, no. 2)

Cover title.

References.

Text in English and French.

... the Earth Physics Branch ... has carried out field observations of both the shallow and deep thermal regime of the Mackenzie Valley, conducted laboratory measurements of the thermal properties of subsurface soils and rocks, both frozen and unfrozen, has examined theoretically the thermal effects resulting from changes in the surface energy balance and compared these results with some observed temperature profiles. (Au)

References.

ACU

... For thin, shallow, high-velocity layers, ... using attenuation measurements of refracted energy, has been successful. For thicker layers, a dispersion method based on modal propagation ... and a technique based on discrete reflections from the base of the layer have been tested: ... The low signal-to-noise ratio on the unprocessed records makes measurement of thickness unreliable. (Au)

... The tests have been conducted on these sites representing volume factors of approximately 1.3 and 2.3 times. Thermal properties of subsurface soils and of the proposed Arctic Gas pipeline route from Norman Wells, N.W.T. to Zama Lake, Alberta. are inferred. Certain extensions to thaw consolidation theory required in a consideration of degrading permafrost are then investigated. (Au)


iv, 12 leaves : figures, table ; 28cm.

(Geothermal series - Canada. Earth Physics Branch, no. 2)

Cover title.

References.

Text in English and French.

... the Earth Physics Branch ... has carried out field observations of both the shallow and deep thermal regime of the Mackenzie Valley, conducted laboratory measurements of the thermal properties of subsurface soils and rocks, both frozen and unfrozen, has examined theoretically the thermal effects resulting from changes in the surface energy balance and compared these results with some observed temperature profiles. (Au)

C-18422


References.

ACU

This paper presents the results of thaw settlement tests conducted on permafrost samples obtained along or adjacent to the route of the proposed Arctic Gas pipeline route from Norman Wells, N.W.T. to Zama Lake, Alberta. These tests have been conducted on three sizes of samples representing volume factors of approximately 1.3 and 23 times. (Au)

C-21261

Offshore permafrost, southern Beaufort Sea / Mackay, J.R. [Calgary : Distributed by APOA, 1972].

1 microfiche : (111. ; 11x16cm.

(APDA project no. 4 : Geological analysis of ocean floor samples. Report, no. 2)

References.

ACU, NSFMO

In the spring of 1970, permafrost was found in drilling operations (Ocean Floor Sampling - Arctic Ocean of APOA) in the southern Beaufort Sea off the Yukon Coast and Mackenzie Delta-Tuktoyaktuk Peninsula area. Two quite small frozen samples from Bore Hole 7B (Sample 6) and Bore Hole 1SA (Sample 7B) were given to the writer for study. In the summer of 1970, the Geological Survey of Canada, in its survey of the southern Beaufort Sea, cored into fresh water ice lenses about 30 miles north of Cape Bathurst. There is no doubt, therefore, that permafrost is present in the southern Beaufort Sea. Some tentative observations on offshore permafrost are given. (Au)

C-21820


References.

ACU

Laboratory direct shear tests were performed on undisturbed samples of frozen silt clay obtained from near Fort Simpson, N.W.T. The results show that with sufficiently slow strain rates, the shear strength of ice-poor, fine-grained frozen soils depends upon normal stress and confirms that they exhibit a definite frictional response. The friction angle determined for the frozen soil corresponded to the effective friction angle obtained when the same material was sheared in a thawed state. (Au)

C-21989


References.

ACU, NSFMO

Crystallization histories of some ice layers in permafrost are inferred from crystal size, shape, dimensional and lattice orientation, and inclusion patterns. In an icing mound, formed by injection of water beneath frozen active-layer soil, early growth was rapid, indicated by copious small crystals and bubbles, followed by slower growth giving rise to crystals and bubbles elongate parallel to the freezing direction. c-axes were normal to crystal long axes. In a small pingo, bulk water existed temporarily at the freezing interface and freezing was unidirectional. In a larger pingo, variations in freezing rate were inferred. Later flow of ice modifies growth fabrics. (Au)

C-21997

Ice-wedge ice, Mackenzie Delta-Tuktoyaktuk Peninsula area, N.W.T., Canada / Sell, W.A. (Journal of glaciology, v. 20, no. 84, 1978, p. 555-562, 111. figures, map)

References.

ACU, NSFMO

Petrologic analysis was performed on ice-wedge...
ice in order to investigate changes in fabric across wedges in relation to the growth mechanism. Crystal size increased from the centre outward and strongly preferred dimensional orientations developed parallel to the sides of wedges. In massive ice penetrated by an ice wedge, crystal size and complexity of crystal shape decreased toward the wedge, dimensional orientations tended to become parallel to the wedge, and crystals formed a point maximum normal to the wedge boundary. (Au)

C-24198

Drill hole data from the Eagle River crossing by the Dempster Highway near the Arctic Circle have been interpreted on the basis of point bars formed by a migrating meander loop and dated by tree core ring counts. In the wake of the migrating meander loop, two waves of changes in the state of permafrost have penetrated downwards into the ground, associated with a downward migrating and thickening interpermafrost talik layer containing water under pressure. (Au)

C-27987

... Palsa-peat plateau complexes cover 0.7% of the 235 square km study area and are found in bog and fen depressions at elevations from 1285-1690 m. Palsa heights range from 0.15-9.75 m and diameters from 3.25-75.0 m. Palsa plateaus have maximum heights of 2.5 m and maximum diameters of 225 m. Both features are vegetated by Cladina-Betula glaucos. Cladina-Polytrichum-Cetraria, and crustose lichens-Polytrichum plant communities. (Au)

C-28029
Use of long-term automatic time-lapse photography to measure the growth of frost blisters / van Everdingen, R.O. & Banner, J.A. (Canadian journal of earth sciences, v. 16, no. 8, Aug. 1979, p.1632-1634) References. ACU

The use of automatic time-lapse camera systems, taking daily photographs at solar noon between 26 September 1977 and 3 May 1978, has made it possible to determine the time and rate of growth of frost blisters at Bear Rock near Fort Norman, N.W.T. The daily negatives have been printed and refiled to produce a time-lapse motion picture covering the full 220 day observational interval. The use of paired cameras allowed production and viewing of daily stereo pairs. (Au)

C-37206

Describes features to be noted on a seven-day field trip Yellowknife-Fort Providence-Fort Simpson-Nahanni-Weigley and Norman Wells. Covers the geological and glacial histories of the areas emphasizing ground-ice occurrence. Engineering and construction problems associated with permafrost in an urban environment, an underground mining operation, and an oil refinery facility are illustrated. (ASTIS)

C-37214

The objective of this field trip is to illustrate the occurrence of permafrost and ground ice and to examine man's response to these phenomena in northwestern Canada in general and in the Mackenzie Delta region in particular. The trip comprises two parts: 1) an aerial transect ... from Yellowknife, N.W.T. to the arctic coast at Tuktoyaktuk, and 2) more detailed coverage of the Mackenzie Delta region, including visits to numerous sites illustrating the principal elements of the landscape of the continuous permafrost zone. ... This guidebook has been written as a general introduction to the region, with more detailed sections covering the localities at which ground tours will be made. (Au)

C-38830

... A field reconnaissance has established the state-of-the-art of cut slope design, construction and performance in the western Canadian Arctic and Alaska. ... Emphasis has been placed on establishing the geological history, the land form, and the associated soil and ground ice characteristics. Flow dominated failures on natural slopes and cut slopes are common in regions of permafrost. A means of stabilizing these failures is proposed. Design charts are provided and recommendations for installation are included. Recommendations for the design and construction of cut slopes in frozen soils are outlined. (Au)

C-39616

This thesis describes a laboratory study conducted on samples of undisturbed,
fine-grained permafrost in soil. Specimens were obtained from sampling sites located near Fort Simpson, Norman Wells, and Inuvik, N.W.T., Canada. Both frozen and thawed soils were tested to explore fundamental behaviour and assess typical geotechnical properties. ... Transient and steady state deformation processes were identified in creep tests performed on the same soil, and analytical techniques used to assess and present the data have been described. ... Site investigation techniques in permafrost terrain have been discussed and recommendations pertaining to improving existing practice are presented. (Au)

C-49956


The audiofrequency magnetotelluric (AMT) method has been used to study permafrost thickness near Tuktoyaktuk, N.W.T. in the Mackenzie Delta. In the frequency range of 10 Hz-10 kHz the permafrost behaves as a simple resistive layer over a conductive layer. This simple two-layer model can be inverted by asymptotic models to give a unique value for the thickness of the highly resistive frozen layer. In areas of simple layering, these results correlate well with drilling. In areas of sharp lateral variations in resistivity, depths tend to be underestimated. Unlike other electrical methods, AMT is not hampered by the presence of a surface melt layer in the summer if the conductivity-thickness product of this "active layer" is less than about 0.03 mho (0.03) (Au)

C-50610

The origin of hummocks, western arctic coast, Canada / Mackay, J.R. (Canadian journal of earth sciences, v. 17, no. 8, Aug. 1980, p. 996-1006, 111., figures, photos.) References. ACU

... The hummocks under discussion are composed of fine-grained frost-susceptible soil: the late summer frost table is bowl-shaped; and the hummocks grade from those which are completely vegetated (earth hummocks) to those with bare centres (sand hummocks). The mound form is usually attributed to an upward displacement of material resulting from cryostatic (freeze-thaw) pressure generated in a confined, wet, unfrozen pocket of the active layer. ... Field observations carried out at Garry Island, Northwest Territories, for 1965-1979 and for 1967-1979, Northwest Territories, provide no field evidence for the cryostatic theory. An alternative model of hummock growth is here proposed. The upward displacement of material is believed caused by freeze-thaw of ice lenses at the top and bottom of the active layer with a gravity-induced cell-like movement: because the top and bottom freeze-thaw zones have opposite curvatures. The cell circulation is evident from the grain-size distribution of hummock soils and from upward-moving tongues of a kaolin slurry in a bowl-shaped container in support of the proposed theory. (Au)

C-57509


In arctic regions mass movements in thawing permafrost are common. Although different types of landslides have been identified, one type referred to as a "bimodal flow" has caused a significant amount of interest on account of the unusually high rate of mass wasting associated with this type of flow slide. The flow is characterized by a steep headscarp and a low angle mud flow or tongue at the base of the slide. Although more than one activity contributes to the retreat of the headscarp, the most important process is that of ablation. ... The components of the energy balance were identified and a field study was undertaken to quantify these terms. ... The results of this study indicate that all the major terms in the energy balance equation combined to form the source of heat responsible for the high rates of observed ablation. Moreover, they provide a rational basis for controlling bimodal flow slides using different insulation materials. (Au)

C-57517


Using data contained in the Mackenzie Valley Geotechnical Data Bank together with data derived from morphometric analyses of topographic maps and air photographs, the volume of ground ice present in the upper 10 m of Richards Island is calculated to be 10.27 cubic km. Pore and segregated ice constitute over 80% of the total ice volume. Wedge ice constitutes between 12 and 16% of total ice volume in the upper 4.5 m, and approximately 36% of all excess ice. In the upper 1-2 m, wedge ice may exceed 50% of earth materials. Pingo ice is insignificant in terms of its contribution to total ice volumes. Excess ice constitutes 1% of the upper 10 m of permafrost; it follows that thawing of this layer of permafrost may lead to an average subsidence of 1.4 m. (Au)

C-59374


Radiohne surveys were carried out at ... Ft. Simpson, Norman Wells and Tuktoyaktuk. These sites represent areas of: 1) discontinuously permafrost; 2) thin continuous permafrost and, 3) thick continuous permafrost, respectively. A solution for electromagnetic plane waves propagating over horizontal stratified ground is used in determining the distribution and thickness of the permafrost. ... The various problems which are peculiar to permafrost surveys are discussed. Between the Radiohne interpretation and the control information were generally favourable. (Au)

Hydraulic water-jet drilling has been used extensively for water well drilling in non-permafrost areas and to some extent for shallow drilling in areas of discontinuous permafrost. The jetting procedure simply involves directing the discharge of the pump through the pipe string. As material is loosened by the jetting action the pipe is advanced. The material loosened is carried upwards around the outside of the pipe by the rising flow of water and is expelled at the sea floor. When the projected depth, usually 61 m (200 ft), was reached or refusal met, the 2.5 cm (one inch) pipe was left in place as casing for the installation of a thermistor cable. ... (Au)

C-61379

... The Beaufort-Delta survey was intended as a preliminary step to assess the performance, reliability and applicability of various investigative procedures, to provide additional correlation among existing data, and to identify conditions which might require more detailed examination during subsequent investigations. ... This paper deals with some anomalous features encountered along two ... lines - north of Richards Island - along the Fillen Corridor, and north of Tuktoyaktuk along the Kugmallit Corridor. (Au)

C-61395

A ... study was carried out ... to investigate permafrost in the vicinity of an exploratory well drilled in the Mackenzie Delta area of Northern Canada. The study served two purposes. ... to confirm a model of the permafrost regime; a model which assumed a degrading environment with permafrost thinning by melting on both top and bottom surfaces. ... [and] to confirm that permafrost is not constant across the study area ... This paper will describe the techniques and results of the study and include discussion of the permafrost model. ... (Au)

C-61409

In the Mackenzie Delta and Beaufort Sea, velocity analyses of seismic refraction and reflection data have proven by far the most accurate method for determining presence, depth to top, and thicknesses of permafrost. Seismic refraction will indicate permafrost and the depth to its top, while velocity analyses of reflection data will determine its thickness. (Au)

C-61417

For long periods of time during the Pleistocene, part of the Beaufort Sea continental shelf was exposed to subzero air temperatures and, as a consequence, permafrost grew in the sediments to a thickness in excess of 600 m. These conditions are reflected today in the ice bonded sediments which are found over a large percentage of the shelf area. The extent of ice bonded sediments is determined by analyzing the "front ends" of oil industry reflection records in terms of refracted arrivals. ... (Au)

C-63673

During 1972/73 a series of studies was initiated at Tununik, N.W.T., to evaluate the energy budget over disturbed and undisturbed
terrain and to determine the validity of an energy budget approach to investigation of terrain sensitivity. More specifically, the studies were intended to establish a methodology for the measurement of energy budget components, to provide information on the relative magnitudes and importance of the component energy terms and to investigate possible relationships between energy budget component terms and the tundra disturbance classification system proposed by the Muskeg Research Institute (1970). The results show that disturbance levels on the Muskeg Research Institiute discontinuous terrain disturbance classification system are closely related to the albedo term. (Au)

C-68225
Soil stabilization for protection of sea-bed structures from ice scour / Morgenstern, N.R. 
1v. (various paging) : ill. ; 28cm. 
References. 
NFSMO 
One of the major problems to be considered in the design of pipelines and drilling platforms in the Beaufort Sea is the damage that can result from ice scouring. It was thus decided to conduct a laboratory investigation to determine whether the sea bed in the vicinity of such structures could be stabilized by in-situ mixing of the sea bed sediments with cement to a degree sufficient to offer substantial resistance to ice forces. The preliminary laboratory work that was carried out is described in this report. In addition, problems of ice scouring and the formation of pressure ridges were reviewed from the available literature. Finally, the results of the laboratory work are discussed and proposals for further research outlined. (Au)

C-73733
Analysis of synergistic systems for evaluating terrain sensitivity to disturbance of icy permafrost in the Mackenzie River valley. 
Canada / Crompton, C.B. 
(Report de pergelacjalny, no. 28. 1981, p. 15-31, 111. figures, tables) 
References. 
ACU 
An extensive land classification for the Mackenzie River valley has been combined with an analysis of synergistic systems, to quantify field units for a more comprehensive terrain evaluation than could have been produced by either field or analytical work alone. The empirical prediction of ice content and its distribution within different environments has been used with field data to develop a classification for sensitivity of the landscape to damage from disturbance. The zone of most rapidly changing sensitivity which occurs around Fort Norman and Norman Wells as the Discontinuous merges into the Continuous Permafrost Zone has been quantified. (Au)

C-75965
Aklisuktuk (Growing Fast) Pingo, Tuktoyaktuk Peninsula, Northwest Territories, Canada / Mackay, J.R. 
References. 
ACU, NFSMO 
Field surveys have been carried out for the 1972 to 1979 period in order to study the growth of Aklisuktuk (Growing Fast) Pingo. The field surveys show that the top of the pingo was slowly subsiding during the seven-year survey period, possibly from a slow downslope glacier-like creep of the ice-rich overburden and ice core. The name "Aklisuktuk" probably dates back at least 200 years. The rapid growth which attracted attention was from accumulation of water in a large sub-pingo water lens. (Au)

C-79907
Active layer slope movement in a continuous permafrost environment. Garry Island, Northwest Territories, Canada / Mackay, J.R. 
References. 
ACU 
Field investigations have been carried out at Garry Island, N.W.T. to study downslope active layer movement at sites with two-sided (downward and upward) freezing and active ice-wedge growth. Movements have been determined with reference to semi-flexible plastic tubes inserted vertically into the ground and by deformation of lines of stakes. The results show that the vertical velocity profile on the hilltops with clayey hummocks is convex downslope; the movement is plug-like and occurs in the late summer; the plug-like movement progressively buries the interhummock peat to form a buried organic layer; and most of the plug-like movement can be attributed to frost creep by thaw of an ice-rich layer at the bottom of the active layer. The ice-rich layer forms by upfreezing in winter and the ice content may be augmented by ice lensing in the summer thaw period. In a sedgy drainage swale, the vertical velocity profile is concave downslope. The active layer of ice-wedge polygons shows a net movement outwards from the centres to the troughs. These studies show that active layer movement at sites with two-sided freezing and active ice-wedge polygons may differ substantially from sites with only one-sided freezing and without active ice-wedge polygons. (Au)

C-81914
1v. 170p. : ill. ; 28cm. 
(Technical memorandum - Canada. National Research Council. Associate Committee on Geotechnical Research, no. 128) 
References. 
ACU 
This publication contains fifteen papers presented at the Symposium. The first four concern studies on the lake drainage experiment conducted on Richards Island, N.W.T. and the consequent permafrost studies being carried out. The balance of the papers discuss geophysical exploration of permafrost, and engineering problems, such as thawing along pipeline installations. (ASTIS)

C-83860
Soils engineering report : Beaufort Sea, area N.W. of Richards Island / Cook, Pickering and Doyle Limited. 
2 microfiches : ill. ; 11x16cm. 
(APOA project no. 110 : Conical and cylindrical gravity structures for southern Beaufort Sea. Report, no. 2) 
Appendices. 
References. 
ACU, NFSMO
The microbiology of some permafrost soils in the
Mackenzie valley, N.W.T. / Ivarson, K.C.
(Arctic, v. 18, no. 4, Dec. 1965, p. 256-260,
tables)
(Contribution - Canada. Soil Research
Institute, no. 149)

C-10056
Permafrost depths, lower Mackenzie Valley.
Northwest Territories / Mackay, J.R.
(Arctic, v. 20, no. 1, Mar. 1967, p. 21-26,
figures)
ACU

C-101524
Studies of soil microorganisms, Inuvik, Northwest
Territories / Boyd, W.L., Boyd, J.
(Arctic, v. 24, no. 3, Sept. 1971, p. 162-176,
figures, tables)
ACU

C-101834
Thermal contraction cracks in an arctic tundra
environment / Kerfoot, D.B.
(Arctic, v. 25, no. 2, June 1972, p. 142-150,
figures, map)
ACU

C-102814
Linear-patterned slopes in the discontinuous
permafrost zone of the central Mackenzie River
Valley / Crumpton, C.B.
(Arctic, v. 27, no. 4, Dec. 1974, p. 265-272,
figures, tables)
ACU

C-103195
Soils of the subarctic in the lower Mackenzie
Basin / Pettapiece, W.W.
(Arctic, v. 28, no. 1, Mar. 1975, p. 35-53,
figures, tables)
ACU

C-108391
Mackenzie Delta - Beaufort Sea development plan:
permafrost response study nearshore & onshore
pipeline geothermal analysis / EBA Engineering
Consultants Limited.
[5.1.] : EBA Engineering Consultants Ltd.,
1981.
1 microfiche : figures, tables ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. NW202)
References.
ACU

This report presents the results of a study of the
general interaction between a subsea oil
pipeline and surrounding permafrost area. The
pipeline is intended to carry oil from offshore
production islands in the Beaufort Sea to a
pipeline terminal on Richards Island in the
Mackenzie Delta. The pipeline will be operated at
a temperature greater than 0 degrees C which
will introduce into the design the risk of
instability due to thaw of permafrost
supporting soils. ... The study documented in
this report is intended to provide a
preliminary estimate of the extent of thaw that
may occur during the operating lifetime of the
buried pipeline for both the shallow water
offshore and onshore conditions. ... All
geothermal analyses were conducted using a
finite element geothermal simulation model
developed at EBA. The model calculates
transient heat conduction in soil of variable
composition, accounts for latent heat of fusion
within the soil, and heat exchange at the
ground surface. Ground surface heat exchange is
computed from meteorological data such as air
temperature, solar radiation, greenhouse
cfactor, wind velocity, snow depth and
ovapotranspiration. ... (Au)
Permafrost mapping

Oxygen isotopic composition of the ground ice

conductivity values. 

m.

the presence and extent of permafrost and

out over electromagnetic induction systems was carried 

electromagnetic induction methods / Sinha, A.K.

process and origin of the water body. It was indicated 

compositions, which were due to the difference 

and gravity. Some geocryologic implications of 

summer growth of ice in frozen ground, 

including the effects on water balance 

calculations and the origin of patterned 

ground, are briefly mentioned. (Au)

Reconnaissance of vegetation and soils along the 


This report complements the reconnaissance of vegetation (Stanek et al. 1981) along 450 km of the Dempster Highway from North Fork Pass in the Ogilvie Mountains, Yukon Territory, to the Peel River, Northwest Territories. The pH and content of major nutrient elements (N,P,K,Ca, and Mg) were determined on soil samples collected from 100 plots along the Dempster Highway in the Yukon Territory. Information was obtained on depth to permafrost in September, generic soil types, thickness of the organic horizons, and slope. The survey indicated that mainly Static and Turbic Cryosols, intermixed with Regosols and sporadic Brunisols, occur in this area. The mapping at a scale of 1:250,000 utilized three major groups of soils according to the pH of their organic layers. The report contains data on some soil properties as related to vegetation and is aimed primarily at providing information for revegetation projects.
Ground temperature studies

C-121568

Ground ice stratigraphy and late-Quaternary events, south-west Banks Island, Canada

Arctic / French, H.M. Harry, D.G. Clark, M.J.


References

ACU

The stratigraphic study of pingos and ice wedges on south-west Banks Island indicates a period of continuous permafrost aggradation in late Quaternary times interrupted by a temporary period of deeper seasonal thaw in the mid-Holocene. Both epigenetic and small syngenetic ice wedges are exposed in coastal bluffs south-east of Sachs Harbour, within the Sachs and Kellett River catchments. Radiocarbon dating suggests that a number of collapsed and partially eroded pingos are relict features related to a period of climatic deterioration which commenced approximately 4000 years B.P.

The stratigraphic study of ground ice is thought to be a useful method of geomorphological and palaeoenvironmental reconstruction, especially in areas which have experienced extended histories of cold, non-glacial conditions. (Au)

C-121508

Ground temperature studies of permafrost growth at a drained lake site, Mackenzie Delta / Burgess, M. Judges, A. Taylor, A. Allen, V.


References

ACU

Illisarvik lake on Richards Island, Mackenzie Delta, was artificially drained in order to investigate the growth of permafrost. Twenty-four boresoles were hydraulically drilled to depths ranging from 15 to 32 m below lake level and were instrumented with temperature cables. Monitoring of ground temperatures beneath the lake and surrounding shore-line during the drainage period showed that the lake bottom and the underlying talik were below the permafrost. The stratigraphic study of ground ice is a useful method of reconstructing past freezing and thawing in these areas. (Au)

C-121504

Pingo of the Tuktoyuktuk Peninsula area.

Northwest Territories / Mackay, J.R.

(Geographie physique et Quaternaire, v. 33, no. 1, 1979, p. 3-61, figures, table)

References

ACU

Most pingos have grown in residual ponds left behind by rapid lake drainage through erosion of ice-wedge polygon systems. The field studies (1969-78) have involved precise levelling of numerous pingos and ice-wedge polygon systems, extensive drilling, detailed temperature measurements, installation of water pressure transducers below permafrost and water (ice) quality, soil, and many other analyses. Precise surveys have been carried out on 17 pingos for periods ranging from 3 to 9 years. (Au)

C-121577

Arctic underpinnings: permafrost.


Text in English and French. ACU

This article describes the history of permafrost research in Canada, which has enabled engineers to make great strides in both on-shore and off-shore projects in the north. (AST15)

C-120359

Pingos of the Tuktoyuktuk Peninsula area.

Northwest Territories / Mackay, J.R.

(Geographie physique et Quaternaire, v. 33, no. 1, 1979, p. 3-61, figures, table)

References

ACU

Illisarvik lake on Richards Island, Mackenzie Delta, was artificially drained in order to investigate the growth of permafrost. Twenty-four boreholes were hydraulically drilled to depths ranging from 15 to 32 m below lake level and were instrumented with temperature cables. Monitoring of ground temperatures beneath the lake and surrounding shore-line during the drainage period showed that the lake bottom and the underlying talik were below the permafrost. The stratigraphic study of ground ice is a useful method of reconstructing past freezing and thawing in these areas. (Au)

C-120359

Pingos of the Tuktoyuktuk Peninsula area.

Northwest Territories / Mackay, J.R.

(Geographie physique et Quaternaire, v. 33, no. 1, 1979, p. 3-61, figures, table)

References

ACU

Most pingos have grown in residual ponds left behind by rapid lake drainage through erosion of ice-wedge polygon systems. The field studies (1969-78) have involved precise levelling of numerous pingos and ice-wedge polygon systems, extensive drilling, detailed temperature measurements, installation of water pressure transducers below permafrost and water (ice) quality, soil, and many other analyses. Precise surveys have been carried out on 17 pingos for periods ranging from 3 to 9 years. (Au)

C-121508

Ground temperature studies of permafrost growth at a drained lake site, Mackenzie Delta / Burgess, M. Judges, A. Taylor, A. Allen, V.


References

ACU

Illisarvik lake on Richards Island, Mackenzie Delta, was artificially drained in order to investigate the growth of permafrost. Twenty-four boreholes were hydraulically drilled to depths ranging from 15 to 32 m below lake level and were instrumented with temperature cables. Monitoring of ground temperatures beneath the lake and surrounding shore-line during the drainage period showed that the lake bottom and the underlying talik were below the permafrost. The stratigraphic study of ground ice is a useful method of reconstructing past freezing and thawing in these areas. (Au)

C-121508

Ground temperature studies of permafrost growth at a drained lake site, Mackenzie Delta / Burgess, M. Judges, A. Taylor, A. Allen, V.


References

ACU

Illisarvik lake on Richards Island, Mackenzie Delta, was artificially drained in order to investigate the growth of permafrost. Twenty-four boreholes were hydraulically drilled to depths ranging from 15 to 32 m below lake level and were instrumented with temperature cables. Monitoring of ground temperatures beneath the lake and surrounding shore-line during the drainage period showed that the lake bottom and the underlying talik were below the permafrost. The stratigraphic study of ground ice is a useful method of reconstructing past freezing and thawing in these areas. (Au)
Field and laboratory acoustic testing of frozen soils / Fransham, P.S., Unrav, J.D., Reesor, S.N.

ACU

Research was undertaken to investigate the compressional wave velocities in frozen soils. Samples were obtained during two consecutive field seasons from Illisarvik Lake, N.W.T. Compressional wave velocities were measured on cores in the field using portable ultrasonic testing equipment. Velocity measurements were made at a single temperature and, hence, yielded a single point on a velocity versus temperature curve. Grain-size and moisture content tests serve as a base for interpreting wave velocities obtained from field surveys show a strong correlation with those obtained from laboratory measurements. This suggests that one should be able to differentiate ice-rich from ice-poor zones, and, hence, obtain an impression of the spatial distribution of the ground ice. Compressional wave velocities have also been measured on a series of kaolinite and sand mixtures. Kaolinite to silica sand mixtures were made in the following ratios: 1.0, .75, .50, .25, and 0. Water contents ranged from 3 to 45 per cent. The samples were compacted using the modified Proctor method. The results show a strong dependence of velocity on moisture content, the proportion of sand to clay, and the bulk density. (Au)

C-121835
Borehole creep and relaxation tests in ice-rich permafrost / Ladenyi, B.

ACU

... Borehole relaxation tests are the alternative to borehole creep tests in the determination of the creep parameters of frozen soils. Their advantage is that the strain is controlled and the stress variation observed, so that there is no danger of exceeding the volume capacity of the cell. Consequently, borehole relaxation tests can easily cover the area of low-stress history and can be performed for long periods of time. The question arises, however, whether the creep parameters deduced from creep and relaxation tests, respectively, are equivalent. A field study, carried out recently at a permafrost site near Inuvik, N.W.T., attempted to answer this question and the principal results of that study are discussed. (Au)

C-121899
Thaw subsidence analysis for multiple wells on a gravel island / Goodman, M.A.

ACU

Sea-floor settlement, particularly differential settlement, is important for off-shore island design. For gravel islands, differential settlement at the sea-floor may result in movement of the island surface which could cause damage to surface facilities and/or require substantial amounts of make-up gravel for maintenance of island elevation. For steel gravity-type structures, differential settlement at the sea-floor could cause large stresses within the structure due to loss of foundation support. The magnitude and distribution of settlement beneath an island is dependent on thaw geometry which in turn is dependent on well arrangement on the island surface. ... two different well configurations have been analyzed, one with wells clustered within a circle in the centre of the island and the other with wells on two concentric circles near the periphery of the island. The intent is to consider one case of concentrated thaw beneath the island centre and another case of...

In the summer of 1978, two series of borehole dilatometer tests were carried out by the author at a permafrost site near Inuvik, N.W.T. on behalf of the National Research Council of Canada (NRCC). The purpose of the tests was to examine and define the mechanical properties of frozen ground in which the performance of a series of full-scale foundation loading tests is being planned by the Division of Building Research, NRCC. For the near future. This paper presents only the portion of the investigation which concerns the short-term tests and compares the data obtained by two different dilatometers. The permafrost table at the site is about 90 cm below the surface. Two different instruments were used in the tests: (1) the Mann presssuremeter typs G, (Ladanyi and Johnsen, 1973) and (2) the Colorado School of Mines dilatometer, also called the CSM Cell (Hustrulid, 1979). Both of them are essentially borehole dilatometers but their size, construction and control systems are quite different. (Au)
Oxygen isotope variations in permafrost in the Tuktoyaktuk Peninsula area, Northwest Territories, are presented in conjunction with other data to provide a range of estimates for the depth of the post-Hypsithermal lake bottom taliks, modern ice-wedge ice, and ground ice of late Wisconsinan age. Some estimates are given for the rate of growth of permafrost in recently drained lakes: the freezing rate at the end of a decade can be less than 0.1 mm/n. The freezing rates are so slow that the effects of oxygen isotope fractionation should be considered in the interpretation of oxygen isotope variations at sites with both closed and open system freezing. (Au)

C-135380

ACU
Seismic wave velocities have been measured on 37 unconsolidated permafrost samples as a function of temperature in the range -16 to +5 degrees C. The samples, taken from a number of locations in the Canadian Arctic islands, the Beaufort Sea, and the Mackenzie River valley, were tightly sealed immediately upon recovery in several layers of polyethylene film and maintained in their frozen state during storage, specimen preparation, and until they were tested under controlled environmental conditions. During testing, the specimens were subjected to a constant hydrostatic confining stress of 0.35 MPa (50 psi) under drained conditions. No stage was a deviatoric stress applied to the permafrost specimens. The fraction of clay-sized particles in the test specimens varied from almost zero to approximately 65%. At temperatures below -2 degrees C the compressional-wave velocity was observed to be a strong function of the fraction of clay-sized particles, but only a weak function of porosity. At temperatures above 0 degrees C the compressional-wave velocity was observed to be a function only of porosity, with virtually no dependence upon the fraction of clay-sized particles. Calculation of the fractional ice content of the permafrost pore space from the Kuster and Toksoz theory showed that for a given fraction of clay-sized particles the ice content increases with an increase in porosity. It is concluded that the compressional-wave velocity for unconsolidated permafrost from the Canadian Arctic is a function of the water-filled porosity.
irrespective of the original porosity, clay content, or temperature. (AU)

C-136433
26 p. : tables ; 28 cm.
(Contractor report series - Canada. Institute of Ocean Sciences, Patricia Bay, 80- 5)
NFSMO

The main purposes of this probability study are to estimate the number of Pingo-Like-Features (PLF's) in a certain area of the Beaufort Sea, to establish zones of constant average PLF density, and to determine the optimal sampling method for future experiments. The findings of this report are based on sampling data provided from analysis of continuous depth profiles taken throughout the area of interest. ... (AU)

C-136441
Study on the acoustic target strength of the PLF's found in the Beaufort Sea / Geomarine Associates Ltd. Simpkin, P.G. Canada. Institute of Ocean Sciences, Patricia Bay [Sponsor].
(Contractor report series - Canada. Institute of Ocean Sciences, Patricia Bay, 80- 7)
Appendix.
NFSMO

... The project addressed in this report is specifically a study of the acoustic target strength of PLF's [Pingos and voluted hills] in the Beaufort Sea. Relevant information such as size and shape of PLF's has been made available by I.O.S. As no specific measurement of the reflecting properties of PLF's is available, an acoustic model will be developed to a point such that an estimate of the amplitude of the echo from a PLF with respect to the background level can be made. ... (AU)

C-136450
Study of Pingo-Like-Features detected in the Beaufort Sea / Coast Pilot Ltd. Canada. Institute of Ocean Sciences, Patricia Bay [Sponsor].
(Contractor report series - Canada. Institute of Ocean Sciences, Patricia Bay, 80- 6)
NFSMO

All echo sounding rolls from the C.S.S. Parizeau and C.S.S. Baffin and their associated launches from 1970, 1971 and 1972 were examined for Pingo-Like-Features (P.L.F.) within the following area: between longitude 128 W and 136 W, and between the 20 metre and 200 metre contour line. A total of 205 P.L.F.'s were photographed and documented. A Mercator projection map was plotted at a scale of 1:500,000 showing the position of each P.L.F. ... (AU)

C-138614
Permafrost problems for gravel islands and permafrost data collection, Beaufort Sea well completions / Enertech Engineering and Research Co. Goodman, M.A. Gulf Oil Canada Limited [Sponsor].
[Calgary, Alta. : Distributed by APOA], 1976.
1 microfiche : figures, tables ; 11 X 15 cm.
(APOA project no. 192 : Beaufort Sea well completions and permafrost. Report, no. 1)
References.
ACU

This report identifies potential offshore permafrost problems for gravel islands and evaluates other retrieval methods for permafrost mechanical properties and ice/unfrozen water content. Specific solutions for offshore arctic well completions and island design are not presented. (AU)

C-139338
(Collected papers on sciences of atmosphere and hydrosphere, v. 20, no. 8, 1982)
References.
ACU

Distinctive ground features such as polygons, pingos and involuted hills are commonly observed in the arctic region, especially around Tuktoyaktuk, N.W.T. of Northern Canada. Their origins and formation processes still remain arguable, but the fact that large ice bodies are found underneath them suggests that water supply from various sources plays an important role in their formation processes. ... A massive ice body at Tuktoyaktuk, Mackenzie Delta, N.W.T., Canada, was subjected in this expedition to a systematic study of the profile of oxygen isotopes of it and a crystallographic study of its ice texture so that the origin of water forming it as well as the formation mechanism of it was investigated. (AU)


D - OCEANOGRAPHY

C-1074
Data presented were collected as part of the Beaufort Sea Project. Mostly tables and charts. Unpublished manuscript.
ACU

Current meter data from the Southern Beaufort Sea for the years 1973, 1974 and 1975 are summarized. Co-tidal charts are presented of the constituents M2 and K1 for the tidal streams and tides. Temperature and salinity measurements coincident with the current observations are also shown. (AU)

Ocean Chemistry carried out sampling and analysis during the Pandemonium II hydrographic cruise to the western arctic in the summer of 1977 on an opportunity basis. Data were obtained at a total of 18 stations for salinity, temperature, oxygen concentration, particle size distribution (Coulter counter), nutrients, (reactive silicate, phosphate, and nitrate) and are tabulated here. Additional seawater sampling for hydrocarbons and mercury, net hauls (Miller and Neuston) and sediment sampling are also compiled but analytical results are not included. (Au)


One of the investigations of the 1974-75 Beaufort Sea Project was an offshore, near-surface current study. A drifting surface drogue was developed that could be deployed and tracked using an aircraft, thus enabling examination of the surface currents over a large area of the Beaufort Sea. Tracking was carried out using the Twin Otter with the assistance of a Bell 206 Helicopter. The ice conditions in 1975 were entirely different from 1974 which no doubt had a significant effect on the surface currents and their response to weather systems. The 1975 data shows that the wind plays an important role in driving the currents, especially in the case of strong northwest winds and the aftermath of these winds; the other most important factor being the discharge from the Mackenzie River. Eddies of different scales sizes and areas of divergence and convergence complicate the picture. In Mackenzie Bay, a persistent divergence is observed, and north of Richards Island a convergence is frequently observed. (Au)


Concentrations of suspended matter measured in the southern Beaufort Sea in August and September, 1975 ranged from less than 0.1 mg/l. to more than 17 mg/l. The highest concentrations were recorded at nearshore stations off Kugmallit Bay. Mid-water and near-bottom zones of turbid water are common, though their exact causes are not clear. The major components of the suspended matter include fine inorganic particles, organic aggregates of plankton and inorganic particles, and phytoplankton. (Au)


... the goal of this research was to investigate the usefulness of the airborne laser profilometer as a tool for obtaining significant wave height information. (Au)

Normal and extreme winds and waves in the Canadian southern Beaufort Sea / Intersea Research Corporation. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1974. 2 microfiches : figures, maps, tables : 11x16cm. (APOA project no. 70 : Wind/wave hindcast, Canadian Beaufort Sea Report) References. ACU, NFSMO

... This study describes the surface environmental events with substantial accuracy so that a high degree of confidence may be placed in the results. Specifically, the consultant will (a) evaluate all available wind data associated with recorded wave data to correlate wind velocity, duration and fetch with wave height; (b) use the fetch and wind data to make a wave hindcast; (c) compare the hindcast results with the wave-riding data in order to select the best hindcast method; (d) make a search of past severe storm wind reports; (e) prepare a hindcast model for the locations of interest. (Au)


... Our specific objective was to gain some...
understanding of the bottom currents and offshore tides in the southern Beaufort Sea, their relationship to wind and ice conditions, and to measure storm surges along the coast in the Mackenzie River Delta area. ... (Au)

D-30015
The physical oceanography of the south-eastern Beaufort Sea / Herminieux, R.H., De Lange Boom, B.R.
Victoria, B.C. : Beaufort Sea Project, Dept. of the Environment, 1975... 1973-1974 winter benthic and oceanographic studies were conducted during the summer of 1974 ('worst ice conditions on record') as well as during the spring and summer of 1975 ('good ice conditions'). The discharge from the Mackenzie River dominates the surface waters of the southern Beaufort Sea, especially during bad ice years. The density distribution is salinity dominated throughout the system. The vertical profiles of salinity, temperature, turbidity and currents are described for summer and spring conditions. ... (Au)

D-30023
Storm surges / Henry, R.F.
Victoria, B.C. : Beaufort Sea Project, Dept. of the Environment, 1975... This report describes a study, involving numerical models, designed to permit prediction of surge levels between Herschel Island and Cape Bathurst and also to check if surge magnitudes at site well off-shore are ever large enough to pose hazards to drilling operations. ... The accuracy of numerical storm surge models has to be verified by simulation of a number of actual surges. ... Two subsidiary topics discussed are 'negative surges', that is, temporary decreases in sea-level, which may hinder shipping, and winter surges, which though much less frequent than summer surges, should probably be considered during the design of near-shore structures, in view of their potential for causing ice damage. (Au)

D-43877
Olived, W.R. Imperial Oil Limited.
Vancouver : F.F. Slaney & Company Limited, 1976... The overall purpose of the 1975 summer program was to supplement the existing data base for the assessment of environmental effects in relation to summer artificial island construction in the Western Bay of Mackenzie Bay by Imperial Oil Limited, and to provide baseline biophysical data at selected sites identified as potential development areas within the Mackenzie Estuary. (Au)

D-43881
Submersible activities under Arctic conditions / Macdonald, M.D., Trice, A.R.
(Proceedings - Conference on Arctic Systems, St. John's, Newfoundland, August 18-22, 1975 / Edited by P.J. Amante, A.A. Brunauer, and P.A. Lapp. New York : Plenum Press, 1977. Nato conference series : II. Arctic systems ; v. 2, p. 837-846, figures) ... Many of the problems encountered while operating submersibles in Arctic regions are similar to those in any remote area of the world. ... This paper will discuss operational problems and identify areas requiring further development. Arctic areas will include Hudson Bay and the coast of Labrador. ... (Au)

D-64419
St. John's, Newfoundland : N.F.S.M.O. ... This paper presents the results of analysis for silicate, phosphate and nitrate, dissolved oxygen, salinity and temperature. ... (Au)
D-73130
4v. : ill., figures, tables ; 28 cm.
(Contactor report series - Canada. Institute of Ocean Sciences, Patricia Bay, 80-4)
Appendices. Bibliography and references.
ACU, NFSMO

This is a study of sonar systems which may be suitable for the detection and mapping of pingo-like features in the south eastern Beaufort Sea north of the 20 meter isobath to the edge of the shelf. The major portions of the area of concern lies in water depths in excess of 30 meters. (Au)

D-74969
(Pacific marine science report, 81-4)
ACU

A brief history is given of the geographic, hydrographic and oceanographic investigations that were carried out in the Beaufort Sea area during the past 150 years and culminated in the Beaufort Sea Project of 1976-75. The information obtained is utilized to prepare a description of the general physical environment of the area, emphasis being placed on the physical oceanography. This description provides the basis for the consideration of four environmental situations (scenarios), each of which could strongly influence in its own way, the general destiny of crude oil or other pollutants discharged into the Beaufort Sea. The advantages and disadvantages of the cold-region use of some oil-spill countermeasure techniques presently available are discussed. A summary of the expected general behaviour of pollutants entering the Beaufort Sea is given, together with some suggestions for further studies necessary to refine our insight into this behaviour. (Au)

D-80420
Ottawa : Dept. of Fisheries and Oceans, 1981. xii, 159p. : ill., 1 fold. map ; 26 cm.
References.
ACU

This volume contains a detailed description of the Athabasca-Mackenzie waterway from Fort McMurray, Alberta to Tuktoyaktuk, N.W.T., including routes to be followed and navigational hazards present. (ASTIS)

D-92142
(Beaufort E.I.S. support document. no. BEISSD29)
Appendices. References.
ACU

... Canadian Marine Drilling Ltd. has been engaged in offshore drilling for oil in the S.E. Beaufort Sea since 1976. During the course of the drilling operations, measurements of nearsurface and subsurface currents have been collected from the drilling ships along with measurements of other environmental factors including meteorological and wave data. These data were acquired to provide an improved understanding of environmental factors both as they relate to the effect of the environment on offshore operations and the possible impact of offshore drilling on the natural environment. The currents were measured at hourly intervals at up to three depths. Gaps in the records due to instrument failures, the presence of severe sea-ice conditions or to preparations for moving the ship. ... In this report, we present the results of a thorough analysis of the 1976 to 1979 data that has previously been available. (Au)

D-94552
viii, 150 p. : figures, tables ; 28 cm.
(Data report series - Canada. Fisheries and Environment. no. 78-3)
Unpublished manuscript.
References.
ACU, NFSMO

This report contains current, tidal, and CTD data collected during a short Arctic field program in March and April, 1977. Current meters were moored across McCure and Prince of Wales Straits and CTD measurements were taken along these two transects and a third in Viscount Melville Sound. Tide gauges were deployed by the Canadian Hydrographic Service to enable sounding reductions to be made, with an additional instrument being specifically deployed for our program. (Au)
D-105066
Ocean drifter studies of surface currents along the coasts of Newfoundland and Labrador and in the Beaufort Sea / Diamand, D., Reimer, E.W., Barrie, J.V.
St. John's : Centre for Cold Ocean Resources Engineering, 1982.
viii, 35 p. : figures, tables ; 28 cm.
(C-CORE publication, no. 82-3)
(Data report - Memorial University of Newfoundland. Centre for Cold Ocean Resources Engineering)
ISBN 0-88901-083-8
Appendices.
References.
ACU, NFSMO

Nine thousand plastic surface drift cards were released off the coast of eastern Canada in 1979 and 1980 at known or proposed oil drilling sites in an attempt to determine the probable extent and landfall of oil which might be accidentally spilled at these sites. The vast majority of the returned cards were found in Europe, primarily Ireland and the U.K. In addition, 630 cards were released at well sites near the Mackenzie Delta in the Beaufort Sea. Some passed through the Bering Strait and were found in the Aleutian Islands and the west coast of North America, however most predictably, were swept westward from the release sites and were found along the north and west coasts of Alaska and the N.W.T. (Au)

D-105872
A compilation of chemical oceanographic data used in the preparation of the Beaufort Sea - Mackenzie Delta EIS / Arctic Laboratories Limited, Thomas, D.J., Dome Petroleum Limited [Sponsor].
10 p. : tables ; 28 cm.
(Beaufort E.I.S. support document, no. BEISSD36)
References.
ACU

This document contains tabular summaries of the raw data that were discussed in the text and used to construct the figures appearing in Volume 3A (Section 1.5 Chemical Oceanography) of the Beaufort Sea - Mackenzie Delta EIS. The data are organized into five tables: Table 1. Summary of trace metal concentrations measured in sea water collected from the Beaufort Sea and other waters. Table 2. Summary of trace metal concentrations measured in sediments collected from the Beaufort Sea and other areas. Table 3. Summary of trace metal concentrations measured in biota collected from the Beaufort Sea and other areas. Table 4. Summary of nutrient concentrations measured in Beaufort Sea and other waters. Table 5. Summary of hydrocarbon concentrations measured in sea water, sediments and biota from the Beaufort Sea. These tables are the condensation of many tables of data from original studies and data reports and only present general chemical observations. (Au)

D-107174
A baseline chemical survey at Tarsuit A-25, July 1978 / Seakem Oceanography Ltd. Thomas, D.J. Canadian Marine Drilling Limited [Sponsor].
1 microfiche : figure, tables ; 11 x 15 cm.
(Seakem E.I.S. reference work, no. RW208)
References.
ACU

Tarsuit A-25 was sampled as a continuation of the Site Survey Programme in July 1978. Baseline values were obtained for copper, zinc, cadmium, lead, nickel, chemical oxygen demand in the water column, and iron in sediment, sea water and zoobenthos. Measured dissolved trace metal concentrations were generally within the range found at other sites in 1977. Total and extractable metals in the sediments indicated Tarsuit is located in a fundamentally different oceanographic regime than other site survey locations. In addition, benthos were predictably less abundant and less diversified in species than at most previously studied sites. (Au)

D-108154
Environmental impact statement sections / Arctic Sciences Limited. Dome Petroleum Limited [Sponsor].
3 microfiches : figures, tables ; 11 x 15 cm.
(Beaufort E.I.S. reference work, no. RW23)
References.
ACU

This report presents information on the setting, water mass characteristics, mean circulation patterns, high- and low-frequency variability and nutrient levels for the Beaufort Sea, Bering Sea, Chukchi Sea, Amundsen Gulf, Prince of Wales Strait, Viscount Melville Sound, Perry Channel, Baffin Bay and Davis Strait. (ASTIS)

D-108189
Wave hindcast study Beaufort Sea / Hydrotechnology Ltd. Baird, W.F., Hall, K.R. Gulf Canada Resources Inc. [Sponsor].
6 microfiches : figures, tables ; 11 x 15 cm.
(Beaufort E.I.S. reference work, no. RW28)
RW228B)
Appendices.

References.

Contents: RWE28 contains the report; RWE28B contains Appendix B. Wave statistics at Location B: North Issungnak.

ACU, NFSMO

Gulf Canada Resources Inc. requires a reliable description of the wave climate of the Beaufort Sea for the design of structures and operations. The wave data are needed to describe probabilities of occurrences of wave heights and periods, frequencies of exceedance of wave heights and periods, statistics describing the persistence and duration of given wave conditions, and the extreme values of wave height. As a consequence of the data now available and the hindcast procedures recently developed, Gulf Canada Resources Inc. requested Hydrotechnology Ltd. to develop a wind-wave hindcast procedure for use in the Beaufort Sea. This report describes the development of the procedure. The first phase of the study consisted of a review of previous wind-wave hindcast studies and an assessment of available wave, ice, wind, and other meteorological data. In the second phase, an acceptable hindcast procedure was developed and comparisons were made of recorded and hindcast data. Finally, in the third phase, wave statistics were developed for six locations in the Beaufort Sea. Finally, a number of presentations of the wave data were developed to allow efficient use of the hindcast wave data by engineers involved with design and operations in the Beaufort Sea. A hindcast was then completed for six locations. The resulting data are presented in Appendices to this report. (Au)

D-108197


1 microfiche: figures, tables; 11 x 15 cm.

(Beanport E.I.S. reference work, no. RWE29)

Appendices.

References.

ACU

In accordance with the requirements of Dome Petroleum's Ocean Dumping permit, water quality measurements (dissolved oxygen, temperature, salinity and water transparency) were conducted at 5 monitoring stations on four occasions at McKinley Bay, N.W.T., during 1980, during operation. No significant effects on the water quality of the parameters listed above could be related to dredging in McKinley Bay. The distributions of all measured parameters were generally similar for the station nearest to active dredging and the four background stations. Routine chemical analyses were also performed on dredge spoil samples. The heavy metal content was variable; except for Hg in one sample (290 ng/g sediment), all values fell within the range of values accepted for average uncontaminated world coastal sediments. The exceptional mercury concentration was, however, still below the Ocean Dumping Control Act regulatory limit of 75 PPM. Total organic carbon content and extractable oil and grease ranged from 0.08 to 8.65% and 45-2120 ppm by weight respectively. Oxygen uptake rates were less than a range of 0.031 to 0.266 ML O2/g sediment/day. (Au)

D-108243


(Beanport E.I.S. technical specialist report)

ACU

The author of this submission reviews that portion of the E.I.S. which deals with the subject of physical oceanography. A knowledge of this science is needed to determine the severity of the environment for operation (wave climate, strong ocean currents, ice


5 microfiches: figures, tables; 11 x 15 cm.

(Beanport E.I.S. reference work, no. RWE36)

Appendices.

References.

ACU, NFSMO

Extreme significant wave heights, and extreme water levels produced by the addition of wind-generated waves, storm surge and tide, have been calculated in the present study for return periods of 1, 10, 50 and 100 years. These results are specified at 10 sites, ranging in depth from shallow water in the coast to deep water north of Herschel Island. The wind-generated waves hindcast in the present study are roughly 2 to 1/2 times larger than those derived by IRC (1974) for Imperial Oil Company Ltd. There are two major causes for this difference: a) the present study has revised the long-return period wind speeds upward from the previous hindcast, and b) the present study has defined the open-water generation area by the furthest observed offshore ice-edge, resulting in much larger fetches than used in the previous study. It was concluded that the observed wave height data base is presently too short to give reliable extreme wave estimates and that hindcasting based on the meteorological data base is the only viable method for obtaining design wave length. (Au)

D-108448


1 microfiche: maps; 11 x 15 cm.

(Beanport E.I.S. reference work, no. RWT07)

ACU

With predictions of oil production in the Arctic reaching some 250,000 barrels per day by 1985 we are on the eve of a possibly vast increase in shipping through our Arctic waters; an increase not only in the numbers of ships, but also, perhaps more dramatically, in the size of ships. The tankers of 200,000 dwt, and more that are expected to ply our Arctic routes will draw in the order of 20 metres, require up to 9 miles to come to an emergency stop. Laden with cargo inherently dangerous to man and the environment alike they represent a potential hazard of an unknown, but likely significant magnitude. It is of paramount importance that the requirements for their safe operation are recognized and provided. It should also be recognized that safe operation is indeed possible. This dissertation will treat two of the major factors that can be considered prerequisites for tanker traffic: 1. Bathymetry and charts. 2. Navigational aids. (Au)

D-108600


1 microfiche: maps; 28 cm.

(Beanport E.I.S. technical specialist report)

ACU

The author of this submission reviews that portion of the E.I.S. which deals with the subject of physical oceanography. A knowledge of this science is needed to determine the severity of the environment for operation (wave climate, strong ocean currents, ice
concentrations and thicknesses). 2. for estimating fluxes or oceanic transports with regard to oil spills, transport of dredge and drilling, ice, ice island motions. 3. for defining the currents, salinities and marine habitat required by creatures. 4. for estimating the effects of the ocean on local and regional climate. The author questions the adequacy of existing physical oceanographic knowledge in addressing the items listed above, and reviews specifically: spill trajectory modelling, ice motion modelling, climatic effects and stabilization of land-fast ice. (ASTIS)

D-125889
2 microfiches : figures; 11 X 15 cm.
(Canadian technical report of hydrography and ocean sciences, no. 20)
Appendix: ACU, NFSDM

Oceanographic data were acquired in an area of 150,000 square km in the southeastern Beaufort Sea during November 1979 in conjunction with the Beaufort Sea Winter Ice Experiment. Hydrographic profiling by CTD probe enabled delineation of the dynamic topography of the region and identification and tracing of the principal water masses. Baroclinic shear was directed southward along bathymetric contours, with a jet of 10 cm/s (0/300 db) overlying the continental slope. Outflow from Amundsen Gulf was evident. Measured flow at mid-depth on the shelf was easterly in the mean, while the baroclinic shear implied weaker surface flow. Observed intrusions of near-freezing water over the slopes pointed to important exchanges of water between the shelf and the basin. The existence on the shelf of suitable saline water for these intrusions was confirmed and is indicative of the importance of freezing and ice-cover divergence in Arctic oceanography. (Au)

D-128112
(NITIS AD-A-126 348)
Appendix.
References. NFSDM

Trajectories of five free-drifting satellite-tracked buoys released during the summer of 1979 in open water in the Beaufort Sea north of the Tuktoyaktuk Peninsula indicate a pronounced east-to-west near-surface flow along the northern Alaskan coast. The direction of the buoy movement is generally in agreement with the direction of the flow in the southern portion of the Beaufort Sea Gyre as previously calculated from dynamic topography. The buoy tracks and speeds differ from the surface circulation calculated from the dynamic topography.... Analysis of the available wind data suggests that the surface currents as indicated by the motions of the buoys were strongly influenced by the local wind. For surface wind speeds above 15 cm/sec, the buoys moved 22 degrees to the right of the wind at 2.8% of the wind speed. (Au)

D-132418
ACU

This article reports on the activities of the Frozen Sea Research Group. It's three field operations in 1982 were firstly in conjunction with the studies of the Northwest Passage (Transport R & D), secondly a "channel flow" experiment of near-surface flow in arctic waters and thirdly oceanographic investigation
visbility, wind, waves and structural icing for the areas of the Beaufort, Bering, Chukchi seas, Parry Channel and Baffin Bay-Davis Strait are included. (ASTIS)

E-104108
The impact of 1980 climate on offshore drilling in the Arctic / Pilkington, G.R.
ACU
After 5 years of operating in the Beaufort Sea, a tremendous amount of experience has been developed in coping with the environment. The drill season has been extended from 107 days in 1977 to 148 days in 1979, mainly as a result of the use of a large ice breaker. However, the drilling systems used are still basically open-water systems. ... (Au)

E-126403
Beaufort Weather and Ice Office report / Canada. Beaufort Weather and Ice Office. [No. 1] (1976?) -
Annual.
Name change from Beaufort Weather Office report to Beaufort Weather and Ice Office report in 1981. Ice central forecast verification prepared by Ice Forecasting Central, Ottawa. NFSMO
Yearly since 1976, Canadian Marine Drilling (Cannar), a subsidiary of Dome Petroleum, has contracted the Atmospheric Environment Service (AES) to provide a forecast service and to provide ice observers to support offshore exploration in the Beaufort Sea. 1982 was the seventh consecutive year a dedicated AES office, the Beaufort Weather and Ice Office (BWIO), was operated from Dome facilities in Tuktoyaktuk during the open-water drilling season. Forecast support, ice information and consulting services were provided to other Beaufort operators through contractual and partnership arrangements between Cannar and Esso Resources and Gulf Canada. This report begins with a description of the data base, outlines the program carried out, gives a description of the environmental conditions through the drilling season and concludes with forecast verification. (Au)

E-138126
[S.T. : British Columbia Hydro and Power Authority], 1980.
1 v. (various pagings) : figures, tables : 28 cm.
Appendix.
References.
ACU
In this report, elements of climate and weather in both the Mackenzie River basin and the Mackenzie River delta and of discharge characteristics of the Mackenzie River are discussed in relation to freeze-up and break-up patterns in the lower reaches of the river. ... The investigations are focused on the synoptic (or macro-) scale of meteorology where some data are available. ... To provide some measure of the relationships between radiation and environment, relevant data from stations in northwestern Canada are discussed. The examination of the radiation data indicates that temperatures might be expected to rise more slowly in the spring and to cool more slowly in the fall under controlled flow conditions. It is also shown, however, that times of significant ice in the delta tend to vary greatly depending on basin climate and river discharge and that day to day meteorological effects, (travelling weather systems, sea breeze effects, etc.) exert a considerable control on delta climate. Because of the many variations caused by these latter elements, the long-term impact of radiation changes that might result from altered ice patterns on the delta will be very difficult to identify. (Au)

E-139327
ACU
Wintertime snow clouds were observed by a vertically pointing radar of 8.6 mm in wavelength from Nov. 1979 to Jan. 1980 at Inuvik in the Arctic Canada. In most cases the level of the radar-echo top was nearly equal to or lower than that of the cloud top. Less frequently, however, it was higher than 4500 m in altitude independently of the cloud top level. Air temperature was always higher than -40 C at the level of the radar-echo top. The radar-echo intensity near the ground surface tended to increase as the level of the radar-echo top. Typical types of snow crystals were the crossed plates, the bullet and the column. The type predominant over others in occurrence varied with the radar-echo intensity near the ground surface and the level of the radar-echo top. This predominance was discussed by taking into account a difference in the vertical profile of air temperature in cloud layers. (Au)

See Also : O-125270, D-25801, D-30023, D-92134, D-92142, D-108189, D-108243, D-128112, F-121622, G-70211, G-70335, G-85960, G-92940, G-122285, H-30189, H-30341, H-99147, H-102250, J-108080, L-117951, Q-15547, Q-80452, Q-87556, Q-107830, Q-115746, Q-127396, Q-138525, Q-138553, T-123188, W-138177

F - SNOW, GLACIOLOGY, AND HYDROLOGY

E-6793
Mackenzie River input to the Beaufort Sea / Davies, K.F.
11, 72p. : ill., charts, tables, maps : 28cm.
(Technical report - Canada. Beaufort Sea Project, no. 15)
(APOG project no. 72 : Beaufort Sea Environmental Program. Report, no. 15)
References.
ACU, NFSMO
This report contains a summary of the findings under the study, "Mackenzie River input to the Beaufort Sea," one of a series of studies comprising the Beaufort Sea Project. Comprehensive studies of gauging sites and methods used are included in the report. Distribution of flow in the main channel as a percentage of total flow has been determined on
concentrations and thicknesses). 2. for estimating fluxes or oceanic transports with regard to oil spills, transport of dredge and drilling, ice, ice island motions. 3. for defining the currents, salinities and marine habitat required by creatures. 4. for estimating the effects of the ocean on local and regional climate. The author questions the adequacy of existing physical oceanographic knowledge in addressing the items listed above, and reviews specifically: oil spill trajectory modeling, ice motion modelling, climatic effects and stabilization of land-fast ice. (ASTIS)

D-130689

This inventory contains a catalogue of all physical oceanographic data from the Beaufort Sea and Amundsen Gulf. Times and locations of measurements are listed and displayed graphically for temperature, salinity, current meter, water level and drifter data. Meteorological and ice information are not included. Yearly plots showing the locations of all measurements are included, as are indexes by area and measurement types. References and sources are listed for all data included in the inventory. (AU)

D-130777

This inventory contains a catalogue of chemical oceanographic data sets from the Beaufort Sea. The inventory includes commonly measured substances such as dissolved oxygen, major and minor elemental components, nutrients and less frequently measured substances such as trace elements, hydrocarbons and chlorinated hydrocarbons. Turbidity and suspended particulate matter (although not truly quantitatively) are also included. Data sets are included for sea ice, sea water, Mackenzie River Delta, Channel water, sediments, biota and atmosphere. Times and locations of measurements are listed and displayed graphically on a yearly basis. A geographical index and alphabetical references (by data set number) are also included. (AU)

D-129889

Oceanographic data were acquired over an area of 150,000 square km in the southeastern Beaufort Sea during November 1979 in conjunction with the Beaufort Sea Winter Ice Experiment. Hydrographic profiling by CTD probe enabled delineation of the dynamic topography of the region and identification and tracing of the principal water masses. Baroclinic shear was directed southwestward along bathymetric contours, with a jet of 10 cm/s (0.300 db) overlying the continental slope. Outflow from Amundsen Gulf was evident. Measured flow at mid-depth on the shelf was easterly in the mean, while the baroclinic shear implied weaker surface flow. Observed intrusions of near freezing water over the slopes pointed to important exchanges of water between the shelf and the basin. The existence on the shelf of suitably saline water for these intrusions was confirmed and is indicative of the importance of freezing and ice-cover divergence in Arctic oceanography. (AU)

D-128112

Trajectories of five free-drifting satellite-tracked buoys released during the summer of 1979 in open water in the Beaufort Sea north of the Tuktoyaktuk Peninsula indicate a pronounced east-to-west near-surface flow along the northern Alaska coast. The direction of the buoy movement is in general agreement with the direction of the flow in the southern portion of the Beaufort Sea Gyre as previously calculated from dynamic topography. The buoy tracks and speeds differ from the surface circulation calculated from the dynamic topography. Analysis of the available wind data suggests that the surface currents as indicated by the motions of the buoys were strongly influenced by the local wind. For surface wind speeds, a jet of 5 cm/s as the buoys moved 22 degrees to the right of the wind at 3.8% of the wind speed. (AU)

D-133418

This article reports on the activities of the Frozen Sea Research Group. It's three field operations during 1982 were firstly in conjunction with the studies of the Northwest Passage (Transport R & D), secondly a "channel flow" experiment of near-surface flow in arctic waters and thirdly oceanographic investigation
in the vicinity of the Ross ice shelf, Antarctica. The contracted CTD survey covering most of the channels in the Canadian Arctic Archipelago and concentrating on Amundsen Gulf is the most comprehensive survey to date covering the archipelago as a whole. Studies of polynya have been completed as well as work on the formation of gas hydrates during oil well blowouts at depth. Experiments were undertaken to investigate subsurface containment of underwater oil well blowouts. Other preliminary studies are outlined and instrument developments described. (ASTIS)

D-138649
1 microfiche : figures, tables ; 11 X 15 cm. (Canadian technical report of hydrography and ocean sciences, no. 30) References. This technical report is the first contribution to the appraisal phase of the Arctic data compilation and appraisal series, Canadian Data Report of Hydrography and Ocean Sciences No. 5. Also available in paper. ACU

A geochemical mass balance approach was used to compare the natural flux of heavy metals and hydrocarbons from the Mackenzie River to the Beaufort Sea with the projected anthropogenic flux of heavy metals and hydrocarbons from proposed hydrocarbon production activities on the Beaufort Sea Shelf. Time scales and geographical scales for pollutants specific to the Mackenzie River/Beaufort Sea estuarine zone were set. The geochemical mass balance is a useful first step toward estimating possible effects of industrial activity in the coastal zone; it is within the framework of the physico-chemical estuary that bioavailability, bioaccumulation and ultimately, biological effect can be addressed. The area used in the chemical mass-balance calculations ... has been arbitrarily chosen as being that part of the Beaufort Sea from the Yukon/Alaska border to the entrance of the Amundsen Gulf (Cape Parry) out to the 200 m isobath. The analysis of oceanographic and satellite imagery data indicates this area to be strongly influenced by the suspended sediment load and freshwater output of the Mackenzie River. (Au)

See Also: A-108146, B-48518, B-99368, B-107093, B-108162, B-108170, C-136433, C-136441, C-136450, E-11630, E-15458, E-64467, E-92061, E-126403, G-19305, H-19806, G-85960, G-87785, G-108340, I-45195, J-107875, I-108073, I-108081, I-108219, J-122815, J-108090, L-21237, Q-2860, Q-15520, Q-43885, Q-46866, Q-80462, R-75556, R-87599, G-107192, Q-108103, Q-108120, Q-113395, Q-114650, Q-115111, Q-115746, Q-116157, Q-119008, Q-122203, Q-127397, Q-127398, Q-127396, Q-138535, Q-139686, X-50317

E - METEOROLOGY AND CLIMATOLOGY

E-8737

Cover title.
Mostly maps.

References. ACU, NFSMO

Data gathered from drillships during the 1976 Beaufort Sea drill season was analysed with respect to percentage frequency of windspeed classes and percentage directional frequency of winds. In addition, all Beaufort Sea "STORMS" during the season (i.e. winds > 20 kt for at least 6 hours) are classified into types and investigated for common factors. (Au)

E-11630

Plans for offshore oil drilling in the Beaufort Sea must take into account such hostile environmental elements as ice, waves, storm surges, wind and weather. The intent of this study is to design a high-quality real-time environmental prediction system which can forecast ice movement, waves, storm surges, wind and weather and provide timely warnings of threats from these elements to the operations. ... (Au)

E-15458

ACU, NFSMO

... Based on an analysis of data from three coastal locations, extreme wind values are presented for offshore areas. Values are given for various return periods and durations. The analysis suggests that the distribution of extreme winds is relatively uniform over southern and eastern portions of the area of interest. In the northwest, where the wind regime is virtually unknown, extreme values may differ from those presented. (Au)

E-15598

The purpose of this paper is to construct a suitable method of objectively predicting the global radiation received at the earth's surface in the Mackenzie Valley. Regression analysis was the basic working tool. Extraterrestrial radiation, measured sunshine, maximum sunshine and the previous days global radiation were used as the independent variables. The data were obtained from sites located at Aklavik, Norman Wells and Fort Simpson. (AU)

E-939594


... This investigation examined the influence of various atmospheric parameters that act to create an urban heating demand, and some of the climatological effects of the consequent anthropogenic heat release in the extreme case of an Arctic settlement in mid-winter. Initial data were obtained in the space heating (for the utilidor-served portion) of Inuvik is regressed against air temperature, wind speed, and solar energy establishes predictive energy-use equations for daily and hourly periods. The equations were well correlated (r squared = 0.90) for both periods, with temperature and wind speed being the most significant variables. On a smaller scale, heat loss from a single window surface was analyzed experimentally. The potential of anthropogenic heat to modify the townsite climate ... is investigated in regard to its effect on the net long-wave radiation balance. Secondly, the impact of the anthropogenic heat in altering the surface energy balance of Inuvik and its environs is investigated. (AU)

E-84467


The Beaufort Sea Environmental Prediction System has been designed as a result of AES participation in a major environmental impact study by the Canadian Department of the Environment in connection with proposed off-shore drilling for oil and gas. ... The system actually designed is of general interest for those concerned with management in the Arctic. ... The emphasis on computerization is not only for efficiency, but for the downstream potential to meet the anticipated requirement for a large increase in the volume, timeliness and detail of forecast information without commensurate increase in manpower and other resources. (AU)

E-83763


A time series of ring-width indices from 27 cores of 13 white spruce trees from Yukon Territory shows growth response to summer temperatures and other climatic variables. The correlations with various temperature parameters are high enough that past temperature information can be inferred for the last 400 yr. ... The chronology shows effects of the Little Ice Age, of the subsequent Northern Hemisphere warming, and of a recent cooling trend. A second time-series of the first amplitude from a principal component analysis of the ring widths yields a better climatic signal than the time series of ring-width indices. These and other temperature-sensitive trees from near the northern tree line are being used in conjunction with improved analytical techniques to reconstruct temperature parameters for high-latitude areas. (AU)

E-92061


This is a source document which includes all material used to prepare the summary document for the climatological sections of the EIS. Information on temperature, precipitation,
viscosity, wind, waves and structural icing for the areas of the Beaufort, Bering, Chukchi seas, Parry Channel and Saffin Bay-Davis Strait are included. (ASTIS)

E-104108

After 5 years of operating in the Beaufort Sea, a tremendous amount of experience has been developed in coping with the environment. The drill season has been extended from 107 days in 1977 to 149 days in 1979, mainly as a result of the use of a large ice breaker. However, the drilling systems used are still basically open-water systems. (Au)

E-126403

Yearly since 1976, Canadian Marine Drilling (Canmar), a subsidiary of Dome Petroleum, has contracted the Atmospheric Environment Service (AES) to provide a forecast service and to provide ice observers to support offshore exploration in the Beaufort Sea. 1982 was the seventh consecutive year a dedicated AES office, the Beaufort Weather and Ice Office (BWIO), was operated from Dome facilities in Tuktoyaktuk during the open-water drilling season. Forecast support, ice information and consulting services were provided to other Beaufort operators through contractual and partnership arrangements between Canmar and Esso Resources and Gulf Canada. This report begins with a description of the data base, outlines the program carried out, gives a description of the environmental conditions through the drilling season and concludes with forecast verification. (Au)

E-138126

In this report, elements of climate and weather in both the Mackenzie River basin and the Mackenzie River delta and of discharge characteristics of the Mackenzie River are discussed in relation to freeze-up and break-up patterns in the lower reaches of the river. The investigations are ... focused on the synoptic (or macro-) scale of meteorology where some data are available. ... To provide some measure of the relationships between radiation and environment, relevant data from stations in northwestern Canada are discussed. The examination of the radiation data indicates that temperatures might be expected to rise more slowly in the spring and to cool more slowly in the fall under clear sky conditions. It is also shown, however, that times of significant ice changes in the delta tend to vary greatly depending on basin climate and river discharge and that day-to-day meteorological effects (travelling weather systems, sea breeze effects, etc.) exert a considerable control on delta climate. Because of the many variations caused by these latter elements, the long-term impact of radiation changes that might result from altered ice patterns on the delta will be very difficult to identify. (Au)

E-139227

Wintertime snow clouds were observed by a vertically pointing radar of 8.6 mm in wavelength from Nov. 1979 to Jan. 1980 at Inuvik in the Arctic Canada. In most cases the level of the radar-echo top was nearly equal to or lower than that of the cloud top. Less frequently, however, it was higher than 4500 m in altitude (independently of the cloud top level). Air temperature was always higher than -40 C at the level of the radar-echo top. The radar-echo intensity near the ground surface was observed to increase with an increase in the level of the radar-echo top. Typical types of radar-echo intensity near the ground surface were observed. The type predominant over others in occurrence varied with the radar-echo intensity near the ground surface and the level of the radar-echo top. This predominance was discussed by taking into account a difference in the vertical profile of air temperature in cloud layers. (Au)


F - SNOW, GLACIOLOGY, AND HYDROLOGY

F-8793

This report contains a summary of the findings under the study, "Mackenzie River Input to the Beaufort Sea," one of a series of studies comprising the Beaufort Sea Project. Comprehensive descriptions of the gauging sites and methods used are included in the report. Distribution of flow in the main channels as a percentage of total flow has been determined on
a month-by-month basis for the period July 1974 to June 1975. Suspended sediments, transport, ice thickness, and water temperature in the Delta are also discussed and the results shown. (Au)

F-7137
(Surveillance report - Canada. EPS. Northwest Region, EPS-5-NW-77-7)
References.
ACU
As part of the Yellowknife Environmental Survey the Environmental Protection Service conducted an investigation of the concentration and distribution of contaminating substances in snow during the winter of 1975. The results indicate that the snow in the Yellowknife area does not conform to specifications for pH, arsenic, lead, iron and manganese, under the Canadian Drinking Water Standards, 1968. Hence, the recommendation is made that the public be informed of the potential hazard and dissuaded from using melted snow as a source of potable water in the Yellowknife area. (Au)

F-7323
References.
ACU
In 1976 and 1977 three growing pingos were drilled for the purpose of measuring sub-pingo water pressures beneath aggrading permafrost. All holes drilled through permafrost in the pingos and adjacent lake flats produced artesian water. The water was clear and as the gushers rose to a maximum height of 3 m above ground level, large sub-pingo water lenses under pressure seemed evident. The existence of the lenses was confirmed by sounding their depths once permafrost was penetrated. One pingo had a 2.2 m deep water lens beneath the top. Pressure transducers, installed in the sub-pingo water lenses or in the unfrozen sands beneath, all indicated pressure heads above the tops of the pingos. Recharge from a distant source cannot account for the high pressures because the hydrostatic heads are above the pingo tops and as the pingo tops are usually the highest features in Tuktoyaktuk Peninsula, there can be no available higher source area; even if there were distant sources, the countless intervening lakes would quickly release any artesian pressures; and numerous pingos have grown up in drained lakes, which are either too small or too young to have through-going taliks beneath them. Therefore, the observed water lenses and high sub-pingo water pressures cannot be attributed to recharge but provide strong field evidence for pressure generated by pingo water expulsion. (Au)

F-20664
(Canadian journal of civil engineering, v. 3, no. 4, 1976, p. 555-562)
References.
ACU
Due to the lack of stream gaging [sic] stations, a peak flow simulation based on physical and meteorological parameters was established for the area along the proposed Mackenzie Valley Highway between Fort Good Hope and the Dempster Highway. Calculations based on snowmelt and rain-on-snow runoff were developed, as it was found that the snowmelt of May or early June gave the yearly spring peak discharge. (Au)

F-28711
ACU
... in 1978 the federal and provincial governments signed a four-year study agreement and commenced a program of baseline studies and information exchange of the water and related resources of the Mackenzie River Basin. This document reports progress made in the first year and describes the activities proposed for 1979-80, which is the second year of the 1978-81 joint study program by the federal, provincial and territorial governments. The Mackenzie River Basin Committee directs the program. (Au)

F-37850
References.
ACU
Discovered in August 1971, the Nahanni karst is the most complex high-latitude karst known. Mean annual temperature is -4.5 deg. C and precipitation 566 mm. The most spectacular landforms occur on a structural unit (the "north karst") connecting south Nahanni and Rama Plateau. Flooding occurs through random perching of water above and below ground where conduits have been newly alluviated. There is no highly integrated regional groundwater body; water moves along independent or poorly interconnected conduits or multiple aquifers. Some depressions are inundated by groundwater entering through stellalves, others when surface and spring inputs exceed drainage. Although winter snowfall averages 213 cm, in most years spring snowmelt does not appear to cause prolonged flooding. However, it raises water levels in the aquifer leaving the area prone to flooding by frequent, intense summer rains. The magnitude and complexity of hydrologic activity in the subarctic Nahanni karst is remarkable, being comparable with that in tropical and temperate carbonate areas. (Au)

F-43869
Prepared for Beaufort Gas Project. Imperial Oil Limited.
Appendices.
References.
Harry Channel, near Big Horn Point in the Mackenzie Delta, N.W.T. . . . has been identified as a potential dredging site for granular materials. . . . The purpose of the study was to provide . . . an overview of the background fisheries, hydrological and water quality data necessary to assess the potential effects of dredging silt and granular materials from Harry Channel. . . . (Au)

AN experiment in lake drainage, Richards Island. . . . (Au)

Mackay, J.R. Canadian Arctic Gas Study Committee. Alaskan Artic Gas Study Limited, and for Fluor Canada Ltd.


Hydrologic investigations continued during the the lake bottom immediately after drainage showed that the permafrost surface dipped steeply lakeward where water depths had exceeded 1.5 m. Temperature measurements show that in nearshore areas, where permafrost was less than 10 m deep, freeze-through from the lake bottom to some nearshore lakes which are on the verge of self-drainage. . . . A lake was selected for draining on Richards Island, Mackenzie Delta area, Northwest Territories, approximately 60 km west of Tuktoyaktuk. . . . The lake dimensions prior to draining were 600 m by 350 m with a maximum water depth of 4.7 m. . . . This report deals with a portion of the pre-drainage program in which the Geological Survey of Canada seismic section was involved. (Au)

Hydrologic investigations continued during the
1979 open water season at several watersheds in the taiga and tundra zones of the eastern Mackenzie Delta region, N.W.T. Data were gathered on snowpack water equivalent, river channel and culvert icing, precipitation, air temperature, river discharge, suspended sediment and stream water temperature. In both taiga and tundra, late winter snowpack water equivalents were low. Relatively low suspended sediment concentrations were measured during the spring flood. A reconnaissance of stream crossings along the Mackenzie and Dempster Highways from Inuvik to the N.W.T.-Yukon border in early May revealed very few problem areas from a hydrologic viewpoint. (Au)
This report contains the results of the Slave River Basin Study which was undertaken as part of the three year (1978-81) Mackenzie River Basin Study Program. The delta was examined because of the serious deficiency of baseline information required to understand the relationships between its biological resources and hydrologic regime. In order to properly understand these relationships it was necessary to examine the origin and present state of the delta and its hydrologic regime: the fish, bird, and aquatic fur bearer resources, and their relationships to delta hydrology. Geomorphological changes were identified through analysis of a series of aerial photos (1930-79) and land mass images (1972-80). Water samples were collected and flow rates and levels recorded at gauging stations between 1978-80. Aerial surveys (1978-80) were useful in determining the relative locations of waterfowl species and muskrat and their habitats, and live-traps were used to collect specimens to tag and monitor species movement. Ground surveys were used to determine habitat use and productivity of bird and muskrat populations. Laboratory analysis determined water quality parameters and ages and productivity of fish and muskrat populations. A summary of the results of these investigations follows. (AU)


This supplement contains the results of two studies undertaken as part of the Mackenzie River Basin Study program. The first section contains the "Sensitive Areas: Literature Review" report, which provides a summary of the available information on thirty seven sensitive areas within the Mackenzie Basin that could be expected to suffer in biologic productivity and cultural or social value if changes occurred in the hydrologic regime (for example, river flows and levels, water quality, and sedimentation). The list of areas examined is not exhaustive. Each area summary contains a description of the hydrologic characteristics; natural resources (wildlife, fisheries, vegetation); socio-economic considerations; sensitivity to hydrologic change; knowledge gaps or data deficiencies; and concludes with a select bibliography. ... The second section is a user guide to searching the Mackenzie River basin environment database which provides united entry searching of bibliographic data base containing some 45,000 references to Canadian literature contained with water resources and related environmental material. This includes the 1600 references and abstracts relating to the Mackenzie River Basin added during the study program. The database is accessible throughout Canada on the O.L. Shared Information Service. (AU)
Snow crystals of Cup type, which were scarcely ever reported in natural snowfall, were observed at the foot of Mt. Hachimantai, Akita Prefecture and at Inuïk, N.W.T., Canada, using a polarization microscope or a replica solution method. On the basis of study by X-ray Laue photography of the hoar crystals of Cup type, it seems that the snow crystals of this type constitute a single crystal by themselves. Further, the crystallographic c-axis of them agrees with the principal axis of hexagon cup and the horizontal stripes on their side planes (hopper faces) are parallel to the crystallographic c-axis. The growth condition of snow crystals of this cup type was estimated about 21 degrees C in air temperature (Ta) and about 118% in saturation ratio (s). From Ta-s diagram, this growth condition was very similar to that of artificial snow crystals of cup type in early stage by Nakaya.

References.
ACU


References.
ACU

Delta sulfur 34 values determined for dissolved sulfate in water discharged by sulfurous springs near Paige Mountain identify gypsum beds in the lower Devonian Bear Rock Formation as the sulfate source, whereas relatively low delta oxygen 18 values show that as much as 30% of the sulfate may have gone through a reductive-oxidative cycle. Reduced sulfur species in the spring water have negative delta sulfur 34 values as a result of microbiological isotope fractionation during sulfate reduction; airborne sulfur species (H2S, SO2, H2SO4) and gypsum formed through reaction of H2SO4 fallout with exposed carbonate rocks show similar negative delta sulfur 34 values. Negative delta oxygen 18 values for the sulfate radical in H2SO4 fallout and in the alteration product indicate that more than half of the oxygen reacting with airborne H2S is derived from water vapour.

References.
ACU


Gulf Oil Canada Limited plans to undertake development of natural gas reserves in the Hans Bay region of the Territories. In preparation for this planned development, Gulf requested F.F. Slaney & Company (Alberta) Limited to undertake a number of environmental investigations during spring, summer and fall, 1976. This report outlines the nature and results of those studies. Physical and chemical studies were carried out during the 1976 Field program and during the preparation of this report to provide a contemporary reference against which to assess biological information. Field study components included field water chemistry determinations, lake soundings, collection of water samples for laboratory analysis and correlation of description sheets for waterbodies. Office studies involved the calculation of descriptive values for waterbodies examined in the field and included determinations of lake surface area, lake alignment, shoreline perimeter, shoreline development with high horizontal areas and flushing rates. Physical studies were limited to waterbodies involved in the biological program and the type and amount of information collected at each site depended to a large extent upon the relative importance of the fishery resources of the waterbody and/or the potential effects of the development upon...
it. Biological studies were designed to provide additional information describing waterbodies in the development region in support of the application for land tenure. These waterbodies included Hans Bay, Parsons Lake, Zed Creek and Hans Creek.

Extensive studies were conducted on other waterbodies where snowmelt runoff from development were expected. Studies at these sites consisted of either a single sampling effort (field water chemistry, phytoplankton, zooplankton, benthos and fish), or if initial net sampling indicated no fisheries resource, termination of further study effort. (Au)

F-121622

References.
ACU

Hydrologic studies of four small runoff plots were conducted in the continuous permafrost zone of north-central Banks Island between 1977 and 1981. The results of the study indicate a high degree of variability in the proportions of water losses from the plots, attributable to surface and subsurface flow. This variability is evident both in inter-year comparisons for a single site and inter-site comparisons for a single year. Inter-year variability is controlled largely by the winter snow distribution and by meteorological conditions during the melt season. Inter-site variability is influenced by snowbank size, with the largest snow accumulation site exhibiting the highest percentage loss to surface flow, and the smallest loss to subsurface flow and evapotranspiration. Surface-flow hydrographs of snowmelt runoff recorded at the plots are explicable within the context of accepted snowmelt theory. Surface flow generated by rainfall was much less important and occurred only twice in the three years of measurement. On these occasions, only areas downslope of existing snowbanks, or those areas from which snow had recently disappeared, produced surface flow. These observations support the validity of the partial and variable concepts of runoff generation in the high Arctic. Areas producing surface flow are dependent on topographically controlled snowbank distribution, rather than, as in temperate areas, on the location of streams. (Au)

F-121630

References.
ACU

Subsurface water movement and solute concentrations were measured during the summers of 1977, 1978, and 1979 on two slopes with small runoff plots, located in the vicinity of the Thomsen River, north-central Banks Island. At two other instrumented plots, subsurface-flow volumes were estimated from water-balance studies. The results show that the relative importance of subsurface flow in the water balance of individual plots varied both at daily and seasonal time scales. On all slopes, however, snowmelt was the major source of water supply, and flow declined very rapidly after the end of snow ablation. In general, the values of solute concentrations in subsurface water were high. Concentrations tended to increase with depth within the active layer. Seasonal trends in concentrations at any one depth included relatively low values during most of the snowmelt period, an increase in the ten days that followed, and a "plateau" concentration attained at very low discharges. The total weights of solutes removed from the plots by subsurface flow during the snowmelt season were large, with a maximum of 43 g/square m in 1978 at the site of the largest snowbank. Using a dry bulk density of 1.5 Mg/cubic m, this figure corresponds to a denudation rate of 29 mm/1000 years. The removal of materials in solution by subsurface flow is thus regarded as an important geomorphological process in this area of the Arctic. (Au)

F-128040

111. : 28 cm. Annual. Text in English and French.

ACU

The report highlights the activities of the Committee, and presents a water resource overview of the Mackenzie River Basin, based on the regular exchange of information among the jurisdictions represented. (Au)

F-131599

ACU

What is proposed is to utilize aerial photography of northern rivers at break-up to obtain discharge values. Velocities determined from aerial photo survey are used in combination with channel cross-profile data can be used to calculate discharges. From such work it is proposed to further develop an analytical relationship between channel geometry and velocity which will permit calculation of discharge in areas where no stream gauging network exists. If such a method were feasible then development of an approach which permits use of non-metric, 35 mm camera systems to obtain velocity data may be possible. The immediate scope of this thesis is to use aerial photography of northern rivers at break-up, with established ground control to obtain discharge values which can be compared with values published for the same sites, by Water Survey of Canada. This is to be done by: (a) mapping the surface velocities of a test reach of river, (b) from these surface velocity measurements, the average channel velocity is calculated, (c) a cross-profile in the test reach is then used to calculate discharge from the equation Q = VA, where A is the area of the cross-profile which is compared with published discharge values for the same site on the same date to determine the accuracy of the method and the suitability of such an approach for operational use. (Au)
Dynamic response to ice forces

The paper is based on studies conducted for river crossings on Polar Sea and Foothills pipeline routes. It discusses design flood estimates, field reconnaissance, river ice phenomena, channel surveys, bank erosion and bed scour, and sedimentation. Numerous references to northern river studies are given. 


---

G - ICE - Except Glacier Ice and Ground Ice.

G-3530

(APOA project no. 72 : Beaufort Sea Environmental Program. Report, no. 36)


ACU, NSMFS

The topography of the Beaufort Sea ice cover has been examined from airborne laser profiles obtained in September and October 1974 by the Atmospheric Environment Service, Environment Canada, and in April 1975 by the Canadian Maritime Command, Department of National Defence. Mean ridge heights and spacings were deduced for the elements of a grid covering much of the Beaufort Sea. On the basis of these and other studies of the Beaufort Sea Project, a discussion is given of the extent to which sea ice deformation features may govern the long-term spread of oil under ice. (Au)

G-5460

ACU, NSMFS

This study considers the dynamic response of large diameter monopod structures to the impact forces caused due to the sudden movement of the shorefast ice. (Au)

G-11649

---

G-15482

(APOA project no. 72 : Beaufort Sea Environmental Program. Report, no. 26)

References: ACU, NSMFS

This report consists of four separate studies concerned mainly with ice climatology in the southern Beaufort Sea. The first... describes the variation of ice concentration with the time of year for six regions with different ice regimes. The second describes a motion of individual ice floes relative to the wind. The third describes a reasonably accurate method for predicting the gross features of the northward retreat of the polar ice pack in the Beaufort Sea and the fourth is an examination of the size of ice floes within various ice concentration ranges near the edge of the polar pack. (Au)

G-15539

(APOA project no. 72 : Beaufort Sea Environmental Program. Report, no. 34)

References: ACU, NSMFS

Using the NOAA and ERTS series of satellites, observations of the Beaufort Sea and encompassing Canada Basin ice cover have been carried out for the March through October periods of the years 1973-5. The seasonal trends in motion and appearance of individual ice years were detailed for the defined landfast-ice, transition and gyral pack zones. The positionings of the summer ice pack boundaries, the leads at the edge of the landfast-ice and other surface features were determined. (Au)

G-18627

---
... An attempt is made here to describe a steady-state theory of ice drift based on a balance between air-ice drag, water-ice drag and Coriolis force. Case studies of ice motion in the Beaufort Sea area are presented. Methods of computing forward and backward two-dimensional horizontal trajectories of an ice particle originating at any arbitrary point are discussed. (Au)

G-19283
3 microfiches ; 11x16cm.
(APDA project no. 2 : Beaufort Sea - Ice movement and current survey - 1970. Report, no. 1)
Appendices.
References.
ACU, NFSMO

Summary of Results - The ice at fifteen sites across the Mackenzie Delta area of the Beaufort Sea has been sampled during the period March 22 to April 19, 1970. Those properties affecting ice strength were sampled; in particular: thickness, snow cover, salinity, temperature, small scale strength and crystal structure. The average of ice thickness measurements during the fourth week of March was 61 inches; the average snow cover about 4 inches. Ice salinities varied in the range 0 to 11.3 o/ooo (parts per thousand). Water salinities were in the range 0.2 to 28.5 o/ooo. The fresh water from the Mackenzie River has a considerable influence on salinity distributions. In most of Mackenzie Bay the ice can be considered fresh. Small scale strength values are typical for sea ice of low salinity and indicate a tensile strength of 100 psi at the most. The crystal structure examinations show typical columnar ice with a horizontal c-axis. (Au)

G-19357
The "Nutcracker" ice strength tests, 1969-70 / Crossdale, K.R. [Calgary : Distributed by APDA, 1970].
5 microfiches, 11x16cm.
(APDA project no. 1 : Nutcracker ice strength tests, 1969-70. Report, no. 1)
Appendices.
References.
ACU, NFSMO

During field tests using the nutcracker ice testers we have measured ice crushing strengths in the range 600 to 900 psi. Approximate deflections at failure (peak stress) were in the range 0.6 to 2.3 inches. The test were conducted in Tuktoyaktuk harbor where the ice was brash with salinities up to about 3 grams/kg (i.e. parts per thousand). The results did not appear to be very sensitive to variations in loading rate in the range 200 to 1,500 psi/minute. Doubling the leg diameter did not significantly reduce the nominal ice failing stress. (Au)

G-19305
Ice and current measurements program, Beaufort Sea, Summer 1970 / Oceanographic Services, Inc. Imperial Oil Limited [Sponsor].
[Calgary : Distributed by APDA, 1970].
1 microfiche ; 11x16cm.
(APDA project no. 2 : Beaufort Sea - Ice movement and current survey - 1970. Report, no. 2)
ACU, NFSMO

Under contract to Imperial Oil Limited (IOL), Oceanographic Services, Inc. (OSI) installed self-contained ocean current and ice movement sensors at several Beaufort Sea locations designated by IOL. These instruments recorded current velocity and ice movement data for approximately two months. Measurements of ice thickness and water depth were made at each location at times of installation and recovery of the instruments. The instruments were installed during the period February 23 to April 17, 1970, and recovered during the period April 30 to June 1, 1970. This report presents the data obtained during the survey and describes certain techniques used and problems encountered. (Au)

G-19399
A study of several pressure ridges and ice islands in the Canadian Beaufort Sea / Hnatuk, J. Kovacs, A. Mellor, M. (Journal of glaciology. v. 20, no. 84, 1978, p. 519-532, ill., figures, map)
References.
ACU, NFSMO

The environmental conditions in the southern Beaufort Sea are described with special emphasis on pressure ridges and ice islands. Techniques for determining the geometric configurations and the physical and mechanical properties of sea-ice structures and ice islands are described. The data obtained in this study will be used in engineering design studies for offshore structures for drilling and production of hydrocarbons from the Beaufort Sea area. (Au)

G-21286
The nutcracker ice strength tests, 1970-71 / Crossdale, K.R. [Calgary : Distributed by APDA, 1971].
3 microfiches ; 11x16cm.
(APDA project no. 8 : Nutcracker ice strength tests, 1970-71. Report)
Appendices.
References.
ACU, NFSMO

During the Arctic field tests ice strength were measured in the range 595 to 1050 psi. These values correspond to a new result; a second test in total the Arctic tests do indicate a size effect, however as only two sizes of pier were tested no working relationship can be derived. The modes of failure seemed more brittle than last year probably because the ice was even fresher; a typical salinity being about 0.1 gm/kg (parts per thousand). Twenty-seven tests were conducted on lake ice with a portable ice strength tester. These tests were conducted on lake ice with a portable ice strength tester, ice strengths in the range 360 to 720 psi were obtained. The tests gave a very consistent mode of failure similar to that suggested by Morganstern in his theoretical analysis. Almost two decades of strain rate were covered during the tests (10^-4 to 10^-2 sec^-1). However maximum ice pressure (ice strength) showed very little sensitivity to strain rate, except for a slight reduction at the higher strain rates. (Au)

G-24457
1 microfiche ; 11x16cm.
(APDA project no. 14 : Beaufort Sea summer ice study. Report)
Appendices.
ACU, NFSMO

The study of ice conditions in the Beaufort Sea was accomplished by testing ice flows from a boat and conducting two reconnaissance flights. An unusual heavy concentration of old pack ice
was observed in the Mackenzie Bay, a condition which was caused by a severe storm on September 14, 1970. This enabled the testing of floes relatively close to shore, along the boat route from Tuktoyaktuk to Herschel Island. All of the floes tested with the exception of Test 1 were smooth ridged, low in salinity, and composed of multi-year ice. The average compressive strength of the ice floes tested was 300 psi, and the average Brazil tensile strength was 66 psi. All of the floes tested were greater than 13 ft. in thickness. The freeze-up process from the frazil to the mill stage was observed and because of the relatively fast freeze-up process, additional testing was not possible.

(AU)

G-24473


1 microfiche: i, figures, tables: 11x16cm.

(APOA project no. 32: Beaufort Sea scour records - Phase II. Report) References.

ACU, NFSMO

Purpose: To study all aspects of sea bottom scouring in selected areas of the Beaufort Sea. A mosaic of a cross-section of the Canadian Government in 1971 was constructed from Side Scan Sonar Records. An attempt was made to revise the map and vocalize the new and additional data. Mosaics of these areas were constructed. During future projects they will be analyzed to determine the number of new and additional areas that would be incorporated into a revised analysis to replace that done during APOA Project 19. (AU)

G-24511

Destruction of ice islands by explosives / Mellor, M. Kovacs, A. [Calgary : Distributed by APOA], 1972.

1 microfiche: i, figures, tables: 11x16cm.


ACU, NFSMO

Purpose: To determine the feasibility of destroying or reducing the size of an ice island forming a future offshore structure. Three grounded ice islands were subjected to explosives in varying quantities, depths, and patterns. Explosives were employed. Tests for optimum bench width were conducted. (AU)

G-25488

The interpretation of ice strength from in situ indentation tests / Morgenstern, N.R. Nuttall, J.B. [Calgary : Distributed by APOA], 1971.

1 microfiche: figures, tables: 11x16cm.

(APOA project no. 16: Theoretical analysis of ice failure. Report, no. 1) References.

ACU, NFSMO

... Imperial Oil Ltd. and APOA have requested the writers to conduct a study on Arctic ice along the following lines: a theoretical analysis of both data from ice pressures on bridge piers and from "Nutcracker" tests, with the aim of investigating the relationship between known mechanical properties of ice and the behaviour observed in these small prototype studies. 2. if found warranted as the theoretical analysis progresses, a special review of existing experimental data on the strength of ice in the context of the problem, with a view to making recommendations for testing in order to obtain adequate data if it does not exist. ... This report presents the results of the theoretical study of the "Nutcracker" test and related test configurations. ... The report ends with conclusions regarding the use and limitations of the results presented here together with recommendations for more field and laboratory testing which will explore further the applicability of these results. (AU)

G-25500

Sea ice pressure ridges and ice islands / CREARE, Inc. Kovacs, A. Mellor, M. [Calgary : Distributed by APOA], 1971.

3 microfiches: i, figures, tables: 11x16cm.


References.

ACU, NFSMO

The environmental conditions of ice-covered polar seas are described, with special emphasis on the pressure ridges and ice islands encountered in Mackenzie Bay and the Beaufort Sea. Techniques for determining the geometric configurations and the physical and mechanical properties of sea ice structures and ice islands are described. Profiles of pressure ridges were determined by surface surveys, drill hole probing, and side-looking sonar scanning; results are given for several multi-year ridges and one first-year ridge. Supplementary information obtained from dives under the ice is also given. Corresponding data are given for ice islands, with particular attention being given to contact between the ice and the sea bed. Measurements of temperature, salinity, tensile strength and compressive strength are given for ice taken from old pressure ridges, and factors influencing the interpretation of test data are discussed. The main report closes with a brief discussion of some of the findings. The appendices give complete diving reports, and a full report on the performance of the SRN6 Hovercraft. (AU)

G-25518

Sea ice tests / Nuttall, J.B. [Calgary : Distributed by APOA], 1971.

1 microfiche: i, figures, tables: 11x16cm.

(APOA project no. 17: Beaufort Sea pressure ridge and ice island scouring. Report, no. 2) ACU, NFSMO

This report presents the results of tests on 16 core samples of ice received from Gulf Oil Canada Ltd. on May 6, 1971 and tested in the laboratory of the Civil Engineering Department, University of Alberta. ... Thin sections were made from each of the samples and photographs of these are included here. The small half cylinders were tested for salinity, and crystal orientation was measured for five of the six samples. No strength tests were carried out on these samples. Crystal orientation was found for all six of the short cylindrical samples; all were tested for compressive strength and the long cylindrical samples were tested for compressive strength, generally two tests from each specimen, and a few tests for salinity. Crystal orientation was measured for 11 of the 15 samples. All samples were stored and tested at -10 deg. C. (AU)
G-25526
Microfaunological - mineralogical analysis of recent mud samples from ice-scoured surface of Beaufort Sea / Mackenzie Delta, 1972-73 / Imperial Oil Limited, Spedding, L.G. [Calgary : Distributed by APQA], 1973. 6 microfiches : 11x16cm.

G-25558

G-25542
Investigation of sea-bed scouring in the Beaufort Sea / Hunting Geology and Geophysics Ltd. [Calgary : Distributed by APQA], 1971. 1 microfiche : figures, tables ; 11x16cm.

G-25704

G-25712
The extent and growth patterns of landfast ice in the southern Beaufort Sea - Winter 1972-73 / Spedding, L.G. [Calgary : Distributed by APQA], 1974. 3 microfiches : 11x16cm.

The report describes the measurement of the movement of ten sites located on the landfast ice north of Richards Island in the Mackenzie Delta. The work was conducted during the period January to May 1972. The measurements were made with a spring tensioned reel/wire system connecting the ice with the sea bed. At five locations a telemetry system allowed readings to be taken remotely from a master control in Inuvik 80 miles away. Wind and temperature information was also collected. (Au)

The extent and growth patterns of landfast ice in the southern Beaufort Sea seem to follow a similar pattern each year. To record the progression of the ice out from shore and to record the position and quantity of relevant ice, topographical features, seven photographic reconnaissance flights were undertaken. These covered the landfast ice between Herschel Island and Atkinson Point during the period January 27 to June 10, 1972. Imperial Oil's camera-equipped Twin Otter aircraft was used. Preliminary analysis of the photographs to classify the ice surface features into zones has been undertaken and the report. Included also is the profiling of some surface features photographed on one flight. Satellite photographs, visual reconnaissance flight reports, and ground observations from


This report describes the measurement of the movement of fourteen sites located on the landfast ice between Shingle Point in the Mackenzie Bay and Atkinson Point on the Tuktoyaktuk Peninsula. An additional site just outside the landfast ice was also monitored for a short period. This work was conducted during the period of November, 1972 to May, 1973. The measurements were made with a spring tensioned reel/wire system connecting the ice with the sea bed. At 12 locations a telemetry system allowed readings to be taken hourly from a master control in Inuvik, 100 miles away. At the remaining three stations recordings were made. Wind and temperature information was also collected. (Au)

Better knowledge about the size and distribution of ice islands from year to year is needed to help in decisions concerning methods of exploration and development in the offshore province. The work covered in this report is a start in the process of collecting yearly counts of Ice Islands along the coast of the South Beaufort Sea. In May 1972, an aerial reconnaissance flight was made along the shear zone between Cape Bathurst and Cape Balthazard. The object of the flight was to record the number and size distribution of the ice islands grounded or trapped in the fast ice of the South Beaufort Sea. A total of 477 aerial photos were taken, these have subsequently been scrutinized. The report presents ice island frequency versus water depth and size for individual legs of the flight. (Au)

Five samples of unconsolidated mud from the Beaufort Sea shelf were analyzed for microfaunal content and clay mineralogy in hopes of discovering some criteria by which the age of ice-scoured trenches could be dated. One sample was recovered from the sediement-water interface in the bottom of a trench, and four samples came from a shallow (48 cm) core adjacent to the trench. Although there is some slight similarity of the trench sample (A55) to the two samples from the upper part of the sediment column (0-12, 12-24 cm) adjacent to the trench, the five samples do not represent a statistically valid sample and definite conclusions based on this data are not justified. The samples are all so similar that they may all be assumed to have been taken from a single population of Recent age. The clay mineralogical analysis suggests a similar relationship to that hinted by the microfaunology. (Au)

Side-scan sonar, echo-sounder and seismic profiler records from the Beaufort Sea show conclusive evidence of scouring on the sea-bed. This is generally believed to be due to the passage of ice-masses. Every third nautical mile of selected records has been analysed by visual and statistical means to determine the origin and rate of scouring. A number of spatial relationships have been established which have a bearing on these problems. These relationships include scour frequency, depth and azimuth. Recommendations are made for further sonar, echo-sounder, sampling, oceanographic, meteorological and radiocarbon work. (Au)

At each site the ice movement was followed by the use of a spring tensioned reel/wire system connecting the ice with the sea bed. At five locations a telemetry system allowed readings to be taken remotely from a master control in Inuvik 80 miles away. Wind and temperature information was also collected. (Au)

The report describes the measurement of the movement of fourteen sites located on the landfast ice between Shingle Point in the Mackenzie Bay and Atkinson Point on the Tuktoyaktuk Peninsula. An additional site just outside the landfast ice was also monitored for a short period. This work was conducted during the period of November, 1972 to May, 1973. The measurements were made with a spring tensioned reel/wire system connecting the ice with the sea bed. At 12 locations a telemetry system allowed readings to be taken hourly from a master control in Inuvik, 100 miles away. At the remaining three stations recordings were made. Wind and temperature information was also collected. (Au)

The extent and growth patterns of landfast ice in the southern Beaufort Sea seem to follow a similar pattern each year. To record the progression of the ice out from shore and to record the position and quantity of relevant ice, topographical features, seven photographic reconnaissance flights were undertaken. These covered the landfast ice between Herschel Island and Atkinson Point during the period January 27 to June 10, 1972. Imperial Oil's camera-equipped Twin Otter aircraft was used. Preliminary analysis of the photographs to classify the ice surface features into zones has been undertaken and the report. Included also is the profiling of some surface features photographed on one flight. Satellite photographs, visual reconnaissance flight reports, and ground observations from


This report describes the measurement of the movement of fourteen sites located on the landfast ice between Shingle Point in the Mackenzie Bay and Atkinson Point on the Tuktoyaktuk Peninsula. An additional site just outside the landfast ice was also monitored for a short period. This work was conducted during the period of November, 1972 to May, 1973. The measurements were made with a spring tensioned reel/wire system connecting the ice with the sea bed. At 12 locations a telemetry system allowed readings to be taken hourly from a master control in Inuvik, 100 miles away. At the remaining three stations recordings were made. Wind and temperature information was also collected. (Au)

The extent and growth patterns of landfast ice in the southern Beaufort Sea seem to follow a similar pattern each year. To record the progression of the ice out from shore and to record the position and quantity of relevant ice, topographical features, seven photographic reconnaissance flights were undertaken. These covered the landfast ice between Herschel Island and Atkinson Point during the period January 27 to June 10, 1972. Imperial Oil's camera-equipped Twin Otter aircraft was used. Preliminary analysis of the photographs to classify the ice surface features into zones has been undertaken and the report. Included also is the profiling of some surface features photographed on one flight. Satellite photographs, visual reconnaissance flight reports, and ground observations from


This report describes the measurement of the movement of fourteen sites located on the landfast ice between Shingle Point in the Mackenzie Bay and Atkinson Point on the Tuktoyaktuk Peninsula. An additional site just outside the landfast ice was also monitored for a short period. This work was conducted during the period of November, 1972 to May, 1973. The measurements were made with a spring tensioned reel/wire system connecting the ice with the sea bed. At 12 locations a telemetry system allowed readings to be taken hourly from a master control in Inuvik, 100 miles away. At the remaining three stations recordings were made. Wind and temperature information was also collected. (Au)

Better knowledge about the size and distribution of ice islands from year to year is needed to help in decisions concerning methods of exploration and development in the offshore province. The work covered in this report is a start in the process of collecting yearly counts of Ice Islands along the coast of the South Beaufort Sea. In May 1972, an aerial reconnaissance flight was made along the shear zone between Cape Bathurst and Cape Balthazard. The object of the flight was to record the number and size distribution of the ice islands grounded or trapped in the fast ice of the South Beaufort Sea. A total of 477 aerial photos were taken, these have subsequently been scrutinized. The report presents ice island frequency versus water depth and size for individual legs of the flight. (Au)

The extent and growth patterns of landfast ice in the southern Beaufort Sea seem to follow a similar pattern each year. To record the progression of the ice out from shore and to record the position and quantity of relevant ice, topographical features, seven photographic reconnaissance flights were undertaken. These covered the landfast ice between Herschel Island and Atkinson Point during the period January 27 to June 10, 1972. Imperial Oil's camera-equipped Twin Otter aircraft was used. Preliminary analysis of the photographs to classify the ice surface features into zones has been undertaken and the report. Included also is the profiling of some surface features photographed on one flight. Satellite photographs, visual reconnaissance flight reports, and ground observations from
other field work have been used as an aid to interpret photographs and to give a more comprehensive coverage of the ice conditions through the winter. (Au)

G-25720
Ice island count, southern Beaufort Sea, 1973 / Spedding, L.G.
[Calgary : Distributed by APOA], 1974.
1 microfiche : [111. figures : 11x16cm.
(APLO project no. 54 : Ice geology of the southern Beaufort Sea. Report, no. 2)
Appendices.

On May 27th and May 30th 1973 aerial reconnaissance flights were made along the shear zone to cover the area between Point Barrow and Cape Bathurst. This is a follow up of similar flights flown on May 23rd 1972 to record the size and distribution of ice islands grounded or trapped in the fast ice of the southern Beaufort Sea. Subsequent analysis of the photographs indicated the presence of 299 ice islands and fragments including sixteen small fragments visually sighted and not recorded on the photographs. The islands observed this year seem to be the result of the break-up of larger islands grounded in the winter of 1971 - 1972. (Au)

G-25739
Statistical analysis of ice pressure ridge distribution in the southern Beaufort Sea / Gladwell, P.W.
[Calgary : Distributed by APOA], 1976.
1 microfiche : figures, tables : 11x16cm.
(APLO project no. 54 : Ice geology of the southern Beaufort Sea. Report, no. 3)
References.
ACU, NFSMO

An analytical function for describing the statistical height distribution of ice pressure ridges in the Southern Beaufort Sea. The statistical analysis of the photographs indicates the presence of 299 ice islands and fragments including sixteen small fragments visually sighted and not recorded on the photographs. The islands observed this year seem to be the result of the break-up of larger islands grounded in the winter of 1971 - 1972. (Au)

G-25780
Beaufort Sea summer ice testing project / Fenco Consultants Limited.
[Calgary : Distributed by APOA], 1973.
12 microfiches : figures, tables : 11x16cm.
(APLO project no. 60 : Beaufort Sea summer ice testing project. Report)
References.
ACU, NFSMO

To study the summer ice properties and the physical parameters of the ice such as surface area, shape, thickness, specific gravity, salinity, temperature and drift velocity of the ice floes. One set of measurements was carried out closely after breakup by July 15 to July 22 and a second set in the open water season from September 18 to September 21. Triangular plate tests, circular plate tests and core hole jack tests were the test tests used to obtain strength parameters. (Au)

G-26476
Island defense system tests / Trofimenkoff, P.N.
[Calgary : Distributed by APOA], 1976.
2 microfiches : figures, tables : 11x16cm.

A total of 11 tests were conducted. Of these, 5 tests were performed to study the dredged island defense system slots. 2 to study the failure of a wide thermal crack and 4 to study the buckling of ice. The 4 buckling tests were performed on Eagle Lake and the remainder on the Hay River. The analyses of the tests indicate the following: (1) The initial failures of the dredged island defense slots were found to generally depend upon the location of the thinnest connecting ice at the slots. The initial failures were generally a bending failure at an average pressure of less than 30 psi. (2) The simulated thermal crack failed at approximately 1/2 the load required to fail an integral sheet, although the thickness of the connecting ice at the crack was 1/2 the natural ice thickness. The mode of failure was a bending failure in the connecting ice at the slot. (3) Reasonable agreement was found between elastic buckling theory and experiment for the 4 buckling tests that were performed. The experimental results were found to be very sensitive to the column and boundary conditions, as can be expected. An insufficient number of tests were performed to draw any conclusions regarding the possible dependence of the buckling strength of ice on strain rate and aspect ratio. (Au)

G-26670
Landfast ice movement / Mackenzie Delta 1973-74 / Spedding, L.G.
(APOA project no. 111 : Evaluation of ice defence systems for artificial islands. Report)
Appendices.

An analytical study of ice movement in the Mackenzie Delta 1973-74. (Au)

The movement of the landfast ice is primarily dependent on wind. Winds under 5 mph and changes in wind direction are enough to keep the ice in motion. This motion is of a cyclic nature and can be correlated to wind velocity increases and decreases. In storms or periods with winds over 15 mph, movement up to 5 feet per hour around the Barrier Islands can be expected. After January the closer to shore will decrease. The motion becomes more severe as one nears the shear zone. Ice motion at the shear zone generally seems to occur during storms and is generally in the direction of the wind. Movements up to 12 feet per hour can be expected. The fast ice seems to act as an elastic material. Wind stress causes the ice and on removal of this stress the ice usually returns to its initial position causing the observed cyclic type motions. (Au)

G-26697
An analytical study of ice scour on the sea bottom / Fenco Consultants Limited.
[Calgary : Distributed by APOA], 1975.
5 microfiches : figures, tables : 11x16cm.
(APLO project no. 69 : An analytical study of ice scour. Report)
Appendices.

The study covers all aspects of scouring: a review of literature and environmental factors required for study; types of ice formations;
Remote estimation of the properties of sea ice, Beaufort Sea field trip report - March 1979 / Rossiter, J.R. Butt, K.A. St. John's - C-CORE, 1979. v. 35p. : ill., 28cm. (C-CORE publication, no. 79-9) (Data report - Memorial University of Newfoundland, Centre for Cold Ocean Resources Engineering) ACU, NFSMO

The main objective of this experiment was to collect data required for construction and design of an operational radar system to estimate the thickness and strength of sea ice from an airborne platform. Emphasis was placed on increasing our knowledge and understanding of ice conditions, particularly the in situ electrical properties of sea ice. A list of agencies and personnel involved in the program is given. The main pieces of equipment used are listed... A description of the sites and a summary of the data as collected are presented... and the positions of the sites are shown... (Au)

G-29039


Although it was not possible to measure sea ice thickness directly, monthly maps indicating the distribution of first-year and multiyear ice for the entire Beaufort Sea region were prepared from Nimbus 5 passive microwave imagery. Detailed investigation of the shear zone was performed using 13.4 GHz scatterometer and X-band SLR imagery for April 1975. A description of the various sensors employed and an outline of the development of a UHF radar for direct measurement of sea ice thickness are included. (Au)

G-40517


... Commencing in 1970, a number of companies cooperated in joint research to determine whether petroleum operations could be conducted in ice-covered waters. Studies by APOA were undertaken in order to measure and predict the presence and behaviour of ice features in the southern Beaufort Sea. A number of these studies had as their aim to record not only the movement and location of ice, but to understand better the origin of ice masses and the causes of their movements. An eventual goal was to develop an ability to predict the magnitude and type of ice that may affect petroleum operations... Numerous studies of the strength of ice were conducted. Results of research into the movement and location of ice would also be valuable in assessing the feasibility of transportation both through the
ice by marine vessels, and over the ice by
ground transportation. Studies on ice
scouring in the grounding of ice masses into the
seafloor were undertaken. One of the
results of the studies has been to adapt
techniques of remote monitoring to record the
presence, movement and magnitude of the ice
features. [APOA projects reviewed area: nos. 19,
32, 33, 39, 51, 53, 54, 67, 69, 89, 99, and
113]. (Au)

G-41106
Field studies of the strength and physical
properties of a multi-year ice pressure ribbon
in the southern Beaufort Sea / Imperial Oil
Limited. Gladwell, R.W. [Calgary : Distributed
by APOA], 1977. 2 microfiches : ill., figures, tables :
11x16cm. (APOA project no. 91 : Strength of multi-year
pressure ridges. Report, no. 1)
Original publisher: Imperial Oil Limited.
ACU, NFSMO

... The ... report contains salinity,
temperature, density and strength profiles for
selected core sample locations on the
multi-year ridge that was the subject of study.
In addition, flexural strengths of large beams
(1 foot square and 8 inches square) quarried
from the ridge are presented and compared to
flexural strengths of small beams (1 inch
square) cut from the large beams. (Au)

G-41114
Structural analysis of the ice encountered in
Ridge Camp 1975 / Arctec Canada Limited.
Imperial Oil Limited [Sponsor]. [Calgary : Distributed
by APOA], 1976. 2 microfiches : ill., figures, tables :
11x16cm. (APOA project no. 91 : Strength of multi-year
pressure ridges. Report, no. 2)
References.
ACU, NFSMO

This crystallographic analysis leads to a
better knowledge of the types of ice
encountered in a ridge. There is, of course, no
obvious repetitious pattern on which would be
ordered the different types of ice but a fair
idea of the genesis of the ridge can be obtained and general features can be pointed
out. ... (Au)

G-42986
Inertial oscillations in floe motion over the
Beaufort Sea - observations and analysis /
Khandekar, M.L. [Calgary : Distributed by
APOA], 1976. (Atmosphere-ocean, v. 18, no. 1, 1980, p. 1-14,
111.)
References.
ACU, NFSMO

A simple model developed by McPhee (1978) has
been used in this study for simulating observed
 oscillatory movement of floe motion in the
Beaufort Sea. The model uses the momentum
equation integrated over ice, and the upper
ocean driven by surface wind stress. Floe
velocity is related to the total ice and water
transport by considering an idealized current
profile for the ocean boundary layer. Using
hourly wind values for Kappianor
(70 deg. 23 sec. N, 135 deg. 06 sec. W)
ocillations in the floe velocity are simulated with
reasonable success. The possibility of
incorporating this model into the Computerized
Prediction Support System (CPSS) of the
Canadian Atmospheric Environment Service is
discussed. (Au)

G-45233
Orbital sensing of Mackenzie Bay ice dynamics /
Day, R. (Arctic, v. 33, no. 2, June 1980, p. 280-291,
111., figures, tables)
References.
ACU, NFSMO

... The results of studies using satellite
images of Mackenzie Bay during the break-up and
freeze-up periods are presented in maps and
tables. These indicate important temporal
variations in the processes of bay ice break-up
and freeze-up. Though the Mackenzie Bay
break-up proceeds from the south and from the
north, the southern melt rate is faster because of
an influx of warm water from the Mackenzie
River. The freeze-up proceeds from south to
north, i.e., from the fresh water area to the
saline water area of the bay. The study of
Mackenzie Bay ice dynamics is important because of
the large traffic through the Mackenzie
River and also because of offshore drilling
activities in the Beaufort Sea. (Au)

G-45381
Third Canadian Geotechnical Colloquium: ice
forces on wide structures / Kry, P.R.
(Canadian Geotechnical Journal, v. 17, no. 1,
References.
ACU, NFSMO

Successful use of artificial islands as
exploration drilling platforms in the southern
Beaufort Sea requires an understanding of the
interactions of ice sheets with wide
structures. Four primary ice failure modes
occur against wide structures: flexure, rubble
formation, buckling, and crushing. The
horizontal forces associated with these modes
differ by more than two orders of magnitude
depending on structure geometry, ice sheet
properties, and ice movement rates. Structure
width influences the occurrence of ice failure
modes, the ice failure stresses, and the total
forces that can be exerted on a structure by an
ice sheet. The relative inability to clear
failed ice around wide structures (compared
with narrow structures) leads to rubble
formation when ice movement is continuous.
After consolidation, the resulting rubble field
will amplify forces exerted on the structure.
... (Au)

G-45799
The application of NOAA satellite imagery to
verify and supplement official Atmospheric
Environment Service thaw-date observations /
Olson, R. (Alberta geographer, no. 16, 1980, p. 13-25,
111., figures)
References.
ACU

... The intent of this study is to illustrate
the utilization of satellite imagery to verify
official A.E.S. ice break-up dates on selected
western Canadian lakes and to supplement
the A.E.S. data base with a break-up date for an
unobserved lake in northern Canada. There
are inherent errors involved in monitoring ice
conditions from the shores of large lakes.
The vastness of Canada, with its many lakes,
necessitates that the surface-based
reconnaissance has limitations. Yet, satellite
imagery is a largely untapped data source for
systematic observations of ice conditions. The
imagery itself cannot replace surface-based
observations, but it can complement and serve
to verify the data from the existing network.
... (Au)
G-48020
Dynamics of sea ice studied / Hoare, R.D.
(APDA review, v. 3, no. 2, Aug. 1980, p. 6-7, ill., photos.)
ACU, NSF/DO

A joint field study of extreme ice dynamics and
features was conducted in April 1980 off the
northwest coast of the Canadian Archipelago by
Dome Petroleum Ltd. on behalf of its partners.
A number of worst case conditions were
investigated, and dramatic new light has been
thrown on the ice regime of the area, features
that may drift into the southeast Beaufort
Sea. (Au)

G-55417
Landfast ice motion observed in the Mackenzie
delta region of the southern Beaufort Sea in
the 1972/73 winter / Spedding, L.G.
(PDAC 79 : the Fifth International Conference
on Port and Ocean Engineering under Arctic
Conditions, at the Norwegian Institute of
Technology, August 13-18, 1979, proceedings, v. 1, p. 23-37, ill., map, photos.)
References.
ACU, NSF/DO

During the winter of 1972/73 movement was
recorded at 11 remote stations deployed on the
landfast ice in the Mackenzie Delta region. The measurements were made with a
spring-tensioned reel/wire system connecting
the ice with the sea bed. Stations deployed at
water depths of 3 metres in locations
protected by barrier islands were displaced an
average of 4 metres in a five-month period. Other stations deployed outside the barrier
islands at water depths up to 20 metres
recorded displacements between 0.1 and 14
metres during April and May 1973. During this
period continuous motion of an oscillatory
nature was recorded. Over the winter the
landfast ice sheet for 50 kilometres along the coast
had been displaced towards the shore. It is
thought the oscillatory motion recorded at the
outer stations may be the result of varying
pack ice pressure at the boundary of the
landfast ice coupled with an elastic response
of the ice sheet. Variation in motion between
stations can be explained by the presence of
pressure ridges and cracks. (Au)

G-55425
Some influences of ice rubble field formations
around artificial islands in deep water / Alyn, N. Wasilewski, B.R.
(PDAC 79 : the Fifth International Conference
on Port and Ocean Engineering under Arctic
Conditions, at the Norwegian Institute of
References.
ACU, NSF/DO

This paper presents some results of recent
design studies on the effect of the ice
environment on Artificial Production Islands in
deep water in the Canadian Beaufort Sea. The
influence of the formation and structure of the
rubble field on forces and sliding
resistance of a deep water artificial island are studied. Evidence is presented showing the
formation of such rubble fields in the shearzone. An example demonstrates the effect of
various ice rubble field parameters on the
safety of an island. (Au)

G-55468
Multi year pressure ridges in the Canadian
Beaufort Sea / Wright, B. Hnatuk, J., Kovacs, A.
(PDAC 79 : the Fifth International Conference
on Port and Ocean Engineering under Arctic
Conditions, at the Norwegian Institute of
Technology, August 13-18, 1979, proceedings, v. 1, p. 107-126, ill., map, photos.)
References.
ACU, NSF/DO

... the findings of a field study designed to
generate fundamental data on multi-year
pressure ridges in the near shore zone of the
Canadian Beaufort Sea are presented. The study
investigated the geometry of eleven floating
multi-year ridges or ridge fragments and the
shear height and keel depth of four additional
multi-year ridge fragments. It is also
shown that the ice comprising multi-year
ridges is solid with the interblock voids existing at
the time of their formation being completely
filled with ice. The data obtained from this
study is being used in the engineering design of
exploration and production systems for the
Beaufort Sea. (Au)

G-55700
Existence of oriented sea ice by the Mackenzie
Delta / Vittoratos, E.S.
(PDAC 79 : the Fifth International Conference
on Port and Ocean Engineering under Arctic
Conditions, at the Norwegian Institute of
Technology, August 13-18, 1979, proceedings, v. 1, p. 643-650, ill., map, photos.)
References.
ACU, NSF/DO

... the crystallography of the sea ice by the
Mackenzie Delta was investigated at four
locations in the spring of 1978. It was
observed that the c-axis lies in the horizontal
plane and has a preferred azimuthal orientation
for distances of hundreds of metres. Preferred
orientations were also observed by use of
Impulse radar in the vicinity of Pullien Island.
These results are similar to those reported for
offshore Alaska. (Au)

G-55677
Implications of structure width for design ice
forces / Kry, P.R.
(Physics and mechanics of ice, papers /
International Union of Theoretical and Applied
Mechanics Symposium, Technical University of
Denmark, Copenhagen, August 9-10, 1979. Edited
pp. 179-193, figures, tables.)
References.
ACU, NSF/DO

Hydrocarbon exploration activities in the
Canadian Southern Beaufort Sea have provided
incentives to further develop our knowledge of
ice and its interactions with structures. To
have sufficient surface area for drilling
operations and personnel quarters, these
islands represent very wide structures compared to
the maximum ice thickness. Their width is
further enlarged by ice rubble fields formed by
early winter ice motions. A rubble field
provides protection against subsequent ice
ride-up. However, the rubble field increases
effective structure width and this amplifies
forces on the structure. Forces arise from
effective stresses generated by ice failure at the
periphery of the rubble field. The
extensive width increases the importance of
localized failures due to irregularities at the
failure interface. Such non-simultaneous
failure implies that effective stresses are
subject to statistical variations such that
design stresses for wide structures are less
than peak values appropriate for narrow
structures. (Au)

G-57908
Remote estimation of the properties of sea ice.
Ice core analysis / Hauser, B., March 1979 /
Langhorne, P.J., Rossiter, J.R., Kelinher, T.E.

References: ACU, NFSMO

A profile of the ice cover in the southern Beaufort Sea was obtained by the submarine U.S.S. Gurnard in April 1976, using a narrow-beam upward-looking sonar. ... A statistical analysis was carried out over contiguous 50 km sections to yield probability-density functions of the drafts of ice and of level ice, the distributions of keel spacings and drafts, and the frequencies and widths of leads. Two distinct types of ice cover were found in the profile. The first ... consisted of heavily ridged ice with mean drafts of up to 5.1 m. The rest of the track ... consisted of a homogeneous ice cover with a mean draft of 3.7 m. ... (Au)


References: ACU, NFSMO

This paper sets forth the results of ice property measurements carried out during the ice breaking trials of the "CANNAR KIGORIAK" in the winter of 1979-80. The measurements included crystallographic analysis to establish ice type and structure, temperature and salinity profiling of ice cores, and uniaxial compression and "Brazil" strength tests. These measurements were all performed on board ship at the time of the trials. The ice analyzed included samples from both first-year ice covers and multi-year pressure ridges. ... (Au)
Further using the strength of the returns, airborne impulse radar appears useful for routine estimation of the "third-dimension" of ice properties, particularly in conjunction with aerial remote sensing surveys. (Au)

G-69639
References.
NFSMO
Synthetic Aperture Radar imagery, generated in real time, has been used for the first time to support an Arctic marine operation. During the latter portion of Dome Petroleum's late season drilling program (November 1979) in the Beaufort Sea, the SAR-S80 flew daily missions in order to provide real-time "snap-shot" of the ice conditions in the vicinity of the operations. The purpose of the program was to assist both the icebreaker support of the drilling ship and the subsequent navigation back to harbour. Near real time imagery was made available to the drillship initially, and later to the icebreaker Kigoriak, by two methods - VHF data link and by "local mail". To provide the context for this SAR application, a review of Beaufort Sea ice conditions is presented along with a brief discussion of the problems and techniques for interpretation of the SAR imagery. The SAR's downlink and operational performance, are described along with an outline of an improved system planned for 1980. The conclusion of marine operations personnel associated with this project was that SAR should form a valuable support tool for future winter arctic operations. (Au)

G-69647
(C-CORE publication, no. 80-6)
References.
NFSMO
Airborne impulse radar, operated from helicopter and Twin- Otter, was used in March-April 1979 to estimate the physical properties of sea ice in the Beaufort Sea and Lake Melville, Labrador. Concurrent measurements included: auger thickness, salinity, temperature, crystal fabric, electrical properties of the ice, simultaneous aerial photography, and Synthetic Aperture Radar imagery. Impulse radar centre-frequency of 80, 100, 200 MHz appears to give the best trade-off penetration vs resolution and antenna size. Data collected from 30 m elevation have reduced side-scatter from the ice surface. Speeds below 40 m/s are required with the current hardware to achieve coherence from scan-to-scan thickness. Excellent for fresh and brackish ice, and are good for undetected first-year sea ice about 1-2m thick. Areas of fresh water pools that have only experienced surface refreezing show thickness profiles that warrant further examination. Bottom returns from multiyear ice are sporadic, although flows up to 4 km have been sounded. Ridges are not usually penetrated, but can be easily detected. Data processing algorithms are under development to characterize the ice further using the strength of the returns. Airborne impulse radar appears useful for routine estimation of the "third-dimension" of ice properties, particularly in conjunction with aerial remote sensing surveys. (Au)

G-69663
NFSMO
Simultaneous 13.3 GHz dual-polarized fan-beam scatterometer data, 19.35 GHz horizontally polarized profiling radiometer data and corresponding X- and L-band SAR (Synthetic Aperture Radar) imagery were collected with the CCRS Convair-S80 in March 1979 in the Beaufort Sea and in the Eastern Arctic in April 1979. This data set was analysed to compile statistics on WMO (World Meteorological Organisation) classes of sea ice, ranging from calm open water to multi-year ice and ice island. (Au)

G-69671
References.
NFSMO
Dual-polarized 13.3 GHz scatterometer data and X-Band SAR data, collected in the Beaufort Sea and in the eastern Arctic, during the SURSat sea-ice experiment deployment in March 1979 and April 1979 respectively, have been analyzed to determine the radar contrasts (signal to sea-ice clutter) between sea-ice ridges and the surrounding sea ice and between icebergs and the surrounding sea ice in the eastern Arctic. The effects of radar resolution cell size on ridge detectability were examined using aerial photography to estimate ridge dimensions. Over the incidence angle range observed, the contrast between ridges and the surrounding sea-ice is nearly independent of incidence angle for all ice types. Cross-polarized radars produce larger ridge contrasts than like-polarized radars, with the largest contrasts and greatest polarization dependence being observed for rough first-year ridges in smooth first-year ice and the smallest contrasts and least polarization dependence being observed for multi-year ridges in multiyear ice. The contrast between icebergs and the first-year ice background is nearly independent of incidence angle over the observed range. Cross-polarized radars enhance iceberg detectability but synthetic aperture radars operated at satellite incidence angles are found to be unsuitable for iceberg detection. (Au)

G-70179
Measurements of sea-ice stresses near grounded obstacles / Sackinger, W.M. / Nelson, R.D. / (Journal of energy resources technology, v.102, no. 3, Sept. 1980, p. 144-147, figures)
References.
NFSM
Landfast ice movement - Mackenzie Delta 1974/75 / Imperial Oil Limited. [Sponsor]. [Calgary : Distributed by APOA], 1975. 7 microfiches : ill., figures, tables ; 11x16cm.
ACU, NFSMO

G-70220
The flexural strength and Young's modulus of landfast ice by the Mackenzie River delta / Imperial Oil Limited. Kry, P.R. [Calgary : Distributed by APOA], 1975. 2 microfiches : ill., figures, tables ; 11x16cm.
(APDA project no. 84 : In-situ ice property measurements in the Beaufort Sea. Report) Appendices.
ACU, NFSMO

Two field trips to the Beaufort Sea by the Mackenzie Delta were made... The ice was determined to be essentially fresh 52 ice with a crystal size of 1.4 inches in horizontal plane and 3.5 inches in a vertical direction. Brazil test results gave a mean tensile strength of 105 + 27 psi. The mean flexural strength determined from in situ cantilever beams failed elastically with the bottom surface in tension was 78 +/- 16 psi. The mean value for Young's modulus was (1.46 -0.54)/1,000,000 psi. Load rate within the range 3 to 300 psi/sec and temperature... 25 deg. C to -1 deg. C have no effect on either flexural strength or Young's modulus. The flexural strength... depended on the size of the sample. Simple considerations, applying the concept of a mean distance between flaws, explained the variation if the mean distance between flaws were 10 inches, suggesting that the crystal boundaries are the relevant flaws for fresh ice. (Au)

G-70262
Ice conditions and ice defense at Netserk B-44 and Adgo P-25 during the winter of 1974-75 / Imperial Oil Limited. Wetge, W. [Calgary : Distributed by APOA], 1975. 1 microfiche : ill., figures ; 11x16cm.
(APDA project no. 104 : Ice pressure measurements Netserk B-44, 1974-75. Report) Appendices.
ACU, NFSMO

During the winter of 1974-75 the ice conditions at Adgo P-25 and Netserk B-44 were periodically monitored visually to determine the interaction characteristics of the ice sheet and the islands. Most significantly the ice sheet at Netserk never became fully integral with or frozen-in to the island. Instead the ice tended to fail along a set of circumferential cracks... We... call this failure mode "continuous crushing." Defense systems in the form of circumferential rows of dry and wet slots were put in place using a Ditch Witch trenching machine. (Au)

G-70270
Ice stress measurement at Adgo Island / Nelson, R.D. Sackinger, W.M. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1974. 1 microfiche : figures, tables ; 11x16cm.
(APDA project no. 104 : Measurement of ice pressure on artificial islands - phase I. Report, no. 2) References.
ACU, NFSMO

This report presents the results of a project to measure stresses in the ice surrounding Adgo Island in the Mackenzie Delta. Stiff load transducers embedded in the ice and monitored by battery-powered electronic amplifiers and recorders were used as the measuring system. (ASTIS)

G-70289
Ice stress measurements at Adgo and Netserk islands, 1974-1975 / Nelson, R.D. Sackinger, W.M. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1975. 2 microfiches : ill., tables ; 11x16cm.
(APDA project no. 104 : Measurement of ice pressure on artificial islands - phase I. Report, no. 3) Bibliography.
ACU, NFSMO

This project was begun in November, 1974... to identify the magnitudes of stresses in the ice surrounding the artificial island drilling platforms which Imperial Oil has constructed in Mackenzie Bay, N.W.T. Two islands were to be instrumented: the first, Adgo P-25, is in five to eight feet of water depth; Netserk, the second, is in ten to twelve feet of water. Specially-constructed low-compliance load cells were to be embedded in the ice near each island... A total of fifteen stations were placed around Netserk during the course of the winter... Six stations were placed at Adgo... In general, the sensors were oriented so as to measure both compressive and tensile stress along an axis passing through the center of the drilling rig tower and were located uniformly around the island... the occurrence of compressive stresses at the various Netserk sites appear to correlate well with ice motion in the area. (Au)

G-70300
(APDA project no. 105 : In-situ pressure measurements around artificial islands in southern Beaufort Sea - phase II. Report, no. 1) Appendices.
ACU, NFSMO

... report describes the measurement of in-situ ice pressures around a dredged exploration drilling island (Netserk F-40) in the southern Beaufort Sea during the winter 1975/76. The project was initiated to provide additional data to that collected around other islands in
the two previous years. A sensor developed by ... Imperial Oil Limited was used to obtain the data. As well, ice-to-island movement was monitored to correlate with the pressures. ... Results of the measurements have been used to estimate the force exerted by the moving ice sheet on the island through the use of a simple model. ... (Au)

G-70237

(APOA project no. 105 : In-situ pressure measurements around artificial islands in southern Beaufort Sea - phase II. Report, no. 3)

ACU, NSFSD

... documents the observed ice conditions during the winter of 1975/76 in the vicinity of Netserk F-40, Ikattok U-17, Netserk B-44, Inuvik, Adgo F-28, Adgo C-15 and Adgo P-25. Principal interest was focussed on Netserk F-40 from which drilling was being conducted since it was in the deepest water and sustained the most significant ice action. This report marks a significant advance in the understanding of ice-island interaction and documentation of ice failure modes against a wide structure. ... (Au)

G-70235

(APOA project no. 105 : In-situ pressure measurements around artificial islands in southern Beaufort Sea - phase II. Report, no. 4)

Appendices. References. NSFSD

This report covers the analysis of the ice movement recorded at eleven locations on the Landfast Ice between Mackenzie and Kugmallit bays for the period November 1975 to May 1976. Reel/wire devices coupled to a telemetry system, allowed hourly readings to be recorded at a master station in Inuvik. The major portions of the stations were around Ikattok U-17, Netserk F-40 and Sarpik B-25 artificial islands. At Ikattok U-17 and Netserk F-40 locations additional movement information was acquired by reel/wire devices connecting the island to the ice sheet and by distal surveys. Data from all these sources has been combined in this report to give a comprehensive picture of ice movement throughout the winter. (Au)

G-72132

References. Document not seen by ASTIS. Citation from MRIS. NSFSD

A comprehensive theoretical analysis of deep-water Arctic ice-structure interactions was partially described in this paper. Following identification of a severity hierarchy of ice formations and associated strengths for the 200 ft. water depth range in the South Beaufort Sea, quasi-static and dynamic interactions of these formations with a steel monocoque production platform structure were analyzed. ... Numerical results for representative quasi-static and dynamic cases were presented and discussed. Certain nongoverning interactive modes including pile-up and in-plane ridge flexure, were also discussed briefly. Conclusions and recommendations for further work were presented. (MRIS)

G-73897

At some sites along Mackenzie River the frequency with which river ice reaches a given bank elevation can be determined using tree age. In the lower series where ice thrusting occurs, the process limits tree age. During breakup Mackenzie River ice may break into blocks 2 m or more in thickness; ice movement on shore is capable of crushing or uprooting trees. The maximum tree age at a given bank elevation is indicative of the amount of time that has elapsed since ice of sufficient magnitude to kill or uproot the tree has reached that elevation. In this manner approximate return periods of ice events can be determined. (Au)

G-81868

Simultaneous data sets obtained from a scatterometer ... radiometer ... infrared radiometer and an RC-10 camera have been collected from approximately the same region of the Beaufort Sea during March (1979), June (1980), and October (1980). It is shown that the microwave signatures characteristic of multi-year and first-year ice obtained under cold conditions during March change significantly under melt or near-melt conditions. ... Examples of quantitative signatures and statistics for the various seasons will be presented together with illustrative examples of X- and L-band SAR imagery. (Au)

G-82350

vi, 12 leaves : ill., figures, photos, tables; 28cm.

References. ACU

... In May 1979, for the third consecutive year, an icing was observed on lower Hans Creek, N.W.T., just upstream of the proposed Inuvik-Tuktoyaktuk highway crossing (68 degrees 52'S; 132 degrees 31'W). In late May, there were three distinct zones of icing which encompassed a total area of approximately 11.4
Radar scatterometer measurements of sea ice were measured by a team from the University of Kansas Remote Sensing Laboratory during the month of March 1979. These measurements were made using both a surface-based and a helicopter-borne scatterometer system. Thick first-year sea ice, thin first-year sea ice, brackish sea ice, and fresh-water inland lake ice were investigated. These ice sites were located off or near the Canadian coast at Tuktoyaktuk, N.W.T., Canada. The investigations were part of the Beaufort Sea Ice Experiment segment of the Surveillance Satellite Project (SARSAT) of the government of Canada. This paper describes the field experiment, documents the sensors used, and presents the results obtained. (Au)

G-83470
Field studies of first-year ice pressure ridges in the southern Beaufort Sea. / Imperial Oil Limited. Gladwell, N.W.T., Canada. [Calgary: Distributed by APOA], 1976. 2 microfiches: ill., figures, tables: 11x16cm. (APOA project no. 75: Field study of first-year ice pressure ridges. Report) Appendices. References. ACU, NFSMO

...The project objectives were: 1. To measure the shape and physical properties of several first-year pressure ridges in the Arctic and floating, in various water depths out to the annual pack ice of the southern Beaufort Sea. This data will provide input to structural design criteria and logistics planning for oil industry activity in the area. 2. To establish a ratio of ridge keel depth to soil height necessary for the evaluation of total ridge size from aerial photographs. Data presented include cross-section drawings of the ridges; temperature, salinity, density and brine volume profiles of the constituent ice, results of Menard Pressuremeter strength tests; sea water salinities; analysis of sea bottom soil samples; and a report on ridge profiling using the Geophysical Survey Systems electromagnetic subsurface profiling techniques. (Au)

G-83500

This report presents the results of the in situ ice pressure measurement program conducted around Imperial Oil Limited's two artificial islands, Arnak L-30 and Kannerk G-42, during the winter of 1976-77. Results consist of pressures recorded by each of 16 sensors, ice-to-island movement data and calculations for evaluating the net effective pressure on the island. Recommendations for improving future programs are listed. (Au)

G-85257

The radar backscatter properties of sea ice were measured by a team from the University of California, Berkeley. The data were collected during the winter of 1977-78 in the Beaufort Sea. The results were used to develop a model for predicting the backscatter properties of sea ice. (Au)

G-85960

A study of the transfer of mechanical energy from the atmosphere to the Arctic Ocean, and then to the ocean suggests that energy measures can be used to compare modeled and observed behavior. The mechanical energy budget of the Beaufort Sea is used to evaluate a parameter study of yield surface shapes and strengths for a plastic sea ice model. These material parameters are optimized to tune the model. Wind and buoy data are then compared with simulations using the tuned model to study the energy budget of the Beaufort Sea ice cover for 17 day period, which includes two storms (extreme ice motion events). The results show that the ice cover dissipates energy by deformation and transfers energy horizontally by stress flux divergence. The energy dissipation is shown to be concentrated in ridging and rafting of ice along the North Slope of Alaska and the Canadian Archipelago. (Au)

G-87785

Echo sounder records obtained in the Beaufort Sea during 1975 and 1976 have been analyzed and the resulting ice scour data has been combined with the results of APOA projects 10 and 11 which included 1970 and 1972 data. Scouring was found to be common in depths of water from 50 to 150 ft. and deeper water. In an attempt to relate these scour to current processes, return periods were calculated using sedimentation assumptions. This indicates the number of years between scouring in a given nautical mile and was found to vary mainly between 10 and 100 years. (Au)

G-88986
Ice property measurements were carried out during ice breaking trials of the "CANSAR KIGRIAK" during the winter of 1979-80, primarily in landfast ice in the Southern Beaufort Sea in the vicinity of Mckinley Bay. They included crystallographic analysis to establish ice type and structure, temperature and salinity profiles, and uniaxial compression and "Bailit" strength tests. The work was performed on board ship at the time of the trials. The ice under study included samples of first-year ice covers and multi-year pressure ridges. Sampling and measurement techniques are described. The strength results are discussed in terms of salinity, loading rate, grain structure, sample orientation and position in the ice cover. Strength results were found to agree generally with values in the literature. (Au)

G-92118

This report will investigate some of the factors that currently determine the position of the landfast ice edge in Lancaster Sound, and more importantly, other factors likely to influence its position in the future. These include ice deformation, export of multi-year ice, ship traffic, and climatic change over the next several decades. The significance of possible ship-related displacement compared to natural advance and retreat, and break-up, of the ice edge will be addressed. Scenarios that detail the season-to-season, ship-related disruption of the local ice conditions will be presented. The more probable effects of ships crossing the ice edge will also be mentioned. A summary of relevant ice, climatic, and oceanographic information will precede assessments of future interactions. The very high natural variability of ice and climatic conditions in the Arctic Archipelago will be emphasized in this regard. These regional characteristics will likely determine the significance of increasing ship traffic on the future location and integrity of the landfast ice edge in Lancaster Sound. (Au)

G-92150

Ice conditions along a 1,700 kilometer year-round marine shipping route, from the Bering Strait to the Canadian Beaufort Sea, are evaluated using over 400 satellite images, all available ice charts, and published data. 1975 is discussed as an extreme year, and compared with probability statistics. The study concludes that for at least nine years out of ten, multi-year ice will not be a significant factor in hindering vessel transit, but in an extreme year, may entail delays in the order of 40 to 70 hours on any given shipment. Ice pressure is the least understood ice condition, and could cause additional delays over the route section between Point Barrow and Barter Island, in part owing to the negative aspect of pressure, is the encouraging presence of distinct leads along the route throughout the winter period. If utilized efficiently, these leads offer opportunities for much greater block speeds than could otherwise be achieved through level first-year ice. Recommendations are made for further field and analytical studies required for a definitive route assessment. (Au)

G-92169

The following summaries of sea ice and surface weather were prepared as the first phase of a study to evaluate the practicable feasibility of shipping oil from Tuktoyaktuk in the Beaufort Sea to Bridport Inlet on Melville Island. The principal objective of the ice analysis was to generate parameters which could be used in assessing ship transit times and establishing vessel design criteria. A full explanation of how this emphasis on shipping was applied in interpreting historical ice data, ... Ice conditions in the Beaufort Sea have been covered by a number of researchers ... These reports provide detailed results of LANDSAT and NOAA imagery interpretation, laser surface profiles, historical summaries, and low level aerial photo coverage. Major conclusions and summaries are presented here. (Au)

G-92240

Surface wind direction data, vital for the study of drifting pack ice, are not routinely available for polar oceans. These data may be estimated from the difference between the direction of motion of detached ice floes, as determined from sequential satellite images, and the angle of sea ice deflection, which varies with the geostrophic wind speed. (Au)

G-99481

References:

ACU, NFSMO

The purpose of this report is to present the results of an analysis of 1977-78 Beaufort Sea aerial photographs. This analysis supplements the 1973-76 and 1976-77 Beaufort Sea Stereo Photo Analyses. ... Burnett Resource Surveys Ltd. was contracted to profile lines selected from specific target areas in the Beaufort Sea. ... The analysis for the ridge heights, ridge orientations, floe sizes and undeformed ice sheet sizes was identical to the procedure outlined in the report "Beaufort Sea Ice Stereo Photo Analysis: 1973-76". Since more areas were photographed in 1977-78 than in 1973-74, more sampling was done and new data blocks were created. ... All results are presented ... in the same format as that of the previous reports. (Au)


ACU, NFSMO

The purpose of this report is to present the results of the analysis of RAMS buoy positional data for ice movement in the Beaufort Sea collected between November 1977 and June 1978, by Gulf and Cannar and the Government of Canada. ... In this three volume report the ice movement information derived is presented in tabular and graphical form along with relevant statistics for design and environmental protection considerations. A detailed description of the analysis methods and an explanation of the various computer outputs appear in the text of the 1975-77 RAMS report. (Au)

Beaufort Sea ice stereo photo analysis, 1976-77 / Gulf Canada Resources Inc. Wright, B.D. Schwab, D.L. [Calgary, Alta. : Gulf Canada Resources Inc.], 1978. 1 microfiche : figures, tables : 11 x 15 cm. (Beaufort E.I.S. reference work, no. RWI02) ACU, NFSMO

The purpose of this report is to present the results of an analysis of 1976-77 Beaufort Sea aerial photographs. This analysis supplements the 1973-76 Beaufort Sea Stereo Photo Analysis. During the winter of 1976-77 ... Esso Resources Canada Limited obtained stereo photographs in the Beaufort Sea. These photographs were profiled by R.M. Hardy and Associates to obtain ridge heights along lines drawn by Esso Resources. These Beaufort Sea photographs along with the corresponding ridge profiles were purchased by Gulf. The same analysis as outlined in the report "Beaufort Sea Ice Stereo Photo Analysis: 1973-76" was then applied. ... (Au)

Beaufort Sea ice stereo photo analysis, 1977-78 / Gulf Canada Resources Inc. [Calgary, Alta. : Gulf Canada Resources Inc., 1980. 5 microfiches : figures, tables : 11 x 15 cm. (Beaufort E.I.S. reference work, no. RWI03) Mostly tables.

ACU, NFSMO

References:

The purpose of this report is to present the results of an analysis of 1977-78 Beaufort Sea aerial photographs. This analysis supplements the 1973-76 and 1976-77 Beaufort Sea Stereo Photo Analyses. ... Burnett Resource Surveys Ltd. was contracted to profile lines selected from specific target areas in the Beaufort Sea. ... The analysis for the ridge heights, ridge orientations, floe sizes and undeformed ice sheet sizes was identical to the procedure outlined in the report "Beaufort Sea Ice Stereo Photo Analysis: 1973-76". Since more areas were photographed in 1977-78 than in 1973-77, more sampling was done and new data blocks were created. ... All results are presented ... in the same format as that of the previous reports. (Au)

Multi-year ice thickness distribution in the Beaufort Sea determined by airborne impulse radar / Memorial University of Newfoundland. Centre for Cold Ocean Resources Engineering, Canadian Marine Drilling Limited [Sponsor]. Esso Resources Canada Limited [Sponsor]. [St. John's, Nfld. : Centre for Cold Ocean Resources Engineering], 1980. 1 microfiche : figures, tables : 11 x 15 cm. (Beaufort E.I.S. reference work, no. RWI04) (C-CORE publication, no. 80-11) (Contract report - Memorial University of Newfoundland. Centre for Cold Ocean Resources Engineering)

Appendices: References.

This material is proprietary to the sponsoring organizations until January 1982, after which time the report will be available as a C-CORE publication no. 80-7, prepared September, 1980. ACU, NFSMO

The possibility of using airborne impulse radar to characterize multi-year ice in the Beaufort Sea was investigated in March 1979. This was the first recorded use of a sea ice sounder from a fixed-wing aircraft. A total of 440 line-km of data were examined, along with simultaneous aerial photography. Initially aided by high and low level photography, analysis of impulse radar data can now be used to differentiate between first-year and multi-year ice. Multi-year ice covered 55% of the line studied, and a total of 11% of the multi-year ice (27 km) showed impulse radar bottom echoes. The maximum thickness penetrated was 13.5 m, while a minimum thickness was imposed by the waveform of the transmitted pulse at 1.3 m. Bottom echoes were sporadic, and deformed ice appears more difficult to penetrate, but further studies will have to be done before these limitations are fully understood. An ice thickness distribution based on the multi-year ice penetrated had a peak at 3.4 m and a mean thickness of 3.7 m. The distribution curve fits a negative exponential for ice thicknesses greater than 4.0 in with an exponential coefficient of -0.62, significantly different from the value of -0.37 reported from previous analysis of subarctic sonar keel drafts in the Beaufort Sea. (Au)


ACU, NFSMO

The purpose of this report is to present the results of an analysis of 1977-78 Beaufort Sea aerial photographs. This analysis supplements the 1973-76 and 1976-77 Beaufort Sea Stereo Photo Analyses. ... Burnett Resource Surveys Ltd. was contracted to profile lines selected from specific target areas in the Beaufort Sea. ... The analysis for the ridge heights, ridge orientations, floe sizes and undeformed ice sheet sizes was identical to the procedure outlined in the report "Beaufort Sea Ice Stereo Photo Analysis: 1973-76". Since more areas were photographed in 1977-78 than in 1973-77, more sampling was done and new data blocks were created. ... All results are presented ... in the same format as that of the previous reports. (Au)
L. D. Schwab. The work reviews, documents, compiles, and presents qualitative and quantitative recommendations on properties of ice in the Beaufort Sea relevant to ice structure interaction modeling. These properties include geometry and kinematics of sheet, ridge, and ice island forms and related mechanical strengths. Geometric and kinematic properties are cast into probabilistic form to optimize use of the relative sparsity of relevant empirical data. Strength and other material properties are presented in mean and maximum ranges to permit more realistic use by the designer. General and historical background on sea ice properties are presented to facilitate deeper understanding and continuation of the work. A description of mathematical simulators for the relevant main classes of offshore structures, providing a matrix for the engineering properties, is given. (Au)

G-107280
Beaufort Sea ice stereo photo analysis. 1973-76 / Gulf Canada Resources Inc. / Wright, B.D.
4 microfiches : figures, tables ; 11 x 15 cm.
(Beaufort E.I.S. reference work, no. RW108)

The purpose of this report is to present the results of an analysis of 1973-1976 Beaufort Sea aerial photographs. This analysis quantifies the distribution of various two and three dimensional ice cover parameters during the fall, winter and spring periods and is of importance to the design of offshore exploration and production systems for the Beaufort Sea. The study was subdivided into two phases, the first involving a stereoscopic analysis of ridge heights along "representative random" lines through the fixed Beaufort Sea areas mentioned. These new profiles were in turn separated into first and multi-year ridge populations, transformed into frequency distributions as a function of space and time, and then fit with probability distribution functions. The second phase of this study was a two dimensional analysis involving a planar determination of the following parameters within each of the fixed areas: ice concentration, ice type, floe size and undeformed ice sheet areas, and various two dimensional pressure ridge measures. The statistics on these features were again separated into first and multi-year ice categories where possible and the two dimensional data also presented as a function of space and time. (Au)

G-108251
Statistics on Beaufort Sea summer ice cover for ice/structure collision assessment / Imperial Oil Limited. Spedding, L.G.
Calgary, Alta. : Imperial Oil Ltd., 1978.
2 microfiches : figures, tables ; 11 x 15 cm.
(Imperial's operating requirements and report in one reference. These statistics have been obtained by reanalyzing the Historical Ice Charts. This report is aimed at improving our data base in the following areas: 1) Update statistics on the dates ice has broken up and cleared from specific water depths, 2) Derive end of season dates, 3) Derive open water season lengths for various water depths, 4) Derive frequency of all ice return probabilities for various water depths, 5) Derive frequency of multi-year ice return for various water depths, 6) Derive frequency of various returns by concentrations and combinations of types, 7) Generate collision probabilities for structures at various water depths. This information is open water season length, and ice incursions of course, is pertinent to all summer operations, whether it is Island building or drill ship operations. (Au)

G-108260
5 microfiches : figures, tables ; 11 x 15 cm.
(Imperial E.I.S. reference work, no. RW103)

Landfast and shear ice conditions observed in the Mackenzie Delta region during the 1977-78 winter are documented in this report. Conditions are documented from initial ice formation in October 1977 to the commencement of break-up in May 1978. In view of the possible development of projects at the deeper water depths of the shear zone, ice motion rates and pressure ridge distributions throughout the winter are required. To fulfill these goals, the winter ice monitoring program has been extended to document conditions during the 1977/78 season with the program emphasis changing to document shear zone conditions. The atmospheric and oceanic data, together with ice patrol aircraft was contracted to make four surveillance flights. Photographs, infrared line scanner and laser profile information of shear zone ice conditions were obtained. On one flight, side-Looking Airborne Radar imagery (SLAR) was obtained. SLAR imagery obtained in the spring of 1978 gave statistical information on the amount of multi-year ice trapped in coastal waters that winter. The following developments and evaluation of potential remote sensing systems for ice reconnaissance is also part of this work. The objective of the program was to evaluate the potential of various radar systems for characterizing the surface roughness of ice, especially radar altimeters for measuring ridge heights. An aircraft equipped with laser profilers, cameras, radiometer, scatterometer and radar altimeter flew a mission north of Richards Island. Industry's contribution to the program was to mark representative ridges with targets so they could be flown over, and provide ground truth observations on blocksize, snow depths, salinities and ridge heights. This report summarizes the results of programs. Shear and landfast ice zone conditions are documented. (Au)

G-108278
2 microfiches : figures, tables ; 11 x 15 cm.
(Imperial E.I.S. reference work, no. RW108)

The ice conditions around the artificial island Isserk E-27 are described for the 1977-78 winter. The exposed geographical location of
the island resulted in an extensive, elliptical rubble field (1400 by 700 m) which stabilized by the end of December. Properties of distinct features such as rubble field, rubble field-ice sheet ("active zone"), and cracks were studied. Using surveying techniques, it was concluded that the rubble field behaved as a solid annulus attached to the island during the period Feb. 20 - May 12 when the surrounding ice sheet movement was limited to less than 2 m. Profiles through the active zone revealed both crushing and bending failure mechanisms. The existence of a preferred crystallographic orientation of the sea ice was confirmed by the Mackenzie Delta; it was also inferred that the presence of the shore structures such as artificial islands influences the ice crystallography near the structure. The mathematical formalism for relating environmental forces to the ice force felt by an artificial island is outlined and it is applied to calculations relating to the safety of Isserl. (Au)

G-108286
6 microfiches : figures, tables ; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RW110) References ACU, NFSMO
This report presents the summer floe size distribution determined from analysis of aerial photographs taken over the Southern Beaufort Sea. Aerial photographs from 56 flight lines taken along the pack ice edge have been examined. The photographs were taken by Imperial and the Atmospheric Environment Service Ice Patrol Aircraft in 1973, 1974 and 1975. Data from aerial photo surveys conducted by Imperial in 1971 is also included for comparative purposes. A review of the literature indicates very little work on floe size distribution has been carried out in that past. Pertinent portions of other work is reviewed and discussed. An attempt has been made to fit the observed data to a statistical distribution model. (Au)

G-10824
2 microfiches : figures, tables ; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RW111) References ACU, NFSMO
This report represents a review of some of the major studies of the ice environment in the south-central Beaufort Sea. Its specific purpose is to summarize the data base for the planning of hydrocarbon production within the Arctic environment. A fourfold approach has been adopted to meet this objective: a) summarizing available reports to extract highlights pertinent to the specific requirements of this report, b) presenting new forms of analysis of published data which clarify the results and suggest new interpretations, c) analysis of data gathered during in-house studies which have hitherto not been presented in formal reports, d) combining various data types from several sources into new models of ice behaviour. The report has been produced in several chapters which have as far as possible been presented as independent units. Each has been designed to grow independently as additional information on the Beaufort environment becomes available and is incorporated into a clear and well founded concept of the Arctic environment. (Au)

G-108308
1 microfiche : figures, tables ; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RW112) References ACU
This study constitutes a brief review of the possibility of using a thermal discharge to control the accumulation of ice inside the proposed Arctic Production and Loading Basin. Without some measure to control ice growth it is calculated that the undisturbed ice cover in the APLB would typically reach a thickness of 1.9 m. Thickness in the ship track would be much greater - potentially 6.3 for ship transits every two days. The 24,000 square km area of the ship berth itself has been designated as an ice management area, within which ice thickness would be controlled to 0.5 m or less. Four different cases representing alternative management approaches have been calculated. Using a mathematical model of unsteady heat transfer a parametric study has been made of the effect of the average frequency of tanker arrivals on heat requirements. It is concluded that management of ice thickness in the berth can be expected to prove feasible with heating rates of the magnitude cited above. There has been no attempt to optimize pumping power against design heat capacity. (Au)

G-108316
1 microfiche : figures, tables ; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RW113) Appendices. References. Cover title: Beaufort Sea production environmental impact assessment, ice conditions along arctic tanker routes. ACU, NFSMO
This summary document describes the important characteristics of the different ice regimes along eastern and western Arctic tanker routes originating in the Canadian Beaufort Sea. The text contains information drawn from a wide variety of sources, but relies heavily on descriptions of ice conditions along actual "best" shipping routes selected through studies since 1977, rather than overall regional summaries, more applicable to pollution assessment and exploration. Sea ice statistical data along with other supporting information is provided on a regional basis in an Appendix - Physical Environment. (Au)

G-108324
8 microfiches : figures, tables ; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RW114V1, RW114V2) ACU, NFSMO
The purpose of this report is to present the results of an analysis of all the available RAMS positional data for ice movement in the
Southern Beaufort Sea. The resultant information is limited to average motions over daily periods by inherent inaccuracies in the RAMS system but it is useful as preliminary design data for exploration and production systems as well as in environmental protection considerations. This report, ice movement time series and statistics derived from 10 RAMS buoy data sets are presented in both graphical and tabular form. The 10 buoys used for this analysis were deployed at various sites throughout the year over the 1975-1977 period... and provide a reasonable amount of information on the spatial and temporal distribution of ice movement in the Southern Beaufort Sea. ... (Au)

G-108332
2 microfiches: figures, tables: ii x 15 cm.
Beaufort E.I.S. reference work, no. RW173
Appendix.
References.
ACU, NSFMD
... This report is a companion report to two further CMEI reports dealing with an ice/structure interaction computer model and probabilistic ice loads on offshore structures in the Beaufort Sea... The intent of these reports is to collectively provide a preliminary probabilistic assessment of the global ice loads which may be applied to offshore production structures located on the Beaufort Sea Continental Shelf. These reports were initiated to demonstrate the feasibility of constructing structures to resist the ice loads in this area; they do not contain sufficient information for detailed design. The ice statistics contained in this report are representative of the Canadian Beaufort Sea and have been used in the computer interaction model to predict return period global ice loads on offshore production structures. Offshore structures... will be subjected to interactions with large ice features. A number of interaction scenarios are possible. These will involve impacts by multi-year floes, multi-year hummock fields and even ice islands although the probability of this is low. This report concentrates on the larger ice features such as multi-year floes which may interact with fixed offshore structures in the region. A summary of the report is presented in Chapter 2. (Au)

G-108340
The flexural failure of hummock fields and large floes at the summer ice edge in the Beaufort Sea / Wadhams, P. Dome Petroleum Limited [Sponsor]. [S.I.: s.n.], 1981.
2 microfiches: figures, tables: ii x 15 cm.
Beaufort E.I.S. reference work, no. RW166
Appendices.
References.
ACU, NSFMD
... A theory for the flexural response of a uniform floating ice raft to wave action has been developed at SPRI and tested against experimental data from the Labrador Sea (first year floes), Greenland Sea (first and multi-year floes, ice island), Bering Sea (thin first year ice) and Antarctic (tabular icebergs). The theory enables us to predict the maximum raft diameter as a function of wave height and period. Furthermore, theory and experimental data on the decay rate of waves in an ice field enable us to calculate how near to the ice edge the EIF must come before suffering fracture. In this report we use as wave data the hindcast wave statistics which we use to compute the effect of Beaufort Sea waves on EIFs of various dimensions. The frequency of flexural failure is estimated and the maximum sizes of the fragments computed. ... (Au)

G-108359
2 microfiches: figures, tables: ii x 15 cm.
Beaufort E.I.S. reference work, no. RW177
References.
ACU, NSFMD
This study was undertaken to estimate the frequency of large ice feature/offshore production structure interactions in the Southern Beaufort Sea, for inclusion in the ice design criteria for offshore structures. The large ice features which are considered in this report are ice islands and multi-year hummock fields. These structures are normally characterized by a large surface area and often by a deep draft (or keel depth). This report addresses the following topics: - the formation and rates of production for these ice features. - the number of ice islands and multi-year hummock fields which may enter the area of the drill sites in any given year, and - the probability that these ice features will interact with offshore structures in the Southern Beaufort Sea for various locations in the area of concern. Chapter 2 is a summary of this study, and presents recommendations for future work arising from this report. Chapter 3 presents detailed discussions on: - the location of where ice islands and multi-year hummock fields are formed and their current populations. - the Beaufort Gyre (the main circulation pattern in the Arctic Ocean). - observed ice movements in the Southern Beaufort Sea, and - the number of large ice features which may enter the area of the drill sites in the Southern Beaufort Sea. In Chapter 4, the various methods upon which interaction probabilities can be based are evaluated. ... (Au)

G-108367
3 microfiches: ii, 11 figures, tables: ii x 15 cm.
Beaufort E.I.S. reference work, no. RW182
Appendices.
References.
ACU, NSFMD
A three week field study to investigate ice dynamics and ice features along the N.W. edge of the Canadian Arctic Archipelago is described. Fourteen ground sites were visited covering a variety of ice phenomena. ... More than 2300 line km of aerial photography, yielding over 4000 square km of data, was taken. Floe sizes and ice types from more than 24,000 floes have been analyzed and are presented, giving the best statistical base so far of the Arctic's most dynamic ice zone. Numerous ice failure mechanisms were documented, including ride-up and local crushing within close proximity of each other. A 5 m thick ice sheet was observed to ride up to a height of 23 m on a 26 degree slope. ... Old landfast ice was noted from central Prince Patrick Island (77 degrees N) extending northwards in increasing thickness to the ice...
Analysis and characteristics of cores from a massive ice body in Mackenzie Delta, N.W.T., Canada. These cores were investigated systematically concerning crystallography together with analyses of chemical components such as oxygen isotopes, pH and salinity. Many band-like structures which were divided by soil layers were observed in the entire length of the cores. The inclination and the thickness of each stratum were not uniform. Crystals in the stratas were clearly different between two adjacent strata in size, shape and c-axes orientation and also in distribution of air bubbles. Obtained results strongly suggest that the massive ice body was formed by congelation of water, being supported by the presence of band-like structure, dispersed soils and elongated air bubbles. (... (Au)

G-120464

The breakup of ice along the Mackenzie River between Fort Simpson and Fort Good Hope was studied in 1979, 1980, 1981, and 1982. This paper describes the 1980 and 1981 observations. An aircraft dedicated to this task was used to make over 40 observation flights during those two breakup seasons in which more than 20 major ice jams were observed during their formation, stationary position, and breakup. Although the paper is based on experience gained during only 4 years, it was found that all observed jams displayed the same characteristics. It appears that general descriptions of ice melting, breakup, and jamming for the section of the Mackenzie River under investigation are possible. (... (Au)

G-122327

This publication presents the eighteen papers given at the Workshop on Sea Ice Ridging and Pile-up at Calgary, 1980. It is one of the first compilations in Canada of information on the initiation, morphology and characteristics of ice ridges and rubble fields, and problems relating to their interaction with structures. (ASTO)

G-116883

Using a newly designed electro-mechanical drill, core samples were obtained successfully throughout a massive ice body near Tuktoyaktuk, Mackenzie Delta, N.W.T. Canada. Obtained cores, about 23 m in total length, were investigated systematically concerning crystallography together with analyses of...

References.
ACU, NFSMO

Work by a number of researchers has shown that the Beaufort Sea ice region lying between the permanent polar pack to the north and the landfast ice to the south, which is generally described as the shear zone or seasonal pack, is among the most densely ridged areas in the Arctic Basin. To date, statistical analysis of either a time or space related series of ice thicknesses has not been possible on a satisfactory scale due to the water depth ... which has limited submarine profiling, while airborne laser and stereo photography still suffer from the limitation of keel-to-sail ratio ambiguities. A seabed mounted, upward-looking sonar device is described, which was deployed in 30 m of water for the winter season 1978/79. Keel drafts were recorded every 6 seconds, providing the first time section of this ice regime over 248 days. Ice thicknesses, growth rates, keel distributions and keel separations were derived, based on the detection of 1573 keels. The keel depth distribution is compared with other researchers' work on sail distributions for the same area, and a sail-to-keel ratio of 1:4:0 derived. (Au)

G-122378


References.
ACU, NFSMO

During the 1979-80 winter trials of the Canadian Ice Pile-up, the authors performed a series of ice property measurements which to a large extent dealt with tests of the uniaxial compressive strength of the ice. The ice which was tested included a number of samples of multi-year ice which were collected by divers during a probe into the polar pack ice with the Canadian in October 1979. The results of these tests are presented here. In general, it was found that the compressive strength of this ice was lower than the strength of the first year ice encountered during the trials. (Au)

G-122386


References.
ACU, NFSMO

Since the 1972/73 winter, Esso Resources Canada Ltd. has conducted yearly programs to quantify near shore winter ice conditions in the Mackenzie Delta region of the Southern Beaufort Sea. Temporal changes in ridge distributions throughout a season and yearly have been documented for the landfast and shear zones. Ridge height data, has been classified into 1.5 metre categories. The analysis shows that, while large changes in regional ridge distributions occur for specific ice conditions, less variation is apparent in the height distribution. Rule of thumb ridge height distributions have been developed to cover ten specific types of ice conditions that can be expected in the Beaufort Sea. It is expected that these rules of thumb height approximations are adequate for the tactical support of operations in the Beaufort Sea. (Au)

G-122408


References.
ACU, NFSMO

Multi-year hummock fields are formed by very large grounded ice pile-ups which, with time, ablate at surface and float away. This process has significant implications in the design of deep water platforms for the Beaufort Sea. (Au)

G-122416


References.
ACU, NFSMO

In May 1978 five first-year ridges were investigated both on the ice surface and from below by divers; the observations of one ridge are discussed here. The ridge keel profile depths as indicated by drilling from the surface were generally less than indicated by both a side looking sonar system and the divers. However, a reasonable agreement was found between the sonar and divers. The divers noted large amounts of slush ice, solid ice blocks, decomposed blocks that had a 'swiss cheese' appearance all within the same keel. Observations were made on the inter-block bonds. (Au)

G-122459


References.
ACU, NFSMO

A special purpose computer program has been developed to model ice rubble field buildup around an offshore structure. The program has been designed to take account of ice movement, properties of the incoming ice, rubble field properties, and the mechanism by which the rubble field is built up and swept away as the moving ice changes direction. The model is particularly useful for generating statistics on the extent of ice rubble, from which tanker loading facility requirements can be evaluated. This paper examines the theory and field data requirements for the program and demonstrates how the rubble field grows and changes. (Au)

The physical characteristics and properties of part of the ice rubble field around the Isungnak location in the Beaufort Sea were investigated at the end of February 1980. A detailed profile, including ice elevations, thicknesses, porosities and snow depths, was made along a radial line extending almost 150 m across the rubble pile. Cores were taken at a number of locations in the formation to characterize physical properties such as temperature and salinity. A number of strength measurements were also made. The sliding resistance of the rubble field at this location was estimated using a simple buoyancy model. (Au)


...A 24-inch diameter water intake pipeline approximately 5 miles long was installed in Great Slave Lake in 1977/78 to meet the increased water requirements of the Town of Hay River. The line, with its associated intake structure and pump house, was put into service in January 1979. By late spring it became apparent that line had failed and that water was being drawn into the system from nearshore. After ice breakup, divers examined the line and found the pipe was broken at a point 7100 ft from shore. This paper describes work which was carried out to ascertain the possible mechanisms causing failure of the pipe, and to suggest improvements in the intake system which might minimize future damage from ice ridges. ... (Au)


As the oil and gas industry investigates various production scenarios for offshore discoveries in ice infested waters, specific design questions must be considered. This paper addresses the problem of contact between first-year grounded ridge keels and trenched pipelines and comments on the possible force levels which could be exerted on a pipeline in an open trench. (Au)


This paper reviews how ice ridges and ice rubble fields can affect ice forces on offshore structures. The mechanism of ridge building as a limiting driving force is also reviewed. For narrow structures, it is suggested that thick multi-year ridges will govern the maximum ice forces. For wide structures, the presence of a rubble field can have a major influence on ice/structure interaction especially if it becomes grounded. For large structures subject to collision by extremely thick ice features (such as ice islands), ridge building behind the large feature may limit the maximum forces on the structure. (Au)

Flexural strength and fracture toughness of sea ice / Timco, G.W. Frederking, R.W. (Cold regions science and technology, v. 8, no. 1, Aug. 1983, p. 35-41, figures) References: ACU, NFSMO

A series of mid-winter experiments were carried out on the ice in the rubble field around Tarsut Island in the Beaufort Sea. The tests included grain structure determinations, salinity and density of the ice, small beam flexural strength and fracture toughness. Typical values for flexural strength and fracture toughness were 0.6-1.0 MPa and 100-140 kPa m/2 respectively. Both properties were dependent on brine volume and depth in the ice sheet. In comparing these results with identical tests on fine-grained freshwater ice it was found that for comparable loading conditions, the strength of the sea ice was significantly lower than the strength of the freshwater ice, whereas the fracture toughness of the sea ice was higher than the fracture toughness of the freshwater ice. (Au)


The authors offer their own investigation results on the estimating of surface wind speed over drifting pack ice from surface weather charts, and comment on the published findings of (Feldman et al., 1979) which appeared in a recent publication of this journal. (ASTIS)


A method is presented by which an ice island may be selected for preliminary design of an offshore structure. The method involves: 1.
Estimation of the risk of an ice island impact.
2. Determination of the distribution of kinetic energy amongst impacting ice islands.
3. Selection of a design kinetic energy based on the maximum risk of failure which would be acceptable.
4. Selection of a design ice island. The design ice island is chosen to be the ice island which is most likely to hit the offshore structure with the design kinetic energy. The ice island statistics are reviewed and analysed using the above selection method to define a design ice island. (Au)

G-127418

Echo sounding, side scan sonar and seismic profiling records have shown that the continental shelf of the Canadian Beaufort Sea has been subjected to extensive scouring by ice features. The scouring phenomena is extremely important in the design and protection of offshore wells and future pipelines. Analyses of records collected by industry and government in the early 1970's and reported by Hnatiuk and Brown in 1977 have been refined with the inclusion of additional data collected by industry and government in 1975 and 1976. Here, the results of the information synthesis are presented in terms of regional maps showing relevant scouring parameters and their variation with location and water depth. A quantitative evaluation of scour return period is also presented on the basis of sedimentation assumption. This information is compared with a recent analysis of sidescan scour mosaics collected repetitively over four areas ranging in water depths from 45 to 150 feet and with time intervals ranging from 2 to 7 years between the repetitive seafloor maps. The rate of addition of new scour determined from the repetitive mosaic approach supports the regional assessment of Beaufort Sea scour but suggests more episodic and areally frequent scour events along with more active scouring in water depths approaching 150 feet. This information is discussed in terms of the Beaufort Sea ice regime. (Au)

G-127663

This paper is a review of classification and properties of ice (physical and mechanical properties) and of sea ice dynamics in the Beaufort and Labrador seas. (NFSMO)

G-129497

Strength and deformation behaviour of horizontally oriented specimens of granular and columnar-grained ice were measured in the field. Cylindrical specimens were loaded on compliant platens and prismatic specimens on steel platens to provide a range of loading system stiffness. Loading tests proved to have a significant effect on strength when the results were interpreted in terms of nominal strain rate, but in terms of stress rate it was largely eliminated. The strength of the granular Ice (2.5 - 4 MPa) was substantially higher than that of columnar-grained Ice (1.0 - 2.5 MPa). Regardless of grain structure, the specimens all failed by yielding at a strain of about .003. (Au)

G-130206

The design of man-made islands in a river ice regime has to cope with the complex phenomena associated with the spring break-up of the river ice. In order to be able to design the islands sufficiently accurately, Hydrodynamic model of Sliepsnek, Holland has developed a numerical flow model, that is capable of simulating the complex phenomena of ice jam release in natural rivers with an irregular channel geometry. This model has been successfully applied in the comprehensive design study regarding six man-made islands in the Mackenzie River, conducted for Igloolik Resources Canada Ltd with respect to the Norman Wells Expansion Project. This paper highlights the computational procedure and results of the computational results of the flow pattern around the man-made islands. The application of these numerical flow models is currently an effective tool for predicting the hydraulic conditions during planning, design, construction and operation of riverine and coastal projects. (Au)

G-130320

A field program conducted in March and April 1980 along the edge of the Arctic Canadian Archipelago from Banks Island to Ellef Ring Island revealed a number of extreme ice features caused by converging sea ice on the shoals of the various islands in the chain. Thirteen sites were investigated to study first hand the effects of massive ride-up and pile-up at the edge of the landfast zone. It is believed from both theoretical models and literature searches that these field studies reveal some of the largest ice events recorded to date. Ice forces and failure mechanisms were studied together with the formation of gravel bars around a number of the more prominent islands. The results are applied to the design of artificial islands on the Continental Shelf of the southern Beaufort Sea. (Au)
G-130706


References. NFSMO

In 1981 a program was initiated by Dome Petroleum Ltd. and McElhanney Surveying & Engineering Ltd. to design and produce a Shipboard Ice Alert and Monitoring System. The concept requires a mini-computer based package to classify types of ice, environmental forces acting upon the ice, and predictions of hazardous ice conditions which could cause disruption of drilling programs. The program is one of a related group of environmental and ice management projects undertaken by Dome to improve both the safety and cost effectiveness of the Beaufort Sea drilling program by reducing down time due to ice hazards. (Au)

---

G-131164

Ice management and ice monitoring in the Beaufort Sea / Butt, K.A., Mercer, J.B. [St. John's, Newfoundland : C-CORE, 1980.]

[10] p., ill. ; 28 cm.

(C-CORE publication, no. 80-18)

References. Draft only.

NFSMO, ACU

... Ice management capabilities have been developed in pace with drill system technology and this paper will describe the problems as seen from the perspective of ice monitoring. The presentation will focus on the ice management experience of Dome Petroleum's offshore drilling subsidiary, Camar (Canadien Marine Drilling Ltd.), and will summarize the objectives and requirements of a suitable ice monitoring system to support its drillships and SSDC. In response to these requirements, an ice monitoring system has been developed and implemented by Camar and will be briefly described. ... [Included is] a brief summary of the status of ice management in the U.S. Beaufort and some comments on the future of ice monitoring development. (Au)

---

G-131962


References. NFSMO

The breakup of ice along the Mackenzie River between Fort Simpson and Fort Good Hope was studied from a dedicated aircraft in 1979, 1980 and 1981. More than 20 major ice jams were observed during their formation, stationary position and breakup. All observed jams displayed the same major characteristics and hence it is possible to generalize about ice melting, breakup and jamming. This paper describes the ice melting process, prior to any ice movement. It discusses the ice jamming process and the various parameters that affect this process. It also addresses several environmental factors influencing the detail character of the jams. (Au)

---

G-136522


1 v. (various pagings) ; figures, tables ; 28 cm.

Cover title.

References. NFSMO

... In the late fall of 1979, an extensive remote sensing program was conducted over portions of the Beaufort Sea in an effort to collect data sets that would serve as the basis for the ice motion models. ... One of the most important ice features required for these models and for the historical summaries is the occurrence of ice pressure ridges. In particular, pressure ridge frequencies and sizes are needed to assess the severity of the ice conditions and to calculate the ice motion forcing functions. In this study detailed analysis of laser profilometer data sets from the AES system were conducted in order to obtain summaries of these pressure ridge variables. This report contains the results of ridge analysis from the Beaufort Sea overflights between December 1 and 16, 1979. ... (Au)
G-137570  Operating manual for the Gulf NAVSAT buoy / Gulf Canada Resources Inc.  [Calgary, Alta. : Distributed by APOA], 1983.  1 microfiche : 11 x 16 cm  (APOA project no. 129 : Development of high resolution ice tracking system for the southern Beaufort Sea, Phase I - test prototype NAVSAT/NIMBUS-RAMS subsystem. Report. no. 1)  Appendix.  ACU

The following is a manual for the prototype Gulf NAVSAT buoy. The buoy contains an ARDS platform, a NAVSAT receiver and a microprocessor with 6 K of RAM memory plus the associated interfaces to the NAVSAT receiver and ARDS platform. The other section to this manual consists of the INSTALLATION INSTRUCTIONS. The buoy is turned off by opening up the buoy and removing the fuse. (Au)


---

G-138550  Final report on engineering properties of ice in the Beaufort Sea / F.G. Bercha and Associates Limited.  [Calgary, Alta. : Distributed by APOA], 1976.  2 microfiches : figures, tables : 11 x 16 cm  (APOA project no. 130 : Preliminary design studies for production structures for the Beaufort Sea. Report. no. 3)  Appendices.  ACU

Dome Petroleum Limited possesses leases and has interests in the development of production facilities in the South Beaufort Sea area, east of the international boundary, west of Banks Island, from shore to the 250 foot isobath. One area where overly conservative design is particularly inflationary is in the construction of the production facility supporting structure. As the integrity of this structure, to a large degree, depends on its ability to resist loads imposed on it by ice, a realistic design is largely contingent on an accurate prediction of ice loads likely to be exerted on it. The objective of the work, then, is to determine and to present in a form suitable for designers, the relevant engineering properties of ice necessary to calculate the overall and localized stability of fixed and floating structures, and to document these properties in a manner suitable for more comprehensive scientific follow-up. Following a general description of the environment, a systematic review and compilation of properties is undertaken. Chapter 2 concentrates on the geometric and kinematic properties of ice formation. Chapter 3 reviews, updates and recommends ranges of the mechanical ice design properties. Chapter 4 gives a review of the various classes of simulators and presents some of the ice-structure interaction situations which are generally encountered. Chapter 5 gives a summary of the optimal design values of the properties discussed in Chapters 2 and 3. Finally, chapter 6 gives conclusions, lists shortcomings of the work, and presents recommendations for further relevant work. (Au)

---


The Heart Lake study area is briefly described. Two taxa, Eleocharis compressa and Rhynchospora alba, are reported from the continental Northwest Territories for the first time, and extensions of range for 19 additional taxa within the District of Mackenzie are recorded. (Au)

---


The distribution and general ecology of 263 bryophyte taxa are presented for an extensive area of coniferous forest, open fens, and alpine terrain along the Mackenzie River in the District of Mackenzie and the Peel River, a major tributary which extends into the Yukon. The continuous or discontinuous permafrost which underlies the area plays a major role in determining the vegetation communities that are present. Fire and disturbance by man initiate succession. Thirty-nine liverworts, 20 peat mosses, and 101"algae" are reported. There are 43 new reports for the District of Mackenzie and 16 for the Yukon. (Au)

---

H-10740  Pipeline revegetation research : Dempster route test sites. Progress report 1977 / Vaartno and Sons Enterprises Ltd.  [Calgary : Foothills Pipe Lines (Yukon) Ltd., 1978. v. 28 leaves : map, figures ; 28cm]  (Environmental report - Foothills Pipe Lines
(yukon) Ltd.)
Prepared for Foothills Pipe Lines (yukon) Ltd.

ACU

This report describes Carmacks grassland, South Ogilvie Mountains and Eagle Plain sites. Specific concerns which will be looked at include the following: species adaptability, time of seeding, fertilizer requirements, establishment methods and possibilities in use of plants for assistance in erosion control. (Au)

H-11126
A classification of fire effects on the microclimate of forest and tundra ecosystems - final report / Rouss, W.R., Mills, P.F.
(Environmental studies - Canada. Northern Environmental Protection and Renewable Resources Branch, no. 2) (North of 60)
ISBN 0-662-01240-1
References. ACU, SSU

The aims of this study are two-fold. The first is to summarize the microclimatic effects of burning of subarctic woodland in terms of soil temperature and moisture, radiation, evaporation and evapotranspiration. The second is to compare the microclimatic characteristics of lichen woodland and of variously aged burns to wet and dry open tundra areas in terms of their energy balances. (Au)

H-11622
Biological productivity of the southern Beaufort Sea : phytoplankton and seaweed studies / Hsiao, S.C.
ACU, NSFWO

Standing stock and in situ primary productivity of the southern Beaufort Sea phytoplankton were determined. Possible reasons for a greater standing stock and primary productivity at inshore stations are discussed. Diatoms were more sensitive than flagellates when they were exposed to crude oils. Primary production of seaweed was severely inhibited by all types of crude oil at relatively low concentrations. (Au)

H-12754
Nitrogen fixation in Arctic marine sediments / Knowles, R.
ACU, NSFWO

Nitrogen fixation was measured in grab and core samples of sediments from the Beaufort Sea and Eskimo Lakes. The indirect assay involving the reduction of acetylene to ethylene was used. Very low rates, of the order of 25 mg N/square meter year, were detected in untreated sediments. Activity was markedly stimulated by addition of glucose, sucrose, lactose, mannitol and malate, much less by acetate, and negligible activity was supported by N-acetylglucosamine, the chitin monomer. (Au)

H-23841
(Canadian field-naturalist, v. 93, no. 3, July-Sept. 1978, p. 259-265. map)
References. ACU

Between 1970 and 1975 plant communities in the Yukon Territory and the District of Mackenzie north of 67 deg. N were investigated. We record three taxa new to the known flora of the Yukon Territory and one new to the flora of the District of Mackenzie. Among the other vascular plants listed here, nine are new to the range predicted by Hulten within the Yukon Territory, 23 are extensions within predicted ranges and thus corroborate these predictions, and 29 are extensions beyond predicted ranges. (Au)

H-23892
References. ACU

Presents an annotated list of species found in Caribou Range in the District of Mackenzie, N.W.T. Location of species and approximate number of collecting stations are included. (ASTIS)

H-25836
Preliminary studies on methanol oxidizing bacteria from the Mackenzie River. N.W.T. / Vanderpost, J.M.
(Technology development report - Canada. EPS. Northwest Region. EPS-4-NW-78- 2)
References. ACU

This study was part of a Mackenzie Valley pipeline environmental assessment as a result of proposals to use methanol as an antifreeze in pipeline hydraulic testing and to release the waste methanol into the local waters after testing was completed. Methanol utilizing microorganisms were isolated from Mackenzie River water and their growth rates, respiration rates, and methanol utilizing rates were investigated. Respiration was found to occur at temperatures as low as 1.1 C. It was concluded that oxygen depletion problems would probably not occur as a result of releasing methanol to the Mackenzie River, but that acute toxicity to various life forms might pose a more serious threat to the river's ecology. (Au)

H-30174
Nutrient limitations to plant production in two tundra communities / Hagg, B.W.
(Canadian journal of botany, v. 52, no. 1, 1974, p. 103-116, tables)
(APDA Project no. 37 : Arctic environmental research, tundra and ecological studies on the Mackenzie Delta and Devon Island. Report)
References. ACU, NSFWO

Nitrogen and phosphorus nutrition were investigated as limiting factors to primary production in a lowland wet sedge meadow and an
upland birch-willow-heath community. Response to nitrogen fertilization in both communities, including increased plant biomass and dry weight production, indicates that nitrogen supply limits production in both soils. In the upland community, phosphorus supply does not limit production, but in the lowland sedge meadow, dilution of the soil solution may decrease phosphorus availability and render this element limiting to production. Nitrogen, if available, can be taken up and metabolized into organic compounds despite low soil temperatures. Phosphorus metabolism may be directly limited by low soil temperatures and low available nitrogen levels. Low soil temperatures exert an indirect limitation on plant production through limitation of organic matter decomposition and microbial nitrification, thus limiting the rate of nitrogen cycling. (Au)

H-30155
Arctic plant communities east of the Mackenzie Delta / Corns, I.G.W. (Canadian journal of botany, v. 52, no. 7, 1974, p.731, map, tables [part fold.]) (APOA project no. 37 Arctic environmental research, tundra and ecological studies on the Mackenzie Delta and Devon Island. Report) References. ACU, NFSMD

Tundra vegetation was analyzed on the basis of 64 sampled and 12 described stands representing a wide variety of plant community types immediately east of the Mackenzie Delta, Northwest Territories. Five main types (Tall Shrub-Heath, Medium Shrub (alder), Low Shrub-Heath, Herb-Low Shrub-Heath, and Herb) and 11 subgroups were distinguished and classified on the basis of floristic similarity using a two-dimensional ordination and by phytosystem. A total of 70 species were sampled or observed in the stands. The areal extent of each major community type was determined using aerial photography for Richards Island, Caribou Hills, Eskimo Lakes, Tuktoyaktuk, and Atkinson Point study areas. (Au)

H-30163

... Plant succession following fire was unique in that no new species invaded the area. Growth came principally from root stocks protected by the organic surface. Cottongrass and Carex spp. were the first to show regrowth following a June fire at one site. The role of cottongrass seedlings in colonizing these tussock communities was minor, because few seedlings older than 1 year were found on any of the sites. Epilobium angustifolium ssp. angustifolium and some Calamagrostis canadensis ssp. canadensis originated from seed although most plants of the latter species had long vigorous rootstocks. Annual plant production had almost recovered after two growing seasons, and nutrient content of the plants was higher in the burned areas. (Au)

H-30180
Cotton Grass (Eriophorum vaginatum) germination requirements and colonizing potential in the Arctic / Wein, R.W. MacLean, D.A. (Canadian journal of botany, v. 51, no. 12, 1973, p. 2509-2518) (APOA project no. 37 Arctic environmental research, tundra and ecological studies on the Mackenzie Delta and Devon Island. Report) References. ACU, NFSMD

Germination requirements of cotton grass (Eriophorum vaginatum L.) were investigated to determine its potential for reseeding disturbed areas of the Arctic tundra. Maximum seed production was 15.7 kg/ha, although production and viability varied widely. There was no seed dormancy and temperatures of 25-30 deg. C produced maximum germination rates. A light treatment enhanced germination between 24-48 hours. Cotton grass seed germinated under less favourable moisture conditions than several other native grasses that strongly invade disturbed arctic sites. Loss of viability during storage under room conditions was high for the first 10 months, yet 27.6-52.5% of the seed remained viable at 19 months. The role that this species could play in revegetation is discussed. (Au)

H-30198

In contrast to tundra, where the mass of vegetation is low and its effect on energy exchange relatively small, boreal forest vegetation exerts a more important buffering effect on energy flux to and from the ground surface. Air movement below the canopy is reduced, and a relatively high proportion of solar radiation is absorbed by the canopy directly, to be lost as sensible or latent heat. Removal of the buffer provided by stratified vegetation results in increased soil heat flux and ground temperatures, and increased depth of the active layer, which in areas of ice-rich permafrost can lead to surface subsidence. (Au)

H-30341

... The present study was undertaken to determine how the relationships between the components of energy dissipation in a native upland low shrub-heath tundra are altered by surface disturbance, and the effects of such alteration on the physical environment. The disturbances investigated were a winter road, controlled oil spill, tundra fire, and reseeded plots on a section of winter road. The study area is located at 69 deg. 27 sec. N, 133 deg. 00 sec. W, 1 km south of the Imperial Oil Base Camp at Tuktoyaktuk, N.W.T., in hummocky low shrub-heath tundra. (Au)

H-30390
Data are presented from August 1972 analyses for a variety of reseeding plots established at Norman Wells, Inuvik and Tuktoyaktuk, N.W.T. and Prudhoe Bay, Alaska in the early summers of 1970, 1971 and 1972. The four sites are in the portion of the Mackenzie Delta and Devon Island. Eight different fertilizer treatments were tested over the years of this study. Tentative and preliminary revegetation techniques and seed mixes are proposed. (Au)

H-38920
Vegetation change and fire frequency in the western subarctic / Johnson, E.A.
2 microfiches : 111., maps, photos. : 10 5x14.8cm.
(Canadian theses on microfiche, no. 35926)
Thesis (Ph.D.) - University of Saskatchewan, Saskatoon, Saskatchewan, 1977. - xi, 106p.
Bibliography.
ACU

H-38917
Alpine macrolichen vegetation in the Canadian cordillera of Alberta and the Yukon / M.G. Steere, W.C. Scatter, G.W.
3 microfiches : 111., maps, photos. : 10 5x14.8cm.
(Canadian theses on microfiche, no. 36471)
Appendices.
ACU

Major objectives were to: (1) determine species richness (S), evenness (J), diversity (H') and cover; (2) examine habitat factors in relation to vegetation; (3) describe and compare communities; (4) examine correlations between vascular forest and tundra transition; (5) compare macrolichens and vascular plant communities. Study areas included Prospect Mountain and the Divide in the Mountain Park region, Alberta, and the Nahoni Range and Ogilvie Mountains in the Yukon. All areas were characterized by poorly drained, neutral to basic substrates, and comparable acidic and basic substrates were sampled in each region. The correspondence of macrolichens and vascular plant communities to environmental factors from regions in the present study are considered to be adequate for predicting vegetation within the uninvestigated, intermediate Cordilleran alpine areas. (Au)

H-43621
Epilipal and epiphytic algal communities in Great Slave Lake / Moore, J.W.
(Canadian journal of botany, v. 58, no. 10, 1980, p.1165-1173, 111., map)
References.
ACU

Seasonal changes in the densities of epiphytic and epilipal algae were determined during 1975 and 1976 at two sites on the north shore of Great Slave Lake. Although densities remained high during the summer, they fell rapidly in October, followed by a secondary peak in November. The growing season for both communities was limited by the formation of ice in the fall, whereas the maximum standing crop of epiphytic algae was partially restricted by low nutrient levels (total phosphorus, 0.008 mg/L; total alkalinity, 30 mg/L). Seasonal changes in the density of epilipal algae were monitored during 1977 and 1978 at a third site on the north shore of the lake, where total phosphorus and total alkalinity ranged up to 0.010 and 94 mg/L, respectively. (Au)

H-44377
Growth rate of spruces related to the thickness of permafrost active layer near Inuvik, northwestern Canada / Sakai, A. Yoshida, S. Seito. M.
(Low temperature science, Series B, Biological science, v. 37, 1979, p. 19-32, 111., map, photos.)
References.
ACU

Growth rate of white spruce (Picea glauca) and black spruce (Picea mariana) occurring at different topographical sites near Inuvik was studied with special reference to the thickness of active layer (the annual layer of thaw). The best sites for tree growth were on south-facing slopes and river alluvium where the soils are well-drained and have a thick active layer. The growth rate of white spruce at different topographical sites was related to the thickness of active layer. (Au)

H-44385
Biomass and productivity of Betula papyrifera near its climatic limit in northwestern Canada / Sakai, A. Yoshida, S. Seito, M.
(Low temperature science, Series B, Biological science, v. 37, 1979, p. 33-38, 111., photo.)
References.
ACU

Measurements of biomass and estimates of net primary productivity were made on a stand of birch Betula papyrifera, 8 km southeast of Inuvik. A partially destructive sampling technique was used. Total biomass was estimated at 74.5 t/ha, with 1.7 in leaves, 57.8 in stem and 15.0 in branches. Net primary productivity of above ground parts was estimated 2.16 t/ha.year with only 0.06 in the branches and 0.42 in the stems, compared with 1.68 in the leaves. (Au)

H-51233
Additional bryophytes from Nahanni National Park and vicinity, Northwest Territories, Canada / Steere, W.C. Scatter, G.W.
(Canadian journal of botany, v. 56, no. 3, 1978, p. 234-244)
References.
ACU
Additional fieldwork in Nahanni National Park and vicinity has added 91 species of bryophytes to the flora of that region. Twenty of these are new to the District of Mackenzie, and 37 are new to the Northwest Territories of Canada. Three new species, Barbulanympha everna (Carr.) B. maxima Syed & Grund... and B. perobtusa (Broth.) Chen are new to North America. (Au)

H-51250


Surface lake mud samples from 20 lake sites across the transition from northern boreal forest to tundra, near the Mackenzie Delta, N.W.T., yielded 284 taxa of diatoms of wide-ranging, mainly subarctic-boreal-nemoral geographical affinity. The toxic composition of the water column shows that 17 of the lakes are oligotrophic with roughly similar diatom assemblages. Distinctive diatom assemblages were recorded only from the three chemically exceptional lakes, saline, meromictic, and slightly Nanae. Barbu is greenish. The ratio of Araphidineae to Centrales proved to have little use in classifying these particular lakes, although it has been effective in other geographical regions. (Au)

H-51284


Picea mariana - Vaccinium uliginosum forests was sampled in a north-south transect near Inuvik, N.W.T., Canada. Four stages in the postfire recovery sequence were described. Little quantitative change in vascular plants was found in the transect or with time since burning, although quantitative changes were found to exist. Contrary to vascular plant development, an orderly postfire succession of cryptogamic species was found. The postfire recovery sequence by comparison with other open boreal forest studies has a persistent shrub-dominated stage. ... Objective analyses by Bray-Curtis ordination and reciprocal averaging ordination were used to analyse the vegetation data and proved useful in the date reduction and interpretation of results. (Au)

H-51322

Seasonal changes in the standing crop of an epilithic algal population on the north shore of Great Slave Lake / Moore, J.W. (Canadian journal of botany, v. 57, no. 1, 1979, p. 17-22, figures, tables) References. (Au)

Seasonal changes in the density of epilithic algae were determined from June 1975 to November 1976 at three sites on the north shore of Great Slave Lake. Densities increased rapidly in May immediately after the disappearance of ice, showed only small fluctuation during the summer, and waned during October. Microscopic algae ... and other diatoms, reached peak abundance (2 x 1,000,000,000 macro cubic m/square cm) on irregular occasions (July, September, October) throughout the growing season. However, filamentous algae, mainly Ulota zonata, reached maximum densities (60 mg/square cm dry weight) during July of both years. Additional survey collections of epilithic algae were made at 14 sites in the east arm of the lake during June and July of 1975. ... Algal densities were considerably less than those recorded from the north shore, a reflection of lower nutrient and alkalinity levels. Maximum abundances for microscopic and filamentoous algae were 1.05 x 1,000,000,000 macro cubic m/square cm and 4.1 mg/square cm respectively. (Au)

H-51349


The Nahanni and Liard mountain ranges ... form the easternmost slopes of the Rocky Mountains and lie just east of Nahanni National Park in the southwestern District of Mackenzie, Northwest Territories. The moss flora ... taxa: 207 species and two varieties are reported from this relatively small area. Of these, 53 species are new records for the South Nahanni region. A number of rare or disjunct bryophyte species are found in the area. (Au)

H-51357


Collections of epilithic, epipelic, epiphytic, and epilimnic algae were made from the littoral zone of 21 lakes and streams in the Northwest Territories during 1975 and 1976. ... The growing season for the attached flora extended from June to October throughout the study area. All four communities displayed a unimodal growth curve during this period, reaching maximum abundance in either July or August. The end of the growing season came during the middle of October when the collection sites were frozen to the bottom. (Au)

H-51365


Thirteen species of Hepaticae and 184 moss taxa are reported from Banks Island, Northwest Territories, Canada. Of these, 10 Hepaticae and 58 mosses are previously unreported from Banks Island. The list includes literature reports and recent collections. (Au)

H-51381


Thirteen species of Hepaticae and 184 moss taxa are reported from Banks Island, Northwest Territories, Canada. Of these, 10 Hepaticae and 58 mosses are previously unreported from Banks Island. The list includes literature reports and recent collections. (Au)
The Weibull distribution is shown to fit well with empirical data of fire intervals for a population of sites. The distribution demonstrates that the recurrence of fire in the subarctic forests of the Northwest Territories, Canada, is predictable. The three parameters of the distribution describe in ecological terms the lag before reburning can occur, the expected recurrence time of fire, and the shape of the variation around the expected recurrence. The parameters behave consistently with logically independent empirical evidence related to the regional and local climate and topography. The relationship of the distribution hazard of burning function to vegetation composition and r-K selection is discussed. (Au)

H-65765
Fuel characteristics of arctic plant species and simulated plant community flammability by Rothermel's model / Sylvester, T.W.; Wein, R.W.
References. ACU

The relative fuel-potentials of 12 northern tundra and forest-tundra ground species of the Mackenzie delta area were evaluated from measured fuel characteristics by simulating a test fire with the Rothermel (1972) fire behavior model. The relative importance of the fuel parameters were in decreasing order: moisture content, biomass, fineness (surface/volume ratio), packing ratio, silica-free ash content, and calorific content. The fuel-potential ratings of the vascular species and of the communities were differentiated primarily by their leaf characteristics. Subject to the limitations with respect to either-extractive contents, the relative fuel potential of tundra and forest-tundra plant communities can be rated on measured fuel characteristics, community composition, and the criteria of the Rothermel model. Possible applications of this study were raised, particularly the use of relatively nonflammable plants in land management. (Au)

H-66850
Gymnocarpium hybrids from Canada and Alaska / Sarvela, J.
(Annales botanici Fennici, v. 17, no. 4, 1980, p. 292-295)
References. ACU

The paper presents the distinguishing features of Gymnocarpium dryopteris (L.) Neuw. subsp. x brittonium Sarvela [subsp. et hydr. nov.: = subsp. disjunctum (Rupr.) Sarvela x subsp. dryopteris], G. x intermediurn Sarvela, G. x achrissporum Sarvela and G. x heterosporum Wagner (Pteridophyta). A provisional outline is given of the distribution of the three first taxa in Canada and Alaska. Apomixis in these taxa is discussed. (Au)

H-70360
Taxonomy and status of Silene uralensis subsp. ogliviensis comb. nov. (Caryophyllaceae) in Yukon Territory, Canada / Brunton, D.F.
References. ACU

A new subspecific combination, Silene uralensis subsp. ogliviensis (Porsild) Brunton is proposed for a recently described endemic of the Ogilvie Mountains, Yukon Territory. On the basis of a review of the type material it is compared with other North American subspecies of S. uralensis and with the similar S. gonosperma of Eurasia and found to be intermediate between these two in some characteristics. No additional stations of this rare taxon have been located since its original discovery in 1968. (Au)

References

ACU

A sequel to earlier papers on bryophytes and macrolichens, this treatment describes the distribution and general ecology of 314 microlichen taxa for 230,000 square km of coniferous forest, open fens, and alpine terrain along the Mackenzie River in the District of Mackenzie, Northwest Territories, and the Peel River, a major tributary which extends into the Yukon Territory. There are 103 new reports for the District of Mackenzie and 69 for the Yukon. Of the taxa, 87% are found in Europe and Asia as well as in North America, 1% are known only from Asia and North America, and 9% are restricted to North America. (Au)

H-96245

Pipeline revegetation research: Dempster Lateral test sites, progress report 1979 / Vaartnou and Sons Enterprises Ltd. Vaartnou, M. Foothills Pipe Lines (South Yukon) Ltd. [Sponsor]. Calgary : Foothills Pipe Lines (Yukon) Ltd., 1980. v, 46 p : figures, folded map, tables : 28 cm. (Environmental services - Foothills Pipe Lines (Yukon) Ltd.)

Appendices References

ACU

In September, 1977 a revegetation research program was initiated along the route of the proposed Dempster Lateral Gas Pipeline with the establishment of test sites in the Ogilvie Mountains and Eagle Plain. In 1978 and 1979 the program was expanded to include test sites near Willow Creek, in the Richardson Mountains, on the Anderson Plain and near Ya Ya Lake in the Mackenzie Delta. The purpose of the program was to obtain information necessary to design a revegetation program for rehabilitation of areas disturbed by pipeline construction. Results to date are encouraging but no conclusions can be drawn at this time because the candidate grasses have had insufficient exposure to the rigors of northern winters. (Au)

H-96253


Appendices References

ACU

In September, 1977 a revegetation research program was initiated along the route of the proposed Dempster Lateral Gas Pipeline with the establishment of test sites in the Ogilvie Mountains and Eagle Plain. In 1978 and 1979 the program was expanded to include test sites near Willow Creek, in the Richardson Mountains, on the Anderson Plain and near Ya Ya Lake in the Mackenzie Delta. The purpose of the program was to obtain information necessary to design a revegetation program for rehabilitation of areas disturbed by pipeline construction. Results to date are encouraging but no conclusions can be drawn at this time because the candidate grasses have had insufficient exposure to the rigors of northern winters. (Au)
The purpose of this report is to provide a preliminary analysis of natural revegetation rates and composition on sites disturbed by construction or industrial activities along the Dempster Highway. The influence of different climatic regimes is evaluated, on a preliminary basis, by comparing revegetation success in three regions ... selected for study: Klondike River Valley, Ogilvie Mountains, and Eagle Plains ... (Au)


H-100064 Microbiological studies of aquatic habitats of the area of Inuvik, Northwest Territories / Boyd, W.L. (Arctic, v. 20, no. 1, Mar. 1967, p. 27-41, figures, tables) ACU


H-103250 Historical aspects of the northern Canadian treeline / Nichols, H. (Arctic, v. 29, no. 1, Mar. 1976, p. 38-47, figures) ACU


This report is the result of a survey completed in 1979, along the Dempster Highway, Yukon Territory, from the North Fork Pass (lat 64 degrees 30'N; long 138 degrees 15'W) to Peel River, Northwest Territories (67 degrees 22'N; 134 degrees 53'W). The report contains the description of 20 vegetation types and a discussion by sections of vegetation related geological, climatic, edaphical and pedological aspects. The results are tentative but provide a framework for a more complete ecological inventory and information for revegetation projects. (Au)


The vegetation of the northern Cape Parry area was mapped by aerial photo interpretation in early 1979 as part of a preliminary vegetation report. ... This first classification and map were essential as an initial step in assessing impact of proposed marine base development. The vegetation study was combined with other environmental reports and was submitted for review by Indian and Northern Affairs, as Section 3.05 Vegetation in "Initial Environmental Overview for a fueling Staging Area for Sea Vessels at Summers Harbour - Booth Island or Wise Bay - Parry Peninsula", in June 1979 by Canadian Marine Drilling Ltd. The provision of detailed information on these vegetation units through a field survey was designated as a second study component. The following gives the results of this study in the form of an addendum to the first report. ... The observations and data taken at each site included: visual percent cover estimates for each species, designation of strata (bryophyte and lichen, dwarf shrub and herb, low shrub), slope, aspect, microtopography, soil, moisture regime, landform and notation of any disturbance. (Au)


Past reports have identified and evaluated the potential of harbour sites along the Canadian Beaufort Coast. ... This study provides a more detailed understanding of some of the more promising sites that have been previously evaluated. More specifically this report provides a brief description of the vegetation of King Point - Harbour Lagoon, Pauline Cove, Baillie Islands and Cape Bathurst. (Au)
The vegetation study of McKinley Bay was divided into two parts, a preliminary overview and a field reconnaissance. In the first part, the vegetation of McKinley Bay was described and mapped by aerial photo interpretation in mid 1979 as part of a preliminary vegetation report. This first classification and map were important aspects in assessing the impact of the proposed marine base development.

The second stage involved the collection of detailed information on these vegetation units through a field survey. The following gives the results of this study in the form of an addendum to the first report. Observations taken at each site included a list of dominant species by strata (dwarf shrub, herb, bryophyte and lichen), soil moisture regime and landform.

Thirteen moss polster samples from forest tundra and shrub tundra collected along the Coppermine River Valley, N.W.T, result in six pollen assemblages associated with type landforms. Forest sites on moderately steep slopes of approximately 12 degrees yield spectra dominated by spruce. Spectra dominated by Salix (>50%) exist only at isolated sites where the shrub is the principal species found. Flat, well-drained surfaces on gentle slopes exposed to wind produce spectra dominated by more than 80% Betula. The assemblage Betula-Ericales corresponds to gentle slopes actively modified by cryogenic processes. The assemblages Betula-Salix and Salix-Betula are found on gentle, poorly drained slopes or in zones of shrub tundra where Salix is a pioneer species on surfaces newly exposed to weathering. The assemblage Betula-Picea is not a specific indicator since it is found on various topographic sites. The paper proposes one example of the utilization of these relationships between pollen spectra and landforms, for the interpretation of fossil pollen samples. This example shows that the variations in pollen spectra of a stratigraphic diagram do not exclusively reflect climatic variations or ecologic successions, but may be due to environmental change brought about by geomorphologic processes.

Reconnaissance vegetation studies on western Victoria Island, Canadian Arctic Archipelago / Edlund, S.A. (Paper - Canada, Geological Survey, 83- 18, p. 75-81, figures) References. ACU

Reconnaissance observations of the flora and plant communities of western Victoria Island suggest that surficial materials strongly influence the flora. The widespread calcareous glacial deposits support a variety of calciphilous plant communities and flora. All three arctic ecosystems (Low, Mid, and High Arctic) occur on western Victoria Island. The vegetation of western Victoria Island is compared with calciphilous vegetation of the southern Queen Elizabeth Islands and an arctic shrub limit and an arctic shrub-forest limit wetlands.

This article describes the rich bird life and plant life of Banks Island, N.W.T. (ASTIS)
H-137910

Range extensions of vascular plants from the northern Yukon Territory / Geywan, L.C.  
(The Canadian field-naturalist, v. 97, no. 2, Apr.-June 1983, p. 170-176, figures)

References.

ACU

Fifty-two vascular plant taxa are reported from the northern Yukon for the first time or as range extensions. Four taxa are new to the flora of the Yukon: Carex amblyorhyncha, Ceratophyllum demersum (Hornwort), Armeria maritima sp. arctica (Thrift), and Artemisia biennis (Biennial Wormwood). Forty-two are reported as the first records for the northern Yukon; 31 beyond Hultén’s (1968) predicted range limits and 11 within. Range extensions are also reported for 10 taxa previously collected within the northern Yukon. (Au)

H-138959

Morphology and description of an outlier population of tree-sized willows on western Victoria Island, District of Franklin / Edlund, S.A.  

References.

ACU

Near the head of Minto Inlet, on western Victoria Island, discontinuous thickets of Salix alaxensis (feltleaf willow), ranging in age from near 5 years to as long as 180 years, reach heights of up to 8 m. They thrive in half a dozen deep valleys and sheltered ravines along the north shore of the inlet, where the microclimate is favourable. These outliers represent disjunct populations more typical of floodplains near treeline, several hundred kilometres to the south and west. (Au)

H-139831

The role of history in determining vegetation composition, an example in the western subarctic / Johnson, E.A.  

References.

ACU

This is a theoretical expansion of the idea (Johnson, 1981) that vegetation composition of the upland lichen woodlands is related to two levels of environmental dynamics: short term (fire frequency) and longer term (habitat). Vegetation dynamics for a location are described by a partitioned stochastic matrix. Its diagonal submatrices are the probabilities (proportions) of species survival or the transfer of abundance between species due to both replacement abilities of species related to density type effects, and fire frequency and magnitude (severity) effects. These submatrices have transition patterns that allow their members to all be capable of replacing each other. They are in this sense equivalent. The stochastic matrix for any location will consist of several diagonal submatrices that represent different equivalence groups (ecological groups or guilds) of plants. Characteristics of these equivalence groups are considered. ... (Au)

H-140265

Comparative morphology, ecophysiology, and life history characteristics of two High Arctic grasses, N.W.T. / Gruke, N.E.  

x. 172 leaves : 111. (some col.), figures, tables : 28 cm.


References.

ACU

In the High Arctic, plants have been selected for adaptation to short growing seasons, low temperature, nutrients, light and moisture availability. Physical, rather than biotic factors dominate natural selection. Stress-tolerant species would be expected in such an environment. However, two wide spread grass species with apparently very different life history strategies were found within a polar semi-desert landscape. Puccinella aligiosa occurs in meadow sites and is a ruderal species ... in that it colonizes bare soil microsites naturally by needle-ice formation and sheet erosion, by a large seed production most years, and is relatively short-lived (~24 yr). Puccinella vaginata is a stress-tolerant in that it occurs in xeric sites with little disturbance or competition for resources, rarely produces mature seeds, and relatively long-lived (~37 yr). This research focuses on the morphological, physiological and life history adaptations of these two grasses to an extreme, but variable environment. ... (Au)

H-140651

Acid rain effects on foliar histology of Artemisia tilelli / Adams, C.M. Dengler, N.G.  
Hutchinson, T.C.  
(Canadian journal of botany, v. 62, no. 3, Mar. 1984, p. 463-474, figures, tables)

References.

ACU

The present study describes the effects of simulated acid rain (pH 2.5-5.6) on foliar histology of an arctic herb, Artemisia tilelli Ledebo., which is remarkably tolerant to naturally occurring acidity at Smokey Hills, N.W.T. Plants were exposed to simulated acid rain twice weekly for 4 weeks in exposure chambers in the greenhouse. Droplets as acidic as pH 2 caused limited macroscopic foliar damage. However, much greater damage was observed when sectioned leaf tissue was examined microscopically. On leaves having no injury visible to the unaided eye, small lesions consisting of one to three collapsed epidermal cells were observed in scanning electron micrographs and in cleared leaves after exposure to rain of pH 3.0 and 3.5. Stomata remained open in damaged areas of acid-sprayed leaves. Lesions most commonly developed from an initial collapse of a few adaxial epidermal cells, followed by progressive injury of underlying tissues. Palisade and spongy mesophyll cells underwent hypertrophic (abnormal cell enlargement) and hyperplastic (abnormal cell division) responses in the region adjacent to severely collapsed tissue, causing reduced intercellular spaces. These effects isolated the injured areas from adjacent healthy tissues, and resembled wound periderm responses to fungal pathogens and to mechanical irritation. This response may be one mechanism of limiting acid rain damage. (Au)

See Also: A-90042, A-103162, B-139807, C-15733, C-99422, C-99708, C-101524, C-114111, C-126950, C-125270, C-126890, C-135631, C-139742, C-14337, C-15733, C-16175, C-16914, C-17149, C-17848, C-18712, C-19145, C-19604, C-207421, C-230120, C-230129, C-230171, C-230178, C-251306, C-263576, C-269011, C-27948
I - Zoology

I-310
References.
ACU

Based on the seven nests located at Anderson River delta in 1973, Parasitic Jaegers had a breeding density of one pair per 2300 ha. Breeding success was 14.3%. Males and females shared incubation. A chick at one nest was unattended by an adult only 8% of the time. Bird remains, particularly passerines, were found in 85.0% of the pellets collected. Microtine rodents were in 25.4% of the pellets. Other food included eggs, insects, and berries. (Au)

I-2893
References.
ACU, SSU

A study of the Porcupine caribou herd was conducted from October 1972 through November 1973 and complements a study by Watson et al. (1973). A description and historical resume are presented. Distribution and movement data were obtained through general aerial reconnaissance and systematic transect flights. Information concerning herd composition was obtained from aerial photographs and ground observation posts. ... Caribou of the Porcupine herd appear to reflect the long term, traditional use of migration routes and seasonal movement patterns in the northern Yukon. Traditional river crossing points were utilized during migration, adult female caribou initiating most crossings. ... (Au)

I-2841
References.
ACU

Moose movements were studied in a broad corridor along the Mackenzie River Valley from the British Columbia border to the Alaska border. Di sightings of moose and moose signs were recorded and revealed that the islands of the Mackenzie River were important moose winter range. Browse surveys were also carried out and willow was discovered to be the most important species, providing over half (52.1%) of the total diet. (ASTIS)

The purpose of this report is to describe the biology of bowhead and white whales of the southeast Beaufort Sea and to assess the possible effects of oil and gas exploration on the whales. (Au)


Identical helicopter-supported surveys indicated a large decrease in the density of ringed seal birth lairs in Amundsen Gulf, N.W.T., between 1974 and 1975. The factors stimulating the change in productivity in the area are not clear but the responses of the seals appear to have included lowered reproductive rates and movement of a significant portion of the population out of the area. (Au)


An account of how Andrew Bahr drove 3,000 reindeer from Alaska to the Mackenzie Delta, a distance of 2,600 km. The drive took five years (1929-1934) and the final number that reached the Mackenzie Delta was 2,382. (ASTIS)


... Our general objective was to conduct fall and early winter baseline surveys ... which would a) characterize fish populations, b) determine other biotic and abiotic characteristics of the aquatic habitats relevant to the fishery resource, c) identify potential environmental impacts related to the construction and operation of a gas pipeline, and d) suggest mitigative measures to offset adverse potential environmental impacts. (Au)


Baseline data obtained from a sampling program carried out from 1971 through 1975, primarily during the open water season, demonstrate the existence of zonation of zoobenthos across the shelf of the southern Beaufort Sea. These zones, which can be characterized physicially and biologically, are designated : (1) Estuarine Zone, (2) Transitional Zone, (3) Marine Zone, and (4) Continental Slope Zone. (Au)


This study collected information on the location and timing of spring waterfowl (primarily ducks, geese and swans) concentrations along the proposed Dempster lateral pipeline route from Whitehorse to Chapman Lakes during the spring, 1978, between March 29 and May 22. Of the 21 waterbodies surveyed, eight were considered important to waterfowl because large concentrations of ducks (>1000) or swans and/or geese were present. Of these eight, seven are less than 3.2 km from the proposed pipeline route. (Au)

Spring migration of the porcupine caribou herd in relation to the proposed Dempster lateral pipeline route / Renewable Resources Consulting Services Ltd. Thompson, D.C. Foothills Pipe Lines (Yukon) Ltd. [Calgary : Foothills Pipe Lines (Yukon) Ltd.], 1978. xl, 70 leaves : maps (part. fold. in pocket), tables ; 28cm. (Environmental report - Foothills Pipe Lines (Yukon) Ltd.) Prepared for Foothills Pipe Lines (Yukon) Ltd. Bibliography : leaves 65-69. ACU

... Caribou may be expected to cross the corridor during spring migrations through the northern Ogilives sometime between early April and mid-May. Two periods of migration may be expected in the Richardson Mountains: the first wave will cross the corridor between mid-March and late April with the second wave typically crossing between late April and mid-May. (Au)

An average of 50% of the portion of the Porcupine herd using Canadian winter range was located east of the Dempster corridor. It is considered most likely that any restriction in access of caribou which could be related directly to the pipeline would occur only during the relatively brief period of construction. Serious conflicts are not anticipated during the operational phase of the pipeline. the majority of interactions with caribou outside of the migration period will be restricted to that area of the corridor between the Peel-Ogilvie River and the North Fork Pass. movement of caribou on their winter range is a normal occurrence and that the effects of any displacement of caribou from the corridor may not be significant. (Au)

I-14026
A key to some larvae of Chironomidae (Diptera) from the Mackenzie and Porcupine River watersheds / Oliver, D.R. McClymont, D. Roussell, M.E.
Ottawa : Fisheries and Marine Service, Fisheries and Environment Canada, [1978]. iv, 73p : ill. ; 28cm.
(Technical report - Canada. Fisheries and Marine Service, no. 791)
(Technical report - Canada. Fisheries and Marine Service, Western Region, no. 113)
References. ACU

Chironomid larvae were collected and identified from the Fort Simpson and Mackenzie Delta areas, Northwest Territories; and the Old Crow area, northern Yukon Territory. Illustrated keys based on these larvae are presented with brief notes on some of the species. Approximately 140 taxa in 75 genera and six subfamilies are keyed. Most of the taxa keyed inhabit medium- to large-sized rivers. (Au)

I-15423
Effects of sediment addition on macrobenthic invertebrates in a northern Canadian river / Rosenberg, D.M., Wiens, A.P.
(Water research, 1978. v. 12, p. 753-763, figures, tables)
References. ACU

Two channels built into the Harris River, Northwest Territories were used to study responses of invertebrates to sediment addition. Sediment addition caused (1) higher numbers of Oligochaeta and Simuliidae to drift in August and September; (2) higher numbers of Plecoptera and Ephemeroptera to drift in September but not in August; and (3) higher number and Chironomidae to drift in August but not September. (Au)

I-20265
Muskox-caribou summer range relations on Banks Island, N.W.T. / Wilkinson, P.F. Shank, C.C.
References. ACU

The use of food and space by muskoxen (Ovibos moschatus) and Peary caribou (Rangifer tarandus pearyi) in north-central Banks Island was studied in summer 1973 to ascertain whether interspecific competition was occurring. The distribution and dispersion of the two ungulates overlapped only negligibly, and their preferred habitats and diets were correspondingly different. We concluded that competition was not occurring. (Au)

I-20362
(Contribution - Alberta. University. Boreal Institute for Northern Studies, no. 56)
References. ACU, NFSMO

The paper reports on 3800 small mammals taken in taiga and tundra east of the Mackenzie River Delta between 1971 and 1974. Local distributions are given for all 100 species of small mammals recorded in the region, plus two accidents. In addition, abundance, body and cranial measurements, and reproductive information is presented for the R. species collected during the study. The taxonomic status of Clethrionomys rutilus platyccephalus is discussed. (Au)

I-20400

This report presents the results of a study in summer 1972. The evidence presented in this report leads to four main conclusions: (i) that the use of food and space by musk oxen showed a slight degree of overlap; (ii) that the observed degree of overlap probably did not indicate the existence of interspecies competition between musk oxen and caribou; (iii) that interspecies competition for food or space is unlikely to occur in the near future between musk oxen and caribou: (iv) that musk oxen and caribou were both within the carrying capacity of their range. (Au)

I-21300
(APDA project no. 11 : Mackenzie Delta ornithological study. Report)
References. ACU, NFSMO

Purpose: To delineate important and critical nesting, moulting, gathering ground, staging and migration routes of the birds in the Mackenzie Delta region. The study area was later expanded to include the coastal region from Herschel Island to the Baillie Islands and north to the bird sanctuary of Banks Island. Field work was conducted in four stages to coincide with major changes in ornithological activities such as spring arrival, nesting, moulting and fall staging. The project started in June, 1970, and was completed in October of the same year. report provides estimates of
bird numbers and describes the habits of migratory and other species of birds that were observed. Some preliminary assessments of the potential impact of oil exploration and production on birds which utilize the study area are included. (Au)

I-22624
Fall migration of the Porcupine caribou herd in relation to the proposed Dempster lateral pipeline route / McCourt Management Ltd. Thompson, D.C. - Foothills Pipe Lines (Yukon) Ltd. [Calgary : Foothills Pipe Lines (Yukon) Ltd.], 1979. ix, 57 leaves : figures, maps (part. fold. in pocket) ; 28 cm. (Environmental report - Foothills Pipe Lines (Yukon) Ltd.) Prepared for Foothills Pipe Lines (Yukon) Ltd. Bibliography: leaves 53-55. ACU

In a typical year, the majority of caribou which cross the Dempster corridor may be expected to cross in two relatively well-defined, albeit broad, areas, one in the Ogilvie Mountains and the other in the Richardson Mountains. The numbers of caribou which cross the corridor in each of these two locations is not predictable from a knowledge of the distribution of the herd during the late summer. Caribou may be expected to cross the corridor during fall migration through the Richardson Mountains between early September and early October; caribou may be expected to cross the corridor in the Ogilvie Mountains between early October and mid-November. It appears that southward migration is initiated by the first snow storm of the season. (Au)

I-23922

This paper provides an assessment of the state of knowledge of the Porcupine Caribou Herd and its habitat, drawing on analogy with other studies where necessary. The history of the animals, their current range, food habits, range studies and seasonal distribution and migration, are discussed. The current status and dynamics of the herd are indicated, and are major extraneous influences which seem likely to affect it in the near future. (Au)

I-25844

Description of 10 species of Ephemeroptera, 9 species of Trichoptera and 12 species of Diptera, collected from north western Canada are given. Distribution records of an additional 7 species of Plecoptera, 1 species of Ephemeroptera, 4 species of Trichoptera and 7 species of Diptera are also presented. (Au)

I-25852
Species descriptions of larval and adult Chironomidae collected from three different areas of the N.W.T. / Moore, I.A. - Canada. EPS. Northwest Region. N.W.T. District Office. [Edmonton]: Environmental Protection Service, Northwest Region, 1977. v, 54 p. : figures ; 28 cm. (Manuscript report - Canada. EPS. Northwest Region, N.W.-77-14) Prepared for Northwest Territories District Office, Environmental Protection Service, Northwest Region. References

Species descriptions of larval and adult Chironomidae collected from Yellowknife Bay (Lat. 62 deg. 25 sec. N; Long. 114 deg. 20 sec. W), the Mathews Lake area (Lat. 64 deg. 03 sec N; Long. 111 deg. 15 sec W) and the Itchen Lake area (Lat. 65 deg. 31 sec N; Long. 112 deg. 50 sec W) are given. (Au)

I-22963

... Various survey methods were employed to determine temporal and spatial distribution of seabirds. From several points along the coast we made counts of spring migrants. Aerial surveys were used to learn the distribution and concentration of seabirds using open leads in the ice and throughout the open water season. Aerial surveys were also used to sample the coastal breeding and molting species. Aerial surveys in the fall sought to locate concentrations in the littoral zone. Data on the distribution and movements of seabirds and other birds in the southeastern Beaufort Sea area were gathered during 1972 and 1974. Data collected during offshore aerial surveys conducted over the Beaufort Sea during 1974 were analysed in relation to ice-cover conditions; the results of such analyses indicated the distributions and movements of birds offshore during a year of above-average ice cover. It was found that the distributions of most species are related to the amount of ice cover present and that birds generally prefer areas of at least partly open water. Maps of species distributions and abundances in relation to ice-cover conditions were prepared for offshore areas. (Au)
Fishes of the Yukon coast / Kendell, R.E.
(APOA project no. 72 : Beaufort Sea Environmental Program. Report, no. 6)
Bibliography: p.41-45.
ACU, NFSMO

The purpose of this study was to collect baseline information regarding the inshore fisheries resource and the aquatic environment of the western coastal Beaufort Sea, and to identify areas that could be critically affected by a major oil spill. We present data collected from April 1974 to September 1975. The study area included the coastal sea out to 7 km offshore, lagoons, bays and estuaries, bounded by the Blow River delta on the east and by Welles Point, Herschel Island, on the west.

Of 21 species of fish recorded within the study area 6 species represented 95% of the total catch in 1974. These were least cisco (Coregonus jordani), Arctic cisco (Coregonus macrocephalus), fourhorn sculpin (Myoxocephalus quadricornis quadricornis), boreal small (Sander lucioperca), and Pumpback or lake whitefish (Coregonus clupeaformis). Of these only the fourhorn sculpin is considered a marine species, the remainder being anadromous species. Some of the life history information is presented along with a discussion of the available literature for each species. Age-length relationships, sex ratios and age at maturity are also presented for the most common species. (Au)

I-30325
(APOA project no. 72 : Beaufort Sea Environmental Program. Report, no. 1)
Bibliography: p.56-58.
ACU, NFSMO

The two main seal species which occur in the Beaufort Sea are the ringed seal (Phoca hispida) and the bearded seal (Erignathus barbatus). In a randomly stratified aerial survey, conducted in 1974, we counted 41,082 ringed seals and 2,759 bearded seals. In an identical survey, conducted in 1975, we counted 21,661 ringed seals and 1,197 bearded seals, which indicates a substantial decline in the total population size. Substantial reductions in pup productivity, pup survival, ovulation rate, and pregnancy rate were also recorded in 1974 and 1975, compared with available data from the same population in earlier years and from other studies. It appeared that these changes were caused by abnormally heavy ice conditions in 1974. Neither ringed nor bearded seals were distributed randomly over depth but their distributions were different. Bearded seals were more strongly associated with shallow water areas. Ringed seal pupping habitat is widely distributed in the inshore fast ice areas of the western Arctic. Bearded seal pupping habitat is mainly restricted to the offshore moving lead areas north of the mainland coast and west of Banks Island. Both ringed and bearded seals concentrate in the moving lead areas during the winter. (Au)

I-30333
(APOA project no. 72 : Beaufort Sea Environmental Program. Report, no. 2)
Bibliography: p.53-55.
ACU, NFSMO

This report presents baseline information on the biology, distribution, and abundance of polar bears in the Beaufort Sea. The report identifies critical feeding and denning areas; and makes recommendations relative to projected industrial activity and future research requirements. From December through July 1974 through July 1975, 425 polar bears were tagged in the western Arctic. Subsequent to tagging, 25 polar bears were shot, 51 were recaptured, and 117 sightings were made of tagged bears (with numbers painted on them, up to two months after tagging). Seasonal movements in the population were largely determined by ice conditions. Five sea-ice habitat types for polar bears were described. The population of polar bears in the study area in 1974 was estimated as 1,521. Crude estimates of the...
population size in 1975 indicated that the total could be as low as 1,000 individuals. Recommendations for the protection of the critical feeding and maternity denning areas were made as were recommendations for future monitoring and research needs. (Au)

I-31008

Banks Island arctic fox studies: age structure and rables infection from 1973-1974 trapline returns / Beak Consultants Ltd. Panarctic Oils Ltd.
Calgary: Beak Consultants Limited, 1975. 301.: figures, maps, tables; 29cm.
Prepared for Panarctic Oil Ltd.
ACU, ACP

... investigations on various aspects of arctic fox biology on Banks Island, N.W.T. Field work conducted in April 1974 consisted of collecting arctic fox heads from trapline caught animals. The samples were aged and brain tissue was analysed for rabies infection. The resultant data are compared with data for other arctic fox population. (Au)

I-31009

Des pelicans au 60 deg. parallele - [Pelicans 60 deg. North] / Poirel, M.
(North/Nord, v. 26, no. 2, Summer 1979, p. 2-5, col. photos.)
English abstract.
Text in French.
ACU

... the colony ... is located in the middle of Mountain Rapids in the Slave River, right on the Alberta-N.W.T. border. Not only is this pelican colony the most northerly one in the world; it is also the only known one where pelicans nest in the middle of turbulent waters - usually these birds prefer the calm waters of lakes or lagoons. In addition, in the Slave River colony, the pelicans "fish" individually: another oddity, since elsewhere they prefer the calm waters of lakes or lagoons. (Au)

I-32166

Forty years of reindeer herding in the Mackenzie Delta, N.W.T. / Treude, E.
Translation of: 40 Jahre Rentierhaltung in Mackenzie Delta, N.W.T.
ACU

Reindeer herding in the Mackenzie Delta area started in March 1935, when a herd of 2,370 animals was delivered to the newly established Reindeer Grazing Reserve. Conceived to supplement the dwindling wildlife resources of the Canadian Arctic and to improve the economic conditions of the native Eskimos, the policy was to keep a government-owned nucleus herd from which additional units could be obtained and put under Eskimo management. Several native-owned herds were set up, for various reasons they all were returned to the government, the last one in 1964. A new approach was undertaken in 1960; in an attempt to demonstrate the economic feasibility of an Arctic reindeer industry, the project was placed under private management. There were plans to start large-scale reindeer breeding following modern conceptions of reindeer husbandry, but when the reindeer population dropped alarmingly, the Canadian Wildlife Service in 1968 accepted the responsibility for a five-year term. The main task then was to rebuild the herd and to conduct biological as well as management-related studies. In March 1974, the herd was finally sold to a native-owned Reindeer Company. In addition to providing a detailed review of reindeer herding in the Mackenzie Delta area, an attempt is made to evaluate the past economic importance of the project and to assess its potential future development. ... (Au)

I-32212

Comparative demography in Clethrionomys rutilus in taiga and tundra in the low Arctic / Martell, A.M., Fuller, W.A.
(Canadian journal of zoology, v. 57, no. 11, Nov. 1979, p.2106-2120, ill., figures, tables)
(Contribution - Alberta, University, Boreal Institute for Northern Studies, no. 64)
References.
ACU

Our working hypothesis was that winter mortality of Clethrionomys rutilus would be more severe in tundra than in taiga, and in winters with "unfavorable" rather than "favorable" conditions during establishment or abortion of the snow cover or in the subnivean environment during midwinter. Vole mortality was higher in the tundra (80-85%) than in the taiga (50-75%), in accordance with our prediction, but year to year differences in snow conditions were not necessary determinants of winter survival during the 4 years of the study. The onset of summer breeding was related to the time of snow melt, and a late spring was followed by a low rate of maturation of young-of-the-year females and small spring-to-fall increase in numbers. Few young of either sex matured in two of three summers in the taiga, whereas about half the females and one-third of the males matured each year on the tundra. Litters were significantly larger on the tundra, and spring sex ratios were female biased. Thus reproductive output was high on the tundra, which would offset high winter losses. ... (Au)

I-34685

Some factors influencing the distribution, seasonal abundance and feeding of subarctic Chironomidae (Diptera) / Moore, J.W.
(Archiv fur hydrobiologie, Bd. 85, Heft 3, 1979, p. 302-335, ill., map)
References.
ACU

The distribution, abundance and feeding of larval Chironomidae were correlated through multiple regression analysis with several environmental parameters. Sampling was conducted between June 1975 and October 1976 in Yellowknife Bay in the Canadian subarctic. The abundance of most Chironomidae and Tanypodinae (Chironomus decorus, Chironomus plumosus, Polyplephium nebiculosu, Tanyporus sp., Glyptotendipes sp., Procladius bellus) within the bay increased in areas with reduced oxygen concentration (50-60% saturation). Although there was also a strong positive correlation between the density of these species and the organic content of the sediments, water depth, temperature, invertebrate predators and phytoplankton levels were not important regulatory factors. Several other species ... developed large populations in only deep well-oxygenated water. ... Temperature accounted for most of the variability in feeding intensity. (Au)
Benthic invertebrates were collected from a subarctic lake during 1976 to assess the effectiveness of diversity indices and indicator species as measures of heavy metal pollution. Collections were made near an operating metal mine, where sediments were contaminated with high levels of arsenic (up to 2,500 mg/kg dry weight), mercury (500 micro gran/kg), lead (850 mg/kg), copper (750 mg/kg) and zinc (950 mg/kg). While diversity indices and indicator species were ineffective in monitoring metal contamination, the strong negative correlation between the concentrations of metals and the abundance of benthic organisms provided a much more realistic assessment of the level of contamination. (Au)

I-38504

Wildlife and wildlife habitat in the Great Slave Lake and Great Bear Lake regions, 1974-1977 / Jacobsen, R.

Wildlife and habitat in the Great Slave Lake and Great Bear Lake regions. The objective was to test the hypotheses that, when exploited, growth and recruitment would increase in the populations, and that the degree of increase would be proportional to the intensity of exploitation. The results of my experiment indicate that in unexploited lakes, recruitment and growth of young fish is regulated by the established population of mature fish. (Au)

I-38514

Patterns of activity of subarctic voles / Herman, T.B.

Activity and movements of female red-backed voles, Clethrionomys gapperi, were monitored with a radio-telemetry system over a 14-month period in a 900 sq. m natural enclosure. Animals exhibited a short-term (2-5 hr.) activity rhythm which remained relatively constant throughout the year and a circadian rhythm which shifted from diurnal in winter to nocturnal and crepuscular in summer. Among anestrous voles, movements and extra-nest activity were minimized during early winter when the subniveau space had not yet developed, and were maximized in late winter-early spring during snowmelt. In summer, activity and movements increased with the progression of reproductive phases from anestrous to lactating. (Au)

I-38598

Role of a unionid clam population in the calcium budget of a small Arctic lake / Green, R.H.

Benthic invertebrates provided a much more realistic assessment of the level of contamination. (Au)

I-38601

Growth and recruitment in experimentally exploited lake whitefish (Coregonus clupeaformis) populations / Healey, M.C.

From 1971 to 1978 I conducted an exploitation experiment on lake whitefish (Coregonus clupeaformis) in four Northwest Territories lakes. The objective was to test the hypotheses that, when exploited, growth and recruitment would increase in the populations, and that the degree of increase would be proportional to the intensity of exploitation. The results of my experiment indicate that in unexploited lakes, recruitment and growth of young fish is regulated by the established population of mature fish. (Au)

I-41688

Zooplankton distribution in the eastern Beaufort Sea and the Northwest Passage / Shih, C.-T.

I-38990

The survival of bacteria in different types of Canadian arctic soil and mechanism of death after freezing and thawing / Lee, S.-K.

Three soil samples from Churchill, Manitoba and two from Inuvik, N.W.T. ... ranged from sandy loam to clay. ... Loam and sandy loam soils were found to give better survival on freezing than other soil types tested. Bacterial populations appeared to stand the least chance of survival if frozen and stored in soils containing a high proportion of clay and a high content of phosphorus. ... Field studies showed that the total bacterial count in sandy and loam soils never dropped below 10,000,000 per gram of soil throughout the winter months. The mechanism of death of bacteria on freezing and thawing was also examined. The study indicated that there is a relation between the total cytochrome content of the cells of the bacteria investigated and their sensitivity to NaCl in the freezing medium. Oxidation activity studies suggested that cytoplasmic membrane disruption and permeability damage were the main cause of loss of viability. (Au)

The main purpose of the 1978 whale monitoring program was to observe whale distribution and hunting success in relation to I.O.L. exploration activities in order to detect and minimize possible adverse effects of those operations, and to provide advice to I.O.L. supervisors regarding the timing and location of activities. The primary objectives of the 1977 study were to: (1) Monitor whale movements and concentrations in the Mackenzie Estuary. (2) Prevent adverse interactions between whales and I.O.L. offshore island-building and operational activities. and, (3) Determine the native utilization of whales and prevent interference with the hunt by I.O.L. activities. (Au)


The main purpose of the 1976 whale monitoring program was to observe whale distribution and hunting success in relation to I.O.L. exploration activities in order to detect and minimize possible adverse effects of those operations, and to provide advice to I.O.L. supervisors regarding the timing and location of activities. (Au)


The main purposes of the 1978 whale monitoring program were: (1) Document the distribution and abundance of white whales in the Mackenzie Estuary and the success of Inuit hunters in relation to Esso exploration activities and (2) Provide on-location advice to Esso supervisors regarding the concentrations and movements of white whale in relation to the timing and location of operations in order to minimize potential adverse effects on whales or whale hunting. The primary objectives of the 1978 study were to: (1) Monitor white whale movements and concentrations in the Mackenzie Estuary: (2) Prevent potential interactions between white whales and Esso offshore island-building and island clean-up activities through on-location advice: (3) Determine the I.O.L. utilization of white whales; and (4) Prevent potential interference with the hunt resulting from Esso activities. (Au)


The main purpose of the 1977 whale monitoring program was to observe whale distribution and hunting success in relation to I.O.L. exploration activities in order to detect and minimize possible adverse effects of those operations, and to provide advice to I.O.L. supervisors regarding the timing and location of activities. The primary objectives of the 1977 study were to: (1) Monitor whale movements and concentrations in the Mackenzie Estuary. (2) Prevent adverse interactions between whales and I.O.L. offshore island-building and operational activities. and, (3) Determine the native utilization of whales and prevent interference with the hunt by I.O.L. activities. (Au)
controlled in wild Parmomyxus according to the probability of having to make extraordinary energy expenditures and are not simply subject to extrinsic controls through the balance of food availability and energy demands. (Au)

I-52210

... The main purposes of the 1979 whale monitoring program were to: (1) document the distribution and abundance of white whales in the Mackenzie estuary and the success of Inuit hunters in relation to Esso exploration activities, and (2) provide on-location advice to Esso supervisors regarding the concentrations and movements of white whales in relation to the timing and location of operations in order to minimize potential adverse effects of whales or whale hunting. The primary objectives of the 1979 study were to: (1) monitor white whale movements and concentrations in the Mackenzie estuary, (2) reduce potential adverse interactions between white whales and Esso offshore island-building activities by providing on-location advice, (3) monitor Esso activities near Garry Island in relation to white whale hunting as requested in Land-Use Permit, N76J360. (4) ascertain the Inuit harvest of white whales, and (5) prevent potential interference with the hunt that might result from Esso activities. ... (Au)

I-50822

Observations on avian distribution, abundance, habitat relationships, and seasonal movements are summarized. A total of 122 species was recorded; at least 46 (and possibly an additional 14) nest in the area. ... (Au)

I-51845
Descriptions of the larvae of four species of Procladius from Great Slave Lake (Chironomidae: Diptera) / Moore, I.W. Moore, I.A. (Canadian journal of zoology, v. 56, no. 9, Sept. 1978, p.2055-2057, table) References. ACU

Descriptions of larvae of Procladius denticulatus, Procladius culiciformis, Procladius freemani, and Procladius bellus collected from Yellowknife Bay (lat.: 62 deg. 25 sec; long.: 114 deg. 20 sec.) are given. Procladius denticulatus was separated from the other species by its large size, a character which always proved distinctive. Procladius culiciformis and P. freemani were separated from one another through several measurements including those of the basal antennal segment and the basal palpal segment. Almost all characters of the head were useful in distinguishing the much smaller P. bellus from the other species. (Au)

I-52337

A new rotifer species of the genus Notholca Goss, 1886 from Great Slave Lake, N.W.T., Canada, is illustrated and described. (Au)

I-52361
Taxonomy of mermithids (Nematoda: Mermithidae) of Canada and in particular of the Mackenzie and Porcupine river systems and Somerset Island, N.W.T., with descriptions of eight new species and emphasis on the use of the male characters in identification / Mulvey, R.H. Nickle, W.R. (Canadian journal of zoology, v. 56, no. 6, June 1978, p.1291-1329, ill., plates, tables.) References. ACU

Twenty-four described mermithids are listed as known members of the Canadian fauna. Five of these are redescribed, and eight new species are described ... A taxonomic key is provided to separate the 10 genera to which the 24 species belong. Keys identify the species of the genera Gastromermis, Hydromerms, and Neomesomermis. Morphology of the male head and genitalia are critically analysed and consistent male characteristics incorporated into four keys. (Au)

I-52434
Predaceous nematodes of the family Monnochidae from the Mackenzie and Porcupine river systems and Somerset Island, N.W.T., Canada / Mulvey, R.H. (Canadian journal of zoology, v. 56, no. 8, Aug. 1978, p.1847-1868, ill., plates, table.) References. ACU

Paramonochus arcticus n.gen., n.sp., Coomansus fletcherensis n.sp., and Mononchus superbus n.sp. from the Mackenzie and Porcupine river systems and Somerset Island are described and illustrated. ... Other monochonds from the river and lake samples are described and illustrated including Coomansus gerlachii and Mononchus maduell which are reported for the first time in Canada. A new genus Parahadronchus is defined with Parahadronchus edenticulatus (ultra-journ. 1969) n.comb. as its type species, and generic diagnoses and a key to the 23 recognized genera of Monnochidae are included. (Au)

I-52450

Red cell, plasma, and total blood volumes were determined in three ringed seals, Phoca hispida, through simultaneous labelling of both red cells and plasma. Total blood volumes were 123.140, and 158 ml/kg of whole body weight (x=142 ml/kg). Lean body weight was determined in one seal; blood volume was calculated as 226 ml/kg lean body weight. (Au)

I-52507

Descriptions of larvae of Procladius denticulatus, Procladius culiciformis, Procladius freemani, and Procladius bellus collected from Yellowknife Bay (lat.: 62 deg. 25 sec; long.: 114 deg. 20 sec.) are given. Procladius denticulatus was separated from the other species by its large size, a character which always proved distinctive. Procladius culiciformis and P. freemani were separated from one another through several measurements including those of the basal antennal segment and the basal palpal segment. Almost all characters of the head were useful in distinguishing the much smaller P. bellus from the other species. (Au)
Influence

1-54968

Fecundity changes in exploited populations of lake trout (Salvelinus namaycush) / Healey, H.C. (Canadian Journal of Fisheries and Aquatic Science, no. 13, p. 127-132, figures, tables) references.

ACU

This report considers the possibility that exploited populations of lake trout may show increased fecundity. Average fecundity of both species in three exploited lakes varied significantly between 1975 and 1976, while fecundity in an adjacent unexploited lake did not vary. Changes in the fecundity of lake trout and in the exploited lakes were not clearly related to the pattern and intensity of exploitation, but fecundity of both species increased in all exploited lakes after exploitation, with trout showing the greatest response. (Au)

I-54968

Influence of age, condition, sampling time and method on chemical constituents in free-ranging ringed seals, Phoca hispida / Geraci, J.R. (Canadian Journal of Fisheries and Aquatic Science, no. 10, p. 1278-1282, tables) references.

ACU

Blood samples were obtained from 29 free-ranging ringed seals ... on Herschel Island, N.T. ... Age, condition, sampling time, and method had variable influence on plasma chemical constituents. Plasma sodium, chloride, and cholesterol levels in three seals judged to be in poor condition were lower than in the 26 remaining seals. Uric acid was highest in shot pups ... Plasma levels of alkaline phosphatase, calcium, and cholesterol varied with age. Shot seals had higher plasma triglycerides and blood urea nitrogen (BUN), as a result of recent feeding. For resons unknown, the circulating levels of two hepatocellular enzymes were elevated in all samples ... Glucose, bilirubin, inorganic phosphate, and aspartate aminotransferase were not significantly influenced by any of the variables studied. The plasma electrolytes and BUN in five captive ringed seals sampled over a 15-day period correlated with levels in healthy, fasted free-ranging seals: uric acid levels were lower in the captive seals. (Au)

I-58602

A review of the systematics and ecology of Arctic char, Salvelinus alpinus, in the western Arctic / McCart, P.J. Aquatic Environments Limited. [Ottawa : Dept. of Fisheries and Oceans], 1980. vii, 89p. ; figures, tables ; 28cm.

ACU

This document synthesizes the available data describing Arctic char in Beaufort Sea drainages in Alaska and Canada including the Mackenzie River and its tributaries. The major purpose of the document is to provide a detailed basis for future studies of Arctic char in the western Arctic, for the assessment of the potential impact of development, and for the management of the species. (Au)

I-58760

Report to Dina on the 1979 survey of the distribution and abundance of seals in the eastern Beaufort Sea / Stirling, I., D.Master, D.P. Calvert, W. Ottawa : Canadian Wildlife Service, 1980. 16 leaves ; figure, tables ; 28cm.

ACU

The sixth annual aerial survey of the distribution and abundance of seals in the eastern Beaufort Sea was conducted between 15 and 25 June 1979. Both the corrected and uncorrected numbers of ringed and bearded seals estimated to have been hauled out on the sea ice during the survey were lower than the high numbers recorded in 1978 ... We suggest that the seal populations in the eastern Beaufort Sea have probably recovered from the decline described earlier but that total numbers will continue to fluctuate between years. (Au)

I-58838


ACU

An extension of the known breeding range of the Yellow Wagtail (Motacilla flava) to east of the Mackenzie Delta is indicated. (Au)

I-56202

Comparison of sympatric dwarf and normal populations of least cisco (Coregonus gardneri) inhabiting Trout Lake, Yukon Territory / Mann, G.J. / McCart, P.J. (Canadian journal of fisheries and aquatic sciences, v. 38, no. 2, Feb. 1981, p. 240-244, figures, tables) References. ACU

A normal (205- to 340-mm fork length at maturity) and dwarf (85- to 135-mm fork length at maturity) form of least cisco exist sympatrically in Trout Lake, Yukon Territory. Dwarf ciscoes have significantly fewer gill rakers, lateral lines scales, and pyloric caeca and significantly more vertebrae, than the average, than normal ciscoes. Dwarf cisco mature earlier than normals (age 3 vs. age 6); however, normals are longer lived (maximum age 23 vs. age 14) and may produce nearly 30 times the annual complement of eggs produced by dwarf cisco. Spawning of dwarf cisco may precede that of the normals, and there is some evidence of both spatial segregation of the two forms by selective schooling and of differences in food habits. (Au)

Baseline ecological information is presented on Dall's sheep, woodland caribou, moose, and grizzly bear in a 250 square km area centered on a proposed tungsten mine site in the Macmillan Pass area of the Northwest Territories and Yukon. (Au)


Footnotes. ACU, SSU.

This study focuses on key elements of a proposed international migratory caribou convention between Canada and the United States. The geographic area of concern is the northern Yukon, encompassing the region north of Dawson, generally described by the range of the Porcupine caribou herd. The paper is divided into several sections. It begins with a brief sketch of the development of the concept of an international wildlife range and the subsequent myriad of proposals for the northern Yukon. A discussion of the biological characteristics of the Porcupine caribou herd follows. Social, conservation, and industrial issues are then outlined in the context of land and resources planning and management. Special reference is made here to the role of native peoples and their use of the land and resources for traditional purposes, as well as their involvement in long-term planning and management. Existing international wildlife agreements are then critically evaluated. The study concludes with possible elements of an international agreement and a critique of the most recent draft Convention between the United States of America and Canada for the Conservation of Migratory Caribou and their Environment. (Au)

Footnotes. ACU, SSU.

References.
ACU, NFSMO

A subarctic rodent community of Clethrionomys gapperi and Peromyscus maniculatus was assessed with multiple-capture traps in contrasting years of population growth. Clethrionomys gapperi mature females were territorial and were mainly caught with mature males. Mature males had large, extensively overlapping ranges and were mainly caught with mature voles. Immatures had small, moderately exclusive ranges and were involved in more multiple captures than were mature voles. Patterns of association in C. gapperi were random. Peromyscus maniculatus ... Except for mature males, most animals had extensively overlapping ranges. The basic social unit consisted of a mature male, a few mature females, and a number of young. Numerical changes were principally related to variation in juvenile survival and winter mortality. Variation in the frequency of multiple captures was indicative of spatial organization and social structure, and was not related to demographic changes. (Au)

International caribou ... the argument is not over / Hunter, C.M. (Alaska, v. 47, no. 6, June 1981, p. 22-23, ill., map)

ACU

This article discusses the proposed international treaty aimed at protecting the caribou, other wildlife, and, in the long run, the culture and lifestyle of indigenous peoples in northern Alaska and the Yukon. The author presents the obstacles which appear, at this moment, to have stalled any further negotiations between Canada and the U.S. (ASTIS)


References.
ACU, NFSMO

Raders. systematic visual observations from the coast, and aerial surveys were used to study migration near the Yukon (1975) and Alaskan (1977-78) coasts of the Beaufort Sea. Consepicuous eastward migration of tions, brant, seaducks, jaegers and glaucous gulls occurs along the icebound coast, and in the Yukon some eastbound species (especially brant) concentrate coastaly. Overall, however, eastward migration is predominantly broad-front with little coastal concentration. ... Westward migration is much less conspicuous visually ... However, radar shows extensive broad-front westward flights, probably largely of shorebirds. Most spring migration, both east and west, is from 15 May to 20 June, with the coastal peak in May. Migration later than that offshore. ... Some waterbirds bypass the largely ice-covered Alaskan Beaufort by flying northeast across interior Alaska, and/or northwestern Canada from the Pacific Ocean to the Canadian Arctic. ... (Au)


References.
ACU, NFSMO

Surveys were flown in March 1979 and 1980 north and south of 73 deg. N on Banks Island to estimate numbers of muskoxen. Observed total was 11809 animals which suggested that the population has continued to expand since previous surveys in the early 1970s. A comparison with previous surveys of densities between the north and the south of the island indicates muskoxen have spread from the Thomsen River valley to the north-east and the south. Comparisons with muskox and caribou populations in Alaska and with reindeer in Greenland suggest that co-existence between these species is normal and does not involve competition. (Au)


References.
ACU, NFSMO

Behavioral responses of individual Barren Ground caribou ... to a 3/4-ton pickup truck were quantified on 36 occasions. ... Forty-eight percent of the individual caribou reacted to the vehicle by running away while 36% trotted away. ... Caribou encountering a moving vehicle exhibited signs of excitement and fright, including the excitation jump and tail-up response. Reversal of direction and/or splitting of the group involved 29% of the individual caribou. The type of habitat (forested vs. open) did not have an effect on observation duration (p>0.50) or on the mean distance at which caribou were first encountered (p>0.50). The distance from the vehicle at which animals began to flee did not differ between sexes (p>0.50) or habitats (p>0.50) but was as great for both sexes as that reported for females with young calves. In forested habitat, male caribou allowed a much closer approach than females (p<0.08) but closeness of approach did not differ between the sexes in open habitat (p>0.50). (Au)


References.
ACU, DGN

The first systematic aerial survey of large mammals on Victoria Island was conducted during August 1980. Caribou numbers were estimated to be 7,936 + 1,839 (p <0.05). Muskox numbers were estimated to be 12,160 + 2,880 (p <0.05). The majority of caribou (74.2%) and muskoxen (75.9%) were found on the western portion of Victoria Island. ... The overall objective of the 1980 program was to obtain preliminary information on the seasonal distributions, numbers and movements of large mammal populations and to fill information gaps or obtain updated information for assessing
I-69973
Chitty’s hypothesis and behaviour in subarctic red-backed voles Clethrionomys gapperi / Mihok, T.
References.
ACU

Behavioural relations in Clethrionomys gapperi were studied in “peak” and “decline” years as a potential test to Chitty’s polymorphic behaviour hypothesis. Behaviour was related to sex, age, and sexual maturity, and was consistent with a dominance hierarchy that favored mature females over immatures of both sexes and mature males. Dominant voles selectively occupied preferred habitat, but they did not consistently differ from subordinate voles in individual attributes. This social structure appeared to be an adaptation to suboptimal subarctic conditions that favored selection for maximal output. Behavioural changes associated with declining population density were contrary to Chitty’s original prediction. High density selected for “docile” as opposed to “aggressive” types in some population categories. These results suggest a need for further study of behaviour, seasonal changes, and dispersal in microtine populations.

I-70050
Nests of Dolichovespula albida from the Arctic Canada (Hymenoptera : Vespidae) / Yamane, S., Makino, S., Toda, M.J.
(Low temperature science output, Series B : Biological science, v. 28, 1980, p. 61-68, figures, tables)
(Contribution. Series B - Hokkaido. University, Sapporo. no. 2304, 1980)
References.
ACU

Two thriving nests of Dolichovespula albida were collected from the Arctic Canada in the summer of 1980. They were found each in “supraterrrestrial” nest sites. The envelope paper was loose in texture, showing a close resemblance to that of D. norvegica. Both nests had only two (one worker and one reproductive) combs and about 170 cells, much smaller than in other Dolichovespula species in temperate regions. Adult productivity was also considerably low, but the colonies did have a good number of workers.

I-70949
Spring migration of bowhead (Balaena mysticetus) and white whales (Delphinapterus leucas) in the Beaufort Sea / F.F. Stanley & Company. Fraker, M.A.
(Winnipeg, Manitoba : Fisheries and Marine Service, 1979, vi, 36p.: figures, tables : 19cm.
(Technical report - Canada. Fisheries and Marine Service, no. 859)
(Technical report - Canada. Fisheries and Marine Service, Western Region, no. 121)
References.
ACU

Information concerning the route, timing, and other details of the spring migration of bowhead and white whales in the Beaufort Sea is [given].

I-75554
Twining and postpartum activity in barren-ground caribou (Rangifer tarandus) / McDonald, E.J.
References.
ACU

On 26 May 1980 twin Caribou calves were observed on the calving grounds of the Porcupine Caribou herd in the northern Yukon Territory. Postpartum activity of one of the twins was delayed relative to that of the other twin and to that of a single calf born at the same time.

I-78921
Muskoxen on Banks Island increasing at unprecedented rate. (Winnipeg, Manitoba : Fisheriem Marine Service. Western Region, no. 368, 1981, 2 leaves : 28cm.
(NWT wildlife notes, no. 1, Apr. 1981)
ACU

Surveys ... have shown an increase ... from an estimated 3,100-3,800 in 1971 to an estimated 10,000-20,000 in 1980. Superior range quality, a lack of natural predators, and the absence of normal die-offs usually caused by weather are believed to have contributed to an unusually high annual rate of increase of 10-20% for the muskox herd .... In response to initiatives by the Inuvialuit, the N.W.T. Wildlife Service has helped to develop a muskox and caribou management plan for Banks Island (now being printed). An interim agreement was signed on March 20, 1981, ... The common objective of the management plan and the interim agreement is to maintain viable populations of both muskox and Peary caribou, considering their biological requirements and also the nutritional and other needs of the Inuvialuit and other northerners.

I-79496
A new species of Clepsis guenée from the northern Yukon Territory (Lepidoptera : Tortricidae) / Mutuura, A.
References.
ACU

A new species Clepsis (Sclitorjola) firthiana is described from the northern Yukon Territory, Canada. Morphologically this species is closely related to the European C. stirgiana (Hubner) and the North American C. clemensiana (Fernald). Genitalic characters are given to distinguish C. firthiana from the North American C. kershoffi Obraztsov and C. moeschliera (Wocke) (which have similar markings), and C. clemensiana (Fernald).

I-79812
Population dynamics of island populations of subarctic Clethrionomys rutilus / Burns, G.B.
(Canadian journal of zoology, v. 60, no. 11, Nov. 1981, p.2115-2122, figures, tables)
References.
ACU

Populations of Clethrionomys rutilus were studied on two islands (Island 2 and Green Island) in the Mackenzie River during the summers of 1976 to 1978. This was done to examine the demographic parameters related to confinement of northern red-backed vole populations on Islands. The number of voles on Island 2 in 1977 increased until late June and then remained nearly constant until trapping ceased in late August. On Green Island in 1977 and 1978 and Island 2 in 1978, populations grew...
all summer and even in August had not reached the densities found during the 1977 high on Island 2. Island 2 had a number of maturing young voles. Higher wounding rates and shorter adjusted range lengths were associated with higher population densities. Although high densities of voles were reached early in the summer of 1977 on Island 2, numbers stopped increasing before the end of the breeding season. Restraint of growth potential was seen in poor maturation of the young and in declining juvenile survival and recruitment of young through summer. (Au)

I-83208
A collection of zooplankton from Tuktoyaktuk Harbour Northwest Territories / Sutherland, I. (Canadian journal of zoology, v. 60, no. 3, Mar. 1982, p. 477-480) References. ACU

Forty-seven taxa of zooplankton were identified from collections taken during larval fish shoes in the Tuktoyaktuk region. The zooplankton fauna contains three components: a small number of common species characteristic of brackish water, a large number of species of either freshwater or marine affinities. Eurytemora gracilicauda Akatova 1949, E. raboti Richard 1897, and E. richingalii Heron & Damasen 1976 are newly recorded from Canada. (Au)

I-84379

Two new species of dorylaim nematodes, Paractinolaimus spanithelus n. sp. and Paractinolaimus longidrilus n. sp., from aquatic habitats are described and illustrated. The main differential characteristics of Paractinolaimus spanithelus are the small number of widely spaced supplements (12), length of sperms (8-10 micro m), bluntly rounded convex-conoid shape of the tail, and the number of pairs of caudal papillae in both sexes. Paractinolaimus longidrilus is distinguishable from closely related species by the spicule length (83 micro m), the bluntly rounded, convex-conoid shape of the tail, and the number of pairs of caudal papillae (11) in the male, and the number of submedian ventral papillae (13) in the male. (Au)

I-87122

The competitive digestibilities of plants and their rates of digestion in vitro were assessed by fermentation with ruminal fluids obtained from barren-ground caribou... shot on their winter range in the southern Northwest Territories. There was a near-linear increase in the in vitro, dry-matter disappearance (IVDMD) with fermentation time (30-120 h) for all eight lichen species that we tested. In contrast, IVDMD was essentially maximal after 60 h fermentation for 10 of the non-lichen species. The green leaves of Carex rostrata and Equisetum variegatum were the only species with IVDMDs higher than 50% after a 60-63 h fermentation period. The two species of mosses and a liverwort were poorly digested (15-27%). The addition of 63 mg of urea to each tube markedly increased the digestibilities of both species of lichens tested, and that of Vaccinium vitis-idaea, but it lowered the IVDMD of Salix and Betula stems and the green and cured parts of Carex rostrata. The IVDMDs of four lichen species collected on the Canadian Arctic Islands were higher than those of eight tericolous species obtained from the mainland winter range of R. t. groenlandicus. (Au)

I-87831
Life cycle characteristics of northern Peromyscus maniculatus borealis / Miller, J.S. (Canadian journal of zoology, v. 60, no. 4, Apr. 1982, p. 510-515, tables) References. ACU

Life cycle characteristics of northern Peromyscus maniculatus borealis were examined in the laboratory in order to identify specific adaptations to strongly seasonal environmental conditions. Although northern P. m. borealis are demographically K selected, body weight (19.2 g), gestation time (26.3 days for postpartum litters), litter size (5.0), birth weight (1.87 g), age at weaning (21.4 days), weight at weaning (0.26 g), growth rates (0.35 g/day), and energy requirements for lactation (181% increase attributable to five offspring) are all similar to those of other subspecies of P. maniculatus, geographic conditions do not appear to have been important in the evolution of the life cycle characteristics of P. maniculatus. (Au)

I-89290

The purpose of the present report is to provide an overview of the biological resources in the Northwest Passage (Visit Melville Sound through Lancaster Sound, Baffin Bay and Davis Strait (south to 60 degrees N.L.)) sections of the potential transportation route. The scope of the review is restricted to marine and coastal portions of this area. Also, the purpose of the review is to describe the characteristics of the major biological components in this area; this document does not evaluate the potential impacts of the transportation plan on the biological system. This report is based entirely on published and unpublished literature and reports, .... No original field research has been conducted as part of this project. .... (Au)

I-89303

Full-scale development of oil and gas reserves in the Canadian Beaufort Sea will be a major industrial undertaking with definite
ISBN 0-662-12016-7  
References.  
ACU, DON.

Between 1974 and 1975, there was a drop of about 50% in the numbers of ringed and bearded seals in the eastern Beaufort Sea, followed by a further 2 years of low numbers after which, in 1978, the population more than doubled. The decline in numbers appeared to be associated with particularly heavy ice conditions in the winter of 1973-74, which may have reduced the food available to seals. The resulting heavy winter mortality, combined with reduced productivity and large-scale emigration, could be responsible for the drop in numbers. Immigration appears to be responsible for the large increase in 1978. ... Ecological conditions in the eastern Beaufort Sea are highly variable and cause changes in the distribution and abundance of ringed and bearded seals. Thus, management of these species as well as assessment of the possible consequences of man-made detrimental effects must be flexible, depending on the status of the populations at the time. (Au)

I-89076

The distribution and abundance of ringed omals in Northwe (Au) territories. Jaklinchuk, D.R.  
(Polar Gas Limited)  
Appendices.  
ACU, DON.  

... This report presents results of part of the 1980/81 Polar Gas Environmental program of land mammal studies. The overall objective of the 1980 program was to obtain preliminary information on the distribution and movements of large mammal populations which potentially interact with various route alternatives. Studies were designed to fill information gaps in order to provide a preliminary assessment of potential environmental impacts. (Au)

I-89034

[Toronto : Polar Gas], 1981.  
(Environmental program - Polar Gas Limited).  
Appendices.  
ACU, DON.

... Bird populations on Victoria Island were studied during the 1980 breeding season as part of a series of studies sponsored by Polar Gas to obtain baseline data on wildlife resources in the area of the proposed pipeline and ancillary facilities. This report presents the results of the 1980 studies of breeding birds and is organized as follows: 1. Overview. ... 2. Aerial Surveys. ... methodology and results ... 3. Ground Surveys. ... methodology and results ... 4. Species Accounts. Results from both aerial and ground surveys and from casual observations are summarized on a species by species basis. Where possible, our information about the distribution and abundance of each species is compared with the results of previous studies. 5. Species Accounts Summary. Results presented in the Species Accounts section are summarized on a species group basis. (Au)

I-89011

[Toronto : Polar Gas], 1981.  
V. 37 p.; ill.; figures, tables ; 28 cm.  
(Environmental program - Polar Gas Limited)  
References.  
ACU, DON.

The most common marine mammal species in this area and hence one of the most likely to interact with the project is the ringed seal (Phoca hispida). This species constitutes a staple food source for coastal Inuit communities ... and is the primary food of the polar bear ... It is the purpose of this study to obtain information concerning the distribution and relative abundance of ringed seals during winter and spring haul-out at submarine pipeline crossings and in bays and inlets where docking and equipment staging sites are being considered. (Au)

I-89026

[Toronto : Polar Gas], 1981.  
K. 144 p.; ill.; figures, tables ; 28 cm.

... the proposed Polar Gas pipeline route on Victoria Island, N.W.T., 1980 / Hatfield Consulting Limited. Williams, G.L. Smith, G.W. Hatfield, C.T. Polar Gas Limited [Sponsor].  
[Toronto : Polar Gas], 1981.  
(Environmen (Au) t(Environmental program - Polar Gas Limited)  
Appendices.  
References.  
ACU, DON.

Hatfield Consultants Limited was engaged by Polar Gas to investigate the living aquatic resources along a proposed pipeline across western Victoria Island in the summer of 1980. Investigations focused on important fish species, their more sensitive life history stages, and critical habitats that could be affected by pipeline construction and operation. Field surveys of each crossing site were scheduled to correspond with fish spawning and migrations as much as possible. Water quality measurements were taken at important fish habitat locations along the route. ... Arctic char and lake trout were the dominant fish species captured. (Au)
I-91537

I-91545
Aquatic invertebrates from the Smoking Hills. N.W.T. M. Havas. M. Hutchinson, T.C. (Canadian journal of fisheries and aquatic sciences. v. 39, no. 6, June 1982, p. 890-903, figures, tables) References. ACU

I-91546

I-91547
The Canadian Wildlife Service, Pacific and Yukon Region, undertook the publication of a systematic review of the state of knowledge of the Porcupine caribou herd, commencing in 1978. As originally conceived, the review was to take the form of an annotated bibliography ... and to include statements of relevant research and investigation currently underway. The topic index was to include ... a brief summary of the current state of knowledge. This document varies from the original plan. It does not include a list of current research and investigation, primarily because the field situation is dynamic ... The other major gaps in this document are statements of current knowledge under major topic headings. Their lack may be partially compensated for by a publication in the Transactions of the 44th North American Wildlife and Natural Resources Conference, which was developed partly as a result of work on this bibliography (Kelsall, U.P. and D.R. Klein. The state of knowledge of the Porcupine caribou herd). ... (Au)

I-92177

I-93165

This is the fourth progress report on wolf/bison studies in Wood Buffalo National Park. It includes the data collected from 10 May to 9 September, 1980. It presents in this progress report are largely descriptive and preliminary. The purpose is to present data collected in a specific period which can be incorporated into the final report. The objectives of the 1980 summer studies at Lake One were to study antipredator strategies in bison, with particular reference to the strategy of protecting calves; to document hunting strategies of wolves, document bison use patterns of Lake One and to document some reported. Two different patterns of daily periodicity are observed, bimodal in Drosophila athabascae and unimodal in D. rerillina and D. subquinarie. The former results from the inactivity under the bright light condition in early afternoon, while the latter from the coincidence of the active peak with the daily thermal maximum. The dim light condition around midnight suppresses the activity of all flies. The species-specific requirements for physical environment are deduced from meteorological records at the time of collections. ... A preliminary survey on this subject was made at Inuvik ... in August, 1980. (Au)

Appendices.

References.


ACU

The imminence of offshore exploration for oil and gas in the Alaskan part of the Beaufort Sea has raised concerns about the potential for disturbance of bowhead whales. The bowhead ... is a baleen whale inhabiting cold northern waters. Historically, five substantial populations existed: Western Arctic, Davis Strait, Hudson Bay, Okhotsk Sea, and Sightsbergen. The western arctic stock inhabits the Bering, Chukchi and Beaufort Seas off the shores of Alaska, the U.S.S.R., and Canada. All five populations were heavily exploited by commercial whalers, and all are now seriously reduced. Only the western arctic population continues to be of substantial size, yet even it is considered to be rare and endangered under U.S. legislation, in Canada, and by the International Whaling Commission. Until very recently, the size of the western arctic stock was believed to be in the range 2264-2865 individuals ... but the latest estimates are somewhat higher .... (Au)

I-106631

Major range extensions of anadromous salmonids and first record of chinook salmon in the Mackenzie River drainage / McLeod, C.L., O’Neill, J.P. (Canadian journal of zoology, v. 61, no. 9, Sept. 1983, p.2183-2184)

References.

ACU

Spawning migrations of chum salmon ... and Arctic cisco ... in the Liard River system (Mackenzie River drainage) within the Northwest Territories and British Columbia were documented during the period 1978 to 1981. These species have not been reported previously from the Liard River. The points of capture, as far upstream as the Grand Canyon of the Liard, represent a major southerly range extension in the Mackenzie River drainage and upstream migrations of nearly 2000 km from the Beaufort Sea. The first record of a chinook salmon ... from the Mackenzie River drainage is reported also. The specimen was collected in the Liard River, Northwest Territories, and was probably a stray, accompanying a spawning escapement of chum salmon. (Au)

I-106692


Appendices.

References.

ACU

In August and early September 1980, LGL Limited, conducted three aerial surveys of the waters north of Tuktoyaktuk Peninsula for Dome Petroleum Ltd. to assess the use of these waters by bowhead whales, which are recognized internationally as an endangered species. The surveys ... included the future site of the Kuglulik artificial island. They were designed to provide baseline information on the numbers, distributions and movement patterns of bowhead whales in the area before construction of the island began ... [and] on other marine mammals in the area. In the 23 bowheads were not seen in the study area on 6-7 August. However, a major influx of bowheads had occurred by the 21-24 August survey, when an estimated 755 bowheads were present in the study area. ... During the final survey (3-4 September), an estimated 222 bowheads were present in the study area. ... The large numbers and movement patterns recorded in late August were not expected, and may be atypical. It is possible that the seemingly atypical summer distribution pattern may have been associated with the delayed spring migration pattern. ... [Documentation of populations of other marine mammals is also included]. (Au)

I-107000


References.

ACU

Aerial surveys were conducted on July 21, July 31, and August 10, 1981 at McKinley Bay, Northwest Territories to determine waterfowl distribution, species composition and abundance. Each survey consisted of two parts: a series of ten east-west transects across McKinley Bay and adjacent terrain, and an aerial survey of the shoreline or "shoreline cruise". The 305 square km study area was further divided into marine and terrestrial components, and total bird numbers in each component were extrapolated from the results of aerial transects. A total of 18,136, 7,949 and 13,180 birds were observed in the marine component on July 21, July 31 and August 10, 1981 respectively. Diving ducks were the most abundant group recorded, with oldsquaw and scoters accounting for over 80 percent of the species total observed in the marine component. ... Total estimated numbers of birds were lower in the terrestrial component, numbering 3,797, 2,498 and 5,517 on the three respective survey dates. Diving ducks were again the most abundant group recorded, but numbers were substantially lower than in the marine component. ... Compared to similar surveys in 1980, considerably more birds were observed in both components of McKinley Bay during 1981. (Au)

I-107018


References.

ACU

Between 1974 and 1975, there was a drop of about 50% in the numbers of ringed and bearded seals in the eastern Beaufort Sea, followed by
two more years of low numbers, after which, in 1978, the population more than doubled. The decline in numbers drop because of heavy winter mortality combined with reduced productivity and large scale emigration. Immigration appears to be responsible for the large increase in 1978. In terms of environmental assessment, this means that because natural conditions can be quite variable, the consequences of foreseeable man-made detrimental effects, such as blowouts or oil spills, will vary depending on the status and condition of the seal population at the time. Ringed seals prefer water with high ice cover and moderate depth. Bearded seals prefer broken ice areas over shallow water. The greatest densities of ringed seals were recorded in the fast ice along the Yukon coast, around Cape Parry and along the southwest coast of Banks Island. The greatest densities of bearded seals were found in the shallow water areas off the Tuktoyaktuk Peninsula. (Au)

I-107026


2 microfiches : figures, plates, tables ; 11 x 15 cm.

(Beaufort E.I.S. reference work, no. RWBO4) Appendices. References. ACU

The purpose of this study was to determine the possible influences of winter icebreaking activity in the landfast ice off McKinley Bay, Tuktoyaktuk Peninsula, upon the distribution of ringed seals during winter and the spring haul-out period. The study area consisted of an experimental area (extending 25 km along the coast) where icebreaking had taken place during January and March 1980, and an adjacent control area (extending 40 km west of the experimental area). Data were collected during two aerial surveys conducted in mid-June. Comparisons of the experimental area with the control area indicated no differences in breathing hole densities and hence winter use of the two areas by seals. Thus data from these segments of one-minute duration were used to make comparisons within the experimental area of segments where icebreaking had and had not occurred. Within the experimental area, both wintering and haul-out seals exhibited an apparent preference for areas in which some icebreaking had occurred. No cause-effect relationship could be established, although there was some suggestion that the icebreaker track may have contained higher densities of breathing holes than the surrounding unbroken ice. It was concluded that no negative influence on the distribution of wintering and haul-out seals could be attributed to the limited icebreaking activities conducted in 1980. (Au)

I-107034


2 microfiches : figures, plates, tables ; 11 x 15 cm.

(Beaufort E.I.S. reference work, no. RWBO5) Appendix.

References.

ACU

During August and September 1980, a survey of resident fish populations in Kugmallit Bay, N.W.T. was conducted. The purpose of this survey was to satisfy the requirements of ocean dumping permit #4443-0990, Kugmallit Bay approach channel to Tuktoyaktuk Harbour. Our objective was to obtain information on the fish populations outside the winter ice as well. Our objective was to obtain information on the fish populations outside the winter ice as well. Our objective was to obtain information on the fish populations outside the winter ice as well. Our objective was to obtain information on the fish populations outside the winter ice as well. Our objective was to obtain information on the fish populations outside the winter ice as well. Our objective was to obtain information on the fish populations outside the winter ice as well. (Au)

I-107042
Sea-bird surveys in the Beaufort Sea, Amundsen Gulf, Prince of Wales Strait and Viscount Melville Sound - 1980 season / Barry, T.W., Jacobson, B.


2 microfiches : maps, tables : 11 x 15 cm.

(Barrett E.I.S. reference work, no. RWBO6) Appendices. References. ACU

Seven surveys of bird species associated with marine and coastal areas of the Beaufort Sea, Amundsen Gulf, Prince of Wales Strait and Viscount Melville Sound were flown during June through September 1980. The purpose of the surveys was to determine times and places that are important to sea-birds during the migration, nesting, molting, brood rearing and fall staging phases of their life cycles. The habitat used by marine and sea-birds was rated according to its sensitivity to environmental impact. Estimates of the portion of species population that might be affected by possible "developmental accidents" etc. are made by various concentration points. (Au)

I-107077


2 microfiches : figures, tables ; 11 x 15 cm.

(Barrett E.I.S. reference work, no. RWDO1) Appendices. References. ACU


2 microfiches : figures, tables ; 11 x 15 cm.

(Barrett E.I.S. reference work, no. RWDO1) Appendices. References. ACU


2 microfiches : figures, tables ; 11 x 15 cm.

(Barrett E.I.S. reference work, no. RWDO1) Appendices. References. ACU


2 microfiches : figures, tables ; 11 x 15 cm.
... The overall purpose of the whale monitoring program is to prevent serious adverse interactions between Esso's operations and whales and Inuit whale hunting activities. To do this, information about whale activities and responses to industrial operations has been collected over several years. This information has assisted with planning, and in some instances on-location advice has been provided to prevent or minimize potentially adverse effects. Specific objectives of the study were: 1) to determine the timing of use of the estuary by white whales and to assess the effects of spring break-up of the landfast ice on patterns of use; 2) to assess the numbers of white whales using the estuary; 3) to determine the distribution and movement patterns of white whales in various parts of the estuary; 4) to observe the behaviour of white whales and their responses to Inuit hunting; 5) to gather information on the status of the Mackenzie white whale stock by taking biological samples from whales landed during the Inuit hunt; 6) to document the occurrence, movements, and activities of bowhead whales in the Mackenzie estuary region; and 7) to document and describe the behaviour of both bowhead and white whales in response to various offshore industrial activities. (Au)

I-107760
1 microfiche : figures, tables ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWB12)
Appendix.
References.
ACU

Esso Resources Canada Limited is planning to increase the production of crude oil from the Norman Wells oilfield. The proposed expansion will require, among other facilities, the construction of six artificial islands in the Mackenzie River. ... In order to gather site-specific information on the potential impact of artificial island and water intake construction in the Mackenzie River, samples of the benthic macroinvertebrate and shallow water fish populations were collected in September 1980. Examination of these preliminary data will make it possible to formulate qualitative conclusions about the effects of construction on invertibrates and fish habitat. .... (Au)

I-107778
2 microfiches : 111., figure, maps, tables ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWB15)
Appendices.
References.
ACU

Esso Resources Canada Limited is proposing to increase oil production at Norman Wells, N.W.T. ... The project Environmental Impact Statement (Esso Canada Resources Limited, 1980) identified a potential for interaction between migrating snow geese and construction and operating phases of oilfield expansion. Studied in 1972 and 1973 as part of planning for possible natural gas pipeline construction, more specific and current information was required for this project. A waterfowl "migration watch" was established to provide that information. The purpose of the migration...
Wildlife observations made in September 1979 on
the icebreaker Canmar Kigoriak between Saint
John, N.B. and Tuktoyaktuk, N.W.T. Vocalization rates of 3
species were indicative of their distribution and relative abundance in different areas and
sea ice habitat types. Recommendations are made of points to be considered if the subject is
researched further. (Au)

1-107824
Wildlife observations during dredging operations
in McKinley Bay, July - August 1980 / Dome
microfiches : 111., figures, tables : 11 X 15
cm. (Beaufort E.I.S. reference work, no. RWB17)
Appendices. References. ACU

In 1979, an experimental Class 4 icebreaker was
built by Dome Petroleum and Canmar Ltd. for
service in the Beaufort Sea. On completion in
September, this vessel sailed from New
Brunswick to the Beaufort Sea, by way of the
Northwest Passage. This route approximately corresponds to that proposed for an icebreaking
tanker route to be developed in the 1980's. The
following report describes the distribution and
relative abundances of marine birds and mammals
observed from the vessel during this voyage. (Au)
Systematic aerial surveys were conducted in the southeastern Beaufort Sea during August 18-24, 1982 and September 5-10, 1981, to examine the relative abundance and distribution of bowhead whales. Additional information collected during the surveys included data on bowhead calf production, movements and behaviour, and data on the relative abundance, distribution and behaviour of white whales, ringed seals and bearded seals. Observers recorded a total of 81 bowhead whales during late August, and a total of 102 during early September. Most bowheads recorded during both surveys were located in the Yukon Zone. Estimated numbers of bowheads present during the early September survey were 1112, 163 and 115 in the Yukon Delta and Tuk Twin zones, respectively. The results of the present investigation and past studies in the region indicate that the distribution of bowheads in the southeastern Beaufort Sea varies among years, and also that the late summer distribution of bowheads may be related to natural factors such as ice conditions and/or food availability. White whales were located primarily in shallow water (≤20 m) areas offshore of the Mackenzie Delta and Tuktoyaktuk Peninsula. The lack of white whale sightings in nearshore waters of the Yukon Zone suggest that seal migration of this species probably occurred offshore. Ringed seals were also observed in most areas surveyed. During periods of calm seas, suggesting they were widely distributed throughout much of the region during the open water season.

Aerial surveys were conducted on July 21, July 31, and August 10, 1981 at McKinley Bay, Northwest Territories to determine waterfowl distribution, species composition and abundance. Each survey consisted of two parts: A series of ten east-west transects across McKinley Bay and adjacent terrain, and an aerial survey of the shoreline or "shoreline cruise". The 305 km² square km study was further divided into marine and terrestrial components, and total bird numbers in each component were extrapolated from the results of aerial transects. A total of 19,106, 7,949, and 13,480 birds were estimated in the marine component. Diving ducks were the most abundant group recorded, with Oldsquaw and scoters accounting for over 60 percent of the species total observed in the marine component. Total estimated numbers of birds were lower in the terrestrial component, number 3,797, 2,498 and 5,517 on the three respective survey dates. Diving ducks were again the most abundant group recorded. Swans were common in the lagoon system at the southeast end of McKinley Bay, with an estimated 269 birds present on July 21. Numbers of Brant and White-fronted Geese increased over the study period, and these species were most commonly observed in small embayments adjacent to Atkinson Point and the lagoon system.

The biological resources of the southeastern Beaufort Sea are surveyed during periods of calm seas, suggesting they were widely distributed throughout much of the region during the open water season. Bearded seals were not observed during all surveys conducted during periods of calm seas. Bearded seals were sighted more frequently in the Tuk Pen area than in either the Delta or Yukon zones, but their overall abundance in the latter area was also relatively low and their distribution patchy. (Au)

The general objectives of these surveys were the following: 1. To obtain site-specific information on the abundance and distribution of birds and mammals in the general Cape Parry area, and to provide quantitative information on the abundance and distribution of birds and mammals in the general Cape Parry area. 3. To determine whether any major bird or animal features of the Cape Parry area were not included in the environmental evaluation. This report presents and discusses the results of these studies. (Au)
Edmonton, Alta.: LGL Ltd., 1982.
12 microfiches: figures, tables; 11 x 15 cm.
(Beaufort E.I.S. reference work, no. RW28)
Paper copy also available.
Available as an APPOA project report and Beaufort E.I.S. reference work; the APPOA project report was published by Arctic Petroleum Operators Association, Calgary.
This annotated bibliography also contains a key index, author index and geographical index.
ACU, NSFMO

The present study was conducted to review the literature pertaining to the various biological studies that have been conducted in the area and to annotate the reports of those studies that are pertinent to the needs of impact assessment. The specific objectives of the present study are the following: 1. to prepare a selected annotated bibliography of the published and unpublished ecological information that will aid in the identification of potential biological impacts from oil and gas development in the Canadian Beaufort Sea, Amundsen Gulf and northwestern Mackenzie Delta, and 2. to summarize the relevant information for each biological topic in the bibliography. The emphasis of the bibliography is on aquatic biological studies. The biological publications have been annotated under seven major topics: - Mammals, Birds, Fish, Zoobenthos, Zooplankton, Ice Biota, and Primary Production (including nutrient cycles and regeneration, bacterial activities, and phytoplankton distribution). Map series that depict the distributions of various biological resources are annotated under the topic Atlases, and a number of multidisciplinary impact-related studies are annotated under the topic Impact Studies. (Au)

I-108048
3 microfiches: 111., figures, tables; 11 x 15 cm.
(Beaufort E.I.S. reference work, no. RWE14)
References: ACU

... The purpose of this study was to: (1) determine the species composition and relative abundance of fish within the study area; (2) identify important fish habitat zones; (3) determine species composition, standing crop, and diversity of benthic macroinvertebrate and plankton communities; (4) determine the food habits of the fish species present in the study area; (5) conduct basic life history analyses of the major fish species present; (6) use the baseline data thus obtained to: a) assess the effects of present and future Imperial Oil 3drill operations upon fish populations in the area; b) form the basis for recommendations to mitigate any effects and for guidelines to be used in preparing future borrow sites. The general conclusions of the study are: 1. Tuft Point coastal waters support a relatively abundant and diverse fish fauna (16 species). The region is of particular importance as a rearing area for the juveniles of anadromous species such as sciaenids, whitefish, and inconnu. The most important fish habitat zones are the near-shore shallows including bays and lagoons and the entrance areas of bays and lagoons. 2. Invertebrates are relatively abundant and diverse wherever organic mud and debris can be found (39 species) 4. The phytoplankton communities in the Tuft Point area are relatively abundant and diverse (36 species phytoplankton). Zooplankton (39 species) appear to be less abundant in the Tuft Point than in other areas of the Beaufort Sea. 5. Present Imperial Oil dredging operations in the Tuft Point area are having little or no effect upon fish, invertebrate, or plankton populations. 6. The dredging site itself is far enough outside of the most important fish habitat zones. The substrate being dredged is mostly clean sand where invertebrate densities are very low and the slight increases in turbidity levels in the immediate vicinity of the dredge site are unlikely to affect fish, invertebrates, or plankton significantly. (Au)

I-108073
2 microfiches: 111., figures, maps, tables; 11 x 15 cm.
(Imperial Oil reference work, no. RWE12)
Appendices. References: ACU

... This study was conducted for I.O.L. in late winter, 1973 and 1974, to provide data on winter conditions within the estuarine environment as an aid to identifying environmental concerns and predicting possible impacts. Specific objectives of the program were to: 1. Sample the winter benthic faunal communities in various sectors of the estuary. 2. Determine certain physical and chemical parameters of any fresh water. 3. Collect substrate samples from the uppermost layer. (Au)

I-108081
1 microfiche: maps, tables; 11 x 15 cm.
(Imperial Oil reference work, no. RWE13)
References: ACU

... The objective of this survey was to obtain comparative data of a preliminary nature. Specific goals were to: I. Determine the presence or absence of fishes, invertebrate fauna at the potential borrow areas. 2. Determine some primary physical and biological attributes of fish habitats at those sites. 3. Derive a preliminary assessment of the importance of certain fish species to the local people. (Au)

I-108111
2 microfiches: figures, tables; 11 x 15 cm.
(Imperial Oil reference work, no. RWE19)
Appendix. References: ACU

... a survey of the benthos was conducted by diving biologists on a potential gravel deposit. The purpose of the survey was to describe the types and distributions of benthos, and their community associations in the gravel area prior
to a proposed dredging program. Sampling stations ranged from 3.3 to 18.2 m in depth. Shallow stations which had been plugged in the bottom by grounding ice were evident at four stations. The benthos from bottom samples were identified only to the family level. A total of 95 families were distinguished. Diversity, in terms of families present, ranged from 17 per sample at the shallowest, sandy station to 68 per sample at a deep station with heterogenous sediments. The benthic biomass varied from 14.43 to 109.70 g/square m per sample. It does not appear that the study area would be a significant feeding area for the seals. Despite the periodic disturbance due to ice scouring, the benthos in samples from the "deep, heterogeneous" stations exhibited high levels of diversity and biomass. However the within station sampling variance in this group was also high, indicating a patchy or clumped distribution of the fauna. If dredging was performed in the study area, the patterns of reorganization and faunal distribution would likely be similar to those associated with ice scouring. (Au)

I-108138

... Imperial Oil Limited is considering possible developments near King Point... to obtain material and provide support facilities for the construction of an oil terminal in Mackenzie Bay... The specific objectives of the environmental overview were to: 1. Conduct a brief survey of available literature and synthesize these data to describe the present levels of chemical parameters in the area... 2. To analyze the benthic community surrounding the following areas: a) Parsons Lake region and environmental impact assessment of development plans existing in early spring, 1976. A brief review of complete studies follows. (Au)

I-108219

This data report summarizes analysis performed by Fisheries and Oceans contract personnel on information collected during the Beaufort Sea/Mackenzie Delta Study. The emphasis of this study was on the following: 1. To analyze the sediments and to perform statistical tests of fish tag/recapture information. Program 2 Fish Stomach Content Program - program written to sort, store and perform statistical tests of fish tag/recapture information. Program 3 Fish Inventory Program - program written to store all stomach content data. (Au)

I-108235
Investigations of the aquatic resources of the Parsons Lake region and environmental impact assessment of development plans existing in early spring, 1976. A brief review of complete studies follows. (Au)

I-108570

This study was conducted... to document the present levels of chemical parameters in sediments and biological tissues and to determine the present status of the benthic macroinvertebrate community in the vicinity of Issungnak 0-61. Field work for this study was conducted in late summer 1980 immediately following island enhancement and prior to start-up of the 1980-1981 drilling operations. The primary objectives of this study are the following: 1. To analyze the sediments surrounding Issungnak 0-61 for As and the trace metals Hg, Cd, Cr, Pb and Zn. Hereafter in this report, As is included under term "trace metals". 2. To analyze the benthic macroinvertebrate community surrounding Issungnak 0-61 for species, density, biomass and trace metal content. 3. To relate sediment trace metals to benthic tissue trace levels, benthic density and benthic biomass in order to determine the significance of sediment trace metals on benthic macroinvertebrates. Additional objectives of this study include the determination and documentation of sediment biochemical oxygen demand, chemical oxygen demand, oil and grease, volatile solids and particulate size distribution. Benthic species diversity and equitability were calculated and a cluster analysis carried out to provide...
further background biological information. Background tissue metal levels in larval and juvenile fish caught incidentally during this study were also measured. ... (Au)

I-108526

The author addresses specific inadequacies in the Beaufort E.I.S. with respect to marine biological impacts of hydrocarbon development in the Beaufort Sea. He feels that by far the most serious risk to the environment is the large oil spill or blowout, and this, as well as the potential chronic build-up of hydrocarbons from minor spills, formation and production waters, etc. must be evaluated for likely damage. To this end the author outlines specific deficiencies of information within the E.I.S. (ASTIS)

I-108904

... Tuktoyaktuk Harbour is undergoing increased shoreline development and vessel traffic, and may soon be upgraded to the status of a public harbour. Dredging activity is increasing and minor oil spills within the harbour are already a common occurrence. Such events may impact negatively upon the fish resources of the area. Successful mitigation of such impacts demands an adequate data base relative to the fish resource, including complete descriptions of life history patterns and of habitats critical to the maintenance of the various fish populations. The purpose of the present study was to describe seasonal changes in the fish community of Tuktoyaktuk Harbour and to assess the significance of the harbour in terms of providing spawning, feeding, rearing, and overwintering areas for marine and anadromous fish. (Au)

I-112100

This report is a systematic review and identification guide to 58 species of bivalve mollusks collected between 1972-1980 a in the western part of the Beaufort Sea. Oceanographically the region is an integral portion of the Arctic Ocean, but faunally it consists of contributions from both the Atlantic and Pacific oceans. Six species are stenobathyal endemics with no close boreal relatives, their presence showing that at least a fraction of the deep-water benthic fauna survived the past several periods of glaciation. During these periods the shelf was emergent and ice-scoured and its fauna obliterated. As conditions ameliorated, adaptable species migrated from adjacent boreal seas, notably the Beringia refugium and also the Atlantic sector to colonize the newly submerged shelf. 24 species are of Atlantic and 20 of Pacific origin, a pattern probably largely dictated by the oligohaline region of the Mackenzie River estuaries which is an effective barrier to many species. The fauna is not depauperated and is numerically comparable to temperate regions with similar limited habitat niches. One new genus, Boreacola in the family Montacutidae, with the new species B. vadosa is described. A new species, Axinulus careyi in the family Thyasiridae is also proposed. ... (Au)

I-112178

References. ACU

Experiments were conducted to compare the relative sensitivity and chemical composition of aquatic invertebrates (insects and crustaceans) exposed to low pH. Test organisms were collected from tundra ponds at the Smoking Hills, N.W.T. One of the ponds was alkaline (pH 8.2), the other was acidified (pH 2.8) as a result of natural SO2 emissions. Based on mortality rates, crustaceans were considerably more sensitive to low pH than insect larvae. Sensitive species (Crustacea: Daphnia middendorffiana, Diaptomus arcticus, Branchinecta paludosa, Lepadurus arcticus; and Diptera: Orthocladius consobrinus) were unable to maintain high internal levels of Na and Cl. K concentrations were also lower in dead and dying Daphnia but not in the more tolerant Diptera larvae (O. consobrinus and Chironomus riparius). There was a net loss of Ca at low pH, but this did not correlate with mortality. Daphnia middendorffiana recovered following brief exposure to pH 4.0. During recovery Na and Cl concentrations returned to their original levels. Acid-exposed Daphnia became infected by pathogenic fungi. No evidence of fungal infection was observed in any of the other treatments. Water chemistry also altered the chemical composition of aquatic invertebrates. All of the crustaceans as well as the trichopteron Limnephilus pallens had lower body Na, Cl, and Ca concentrations in the acidified pond water than in the alkaline pond water adjusted to pH 4.5. Part of this difference in their chemical composition may be due to elevated Al concentrations in the acidified pond water. (Au)

I-113476

... The second of a series of monitoring surveys was flown in the Beaufort Sea off the Tuktoyaktuk Peninsula and the Mackenzie Delta, in northern Amundsen Gulf and in Prince Albert...
Distribution, Ice cover in the Beaufort Sea was restricted to a narrow strip of fast ice along the mainland coastline. The density of ringed seals was higher than it was in 1981, and the estimated population very similar. Regressions of ringed seal density on habitat factors did not show any changes in density that could be attributed to hydrocarbon exploration. Amundsen Gulf and Prince Albert Sound were covered with 8/8 fast ice. High densities of ringed seals were seen throughout these areas, with some very dense concentrations near the western end. Bearded seals occurred along the seaward edge of the landfast ice in the Beaufort Sea, and on small floes further out in larger numbers than in 1981. (Au)


Appendix: Beaufort scale of sea states.
References.

ACU

This report presents new information on the distribution, abundance, and movement patterns of white whales in the Canadian Beaufort Sea and Amundsen Gulf between mid July and mid September 1981. Information on white whales was collected during four large-scale systematic aerial surveys designed to census bowhead whales (Davis et al. 1992). The survey techniques were also suitable for observations of white whales. The study area (Canadian Beaufort Sea south of 72 degrees N and Amundsen Gulf) was divided into five blocks: from west to east these are the Yukon, Delta, Tuktoyaktuk Peninsula, West Amundsen Gulf and East Amundsen Gulf blocks. Transect lines, oriented north-south, were spaced evenly across these blocks. Coverage of these lines varied with sea states.

In a display of international cooperation and Native leadership, representatives from both Eskimo and Indian communities in Northeast Alaska and Northwest Canada gathered in Arctic Village, 30 November and 1 December 1982, and formed a commission to protect the Porcupine caribou herd. ... The Porcupine herd, which migrates yearly between Alaska and Canada and whose calving grounds near the Beaufort Sea lie in both countries, is an important subsistence resource for the more than 7,000 villagers within a region the size of the state of Wyoming. The prospects of exploration of the Arctic National Wildlife Refuge (ANWR) in the U.S. and the building of harbor facilities by Gulf Canada at King Point on the Yukon Beaufort coast gave new urgency to their action. (Au)


Appendices.
References.

ACU

This report documents the results of survey work conducted in the summer of 1981 for the Northern Land Use Information Series mapping program. This fisheries survey encompasses Bathurst, Melville, Prince of Wales and northern Victoria islands in the District of
Franklin, Northwest Territories .... These islands border Viscount Melville Sound which is an area of interest for potential resource and transportation development. The Northern Land Use Information Series is an environmental research and information mapping program for northern Canada, which provides a reconnaissance-level information base to facilitate regional planning and application of the Territorial Land Use Regulations ....

During the survey, data were collected on freshwater and marine fish, planktonic and benthiic invertebrates, water chemistry, and domestic and commercial fisheries. This report summarizes that information and briefly discusses previous freshwater and marine research in the area. Wildlife and botanical observations are included in appendices along with a list of other reports in the Northern Land Use Information Series. .... (Au)


Lacking maps, IPL has deemed that raptor nesting information contained on maps is of a confidential nature. ACU

A survey of nesting areas for sensitive raptor species was conducted from 27 June to 1 July, 1981 along Interprovincial Pipe Line (N.W.) Limited's proposed pipeline route from Norman Wells, N.W.T. to Zama Lake, Alberta. This survey was an extension of a 1980 survey (Ealey and McCourt 1980) which identified potentially sensitive nesting areas, but which could not conclusively indicate occupancy or success of nest sites observed. The purpose of the 1981 survey was to examine all nesting areas within a potentially "sensitive zone" of 3.2 km from the proposed pipeline route, to determine species of raptor currently using nest sites, and to assess the sensitivity and importance of the nesting areas planned during construction and operation of the proposed pipeline. .... (Au)

Waterfowl migration surveys along the Mackenzie River from Fort Simpson to Norman Wells. Geddes, F.E. McCourt, K.H. Interprovincial Pipe Line (NW) Ltd. [Sponsor]. [Edmonton, Alta.]: Interprovincial Pipe Line (NW) Ltd., 1982. x, 70 leaves: figures, tables; 29 cm.


Habitat structure of two collombolan communities, one at Barrow, Alaska, U.S.A., the other at Tuktoyaktuk in the Mackenzie Delta, Canada, has been analyzed in relation to microtopographies characteristic of tundra regions. Multivariate statistical techniques, cluster analyses (UPGMA), and principal component analyses (PCA) reveal various ecological changes in component species. In spite of such local variations in component species, the two communities show similar patterns of habitat structure that are organized principally along a gradient of environmental moisture. (Au)


Appendices. References. ACU

... The study reported here is a first attempt at an alternative approach designed to gather large amounts of life history information in a short time. The study used low-level aerial photography to measure the length of bowheads and to identify animals individually based on natural markings on the body. .... We had developed the basis of the technique during a pilot study in the Canadian Beaufort Sea in 1981 .... However, the number of photographs obtained in 1981 was small and a principal objective of the 1982 study reported here was to refine the aerial photographic techniques and to test their accuracy and precision .... The study was conducted on the bowhead summering grounds in the Canadian Beaufort Sea from 12 August-5 September 1982. .... the study provided important verification of the photographic techniques and the method of individual identification. The report presents the results of these tests and then provides data on the length-frequency distribution of our sample, estimates of various life history parameters, and estimates of the gross annual reproductive rate. Throughout the report we attempt to evaluate the obvious, and not so obvious, biases that may be associated with the techniques used. .... (Au)


This report is an annotated bibliography of birds found in the Beaufort Sea. Included are citations of bird studies in Scandinavia, Siberia, Alaska and Hudson Bay. (ASTIS)


Habitat structure of two collombolan communities, one at Barrow, Alaska, U.S.A., the other at Tuktoyaktuk in the Mackenzie Delta, Canada, has been analyzed in relation to microtopographies characteristic of tundra regions. Multivariate statistical techniques, cluster analyses (UPGMA), and principal component analyses (PCA) reveal various ecological changes in component species. In spite of such local variations in component species, the two communities show similar patterns of habitat structure that are organized principally along a gradient of environmental moisture. (Au)
The effects of vessel traffic in the Arctic on marine mammals will lead to marked increases in vessel traffic, particularly in the southeastern Beaufort Sea and in the Northwest Passage from Amundsen Gulf to Davis Strait. This increase is best exemplified by the projected use of supertankers, which will cause unprecedented levels of disturbance from their year-round icebreaking activities and by the high levels of sound produced underwater, principally by propeller cavitation. The possible effects of such disturbance on the marine mammals that occur along the proposed tanker route are discussed, and recommendations are made for appropriate scientific research that will help to predict the outcome of such interactions. (Au)


Observations of bowhead whales (Balaena mysticetus) in the eastern Beaufort Sea August-September 1980 resulted in 9 calf sightings. Of 179 whales classified into length categories during aerial surveys, 6(3.4%) were calves; of 191 seen from shipboard, 3(1.6%) were calves. These percentages are consistent with values from similar studies on bowheads. However, our results tend to be lower for bowheads than production estimates based on reproductive data for other mysticete populations. (Au)

Reindeer in the Belcher Islands. / Mansfield, A.W. Canadian Dept. of Fisheries and Oceans. Arctic Research Directors Committee (Sponsor). Ste. Anne de Bellevue, Que. : Dept. of Fisheries and Oceans, Arctic Biological Station, 1983. x, 97 p. : illustrations, map, tables ; 28 cm. (Canadian technical report of fisheries and aquatic sciences, no. 1186) References. ACU

In March 1978, 60 reindeer were transplanted from the Reindeer Reserve near Tuktoyaktuk to the Belcher Islands in Hudson Bay. The transplant was undertaken to replace native caribou which disappeared from the islands in the 1870's. Observations of the herd remained inconclusive until March 1982 when an aerial survey produced an actual count of 222 reindeer. (Au)


Habitat data were gathered at Chick Lake and Moon Lake, Northwest Territories on permanently marked transects by recording tracks. Marten selected different habitat in different seasons and study sites. Scats collected on transects showed food habits to be similar to other areas of North America in that voles were the major food of Martens. Nevertheless Marten in the Northwest Territories appeared to be selective in species consumed in contrast to more opportunistic feeding habits reported for other areas. (Au)

Distribution of arctic marine isopods of the Mesidotea (+ Saduria) complex in relation to depth, temperature, and salinity in the southern Beaufort Sea / Percy, J.A. (Arctic, v. 36, no. 4, Dec. 1983, p. 341-349, figures, tables) References. ACU

Three benthic isopods of the Mesidotea (+ Saduria) complex are common in the coastal waters of the southern Beaufort Sea. Their relative distribution in relation to water depth, temperature, and salinity was studied by means of 146 trawl, grab, and trap samples. Mesidotea antonowii is restricted to the warm,
brackish nearshore estuarine zone, in water depths of less than 10 m. M. sibirica is most commonly encountered at intermediate depths of 5-25 m. M. oculata is the most common marine form, occurring at depths from 10 to 441 m. This distribution pattern is similar to that reported for these species in the European Arctic. Salinity fluctuations caused by wind-induced shifts in the location of the river plume, and the occurrence of deep, high-salinity water close to shore, results in overlap in distributions of the isopods in some areas adjacent to the delta. (Au)

I-133760


By conventional life-table analysis, assuming a stable population, the mortality rate in the Porcupine Caribou Herd between 1972 and 1977 was estimated to be 0.28 for all age classes and 0.28 for 3+ animals. Based on the unadjusted age distribution of the hunter harvest, the mortality rate for 3+ animals was 0.41 for males, 0.20 for females, and 0.25 for both sexes combined. Using census, recruitment and hunting parameters the mortality rate was 0.07; 0.04 from natural causes and 0.03 from hunting. Blases in the estimates and the need for new techniques to estimate mortality rate are discussed. (Au)

I-133779


The distribution, numbers and movements of caribou in a 210,000 square km area north of Great Bear Lake were studied between March 1980 and February 1981. Most (94%) of the Bluenose herd wintered in the forested region between the Horton and Mackenzie Rivers. Tundra wintening animals (6%) occupied a small area in the vicinity of the Rae-Richardson Rivers. Mean group sizes were almost twice as large in forested vs. tundra winter ranges. Mean group sizes decreased significantly between 1980 and 1981 on both forested and tundra winter ranges partially in response to the mild winter of 1981. In February 1981 a stratified sample of an area of 60,000 square km was estimated 38,497 ± 10,442 caribou in the Bluenose herd. Recruitment in February 1981 was estimated at 17.8% (n=296). Mortality rates from human kill and natural factors are estimated at 6.5% and 8 percent, respectively. Survival rates are difficult to determine because of the small area of range compared to other caribou populations. The distance between winter range and calving grounds is approximately one third that of other caribou populations. Timing of movements is consistent with other caribou populations suggesting response to a consistent factor such as photoperiod. (Au)

I-133787


Over 10,000 barren-ground caribou in the Beverly, Bathurst and Kaminurak caribou herds have been marked with ear tags, neck collars or both since 1959. The objective of the marking program was to learn more about herd movements and seasonal distribution, to document any interchange of caribou among herds, and to collect information on the numbers, distribution and composition of those caribou shot by hunters. Kaminurak herd tags returned before 1966 and Beverly and Bathurst tags returned before July 1970 have been published. This paper analyzes the subsequent tagging and return data and compares these results with those already published. Since the 1966 and 1970 analyses, over 1300 caribou have been tagged and 179 tags (24% of all returns) have been recovered. The overall tag return rates are 7.2%, 5.4% and 6.4% for the Beverly, Bathurst and Kaminurak herds respectively. The recent tag recoveries illustrate the same hunting trends as the earlier returns. More males were shot than expected (based on the number tagged) and more caribou were shot in winter than summer. Tag return locations indicated that the ranges of all three herds were, with one exception, stable over time. Part of the winter range of the Kaminurak and Beverly herds overlapped throughout the tag return period. There was no evidence to suggest a major shift of caribou from one herd to another. (Au)

I-133795


The first systematic aerial survey of caribou on Victoria Island was conducted in August 1980. Caribou numbers were estimated to be 7,936 ± 1,839. The majority of caribou (74.2%) were found on the north-western portion of Victoria Island. Caribou in this area were typical Peary caribou whereas caribou south of this area were darker and larger forms thought to be intergrades between Peary caribou and former mainland migrants (the Dolphin and Union herds). Calf/cow percentages were high (greater than 70%) and natural mortality rates are believed to be low. Mortality from Inuit hunting may be very high (greater than 13%). Male caribou occurred at lower elevations (less than 150 m a.s.l.) than females. A relatively high density (7.5 caribou/km²) of movements was recorded at the head of Prince Albert Sound. Mean group size (excluding singles) was 3.5 (SE ± 0.41) but observed changes in group size suggested a dispersal of caribou during the survey period. Two possible calving grounds were identified during the survey. (Au)
(Environmental studies - Canada. Northern Environment Protection and Renewable Resources Branch, no. 31)
ISBN 0-662-1266-1

ACU

This annotated bibliography contains 119 entries dealing with the Mackenzie Delta reindeer herd, a commercial reindeer operation that began as a government-sponsored "experiment" in the 1930's. The bibliography is organized by author's surname and indexed by keywords (subjects). About half of the entries deal specifically with the herd, but others are included that give perspective and information on the rangeland that is important for future management. (Au)

vii, 44 p. : figures, table : 26 cm.
(Progress report - N.W.T. Wildlife Service, no. 5)

Cover title: Barren ground caribou distributional changes near a winter road.
Appendix.
References.
ACU

The increased use of transportation facilities in northern development has raised concerns over potential impacts on barren-ground caribou ... Previously, a segment of the Bathurst herd has wintered in the Gordon Lake area, Northwest Territories, where a winter road has been constructed to haul supplies to local mine sites. A study was initiated in January 1981 to evaluate a technique for measuring distributional changes of caribou wintering in the vicinity of the road. A block survey was designed to enable replication of aerial surveys in localities exposed to the road. Surveys were scheduled prior to, during and following road construction. Two aircraft types (fixed-wing and helicopter) were to be used simultaneously to compare relative precision and efficiency. Only a few caribou were found in the Gordon Lake area during reconnaissance flights, and animals remained in the forest-tundra transition zone. Due to the scarcity of caribou near the winter road, the block surveys were cancelled. A critical review of some approaches used in previous disturbance research is given. (Au)

x, 158 p. : figures, tables ; 28 cm.
(Progress report - N.W.T. Wildlife Service, no. 7)

Cover title: Barren ground caribou calving grounds in the Northwest Territories.
Appendices.
References.
ACU

Potential effects of human activities on barren-ground caribou on the Bathurst, Beverly and Kaminuriak calving grounds are unknown. In April, 1980, DIAND sponsored the N.W.T. Wildlife Service in a 3-year disturbance study on calving grounds. The first year of the study concentrated on histories of the use of calving grounds, topography, snowmelt patterns, vegetation and abundance of predators. Historically, the general location of the calving grounds has not changed. Variations in topography is a characteristic of all three calving grounds. The geographical limits of the more varied topography approximately align with the borders of the Beverly and Kaminuriak calving grounds. The three calving grounds are located in the northern portion of each herd's range and remain snow-covered longer than more southerly portions of their ranges. Snowmelt begins and ends earlier on the Kaminuriak and southern portion of the Beverly calving grounds (early June) than on the Bathurst and northern portion of the Beverly calving grounds (mid-June). Willows and dwarf birch shrubs characterize the vegetation on the Kaminuriak and southern portion of the Beverly calving grounds. Lichen communities dominate the vegetation on the northern portion of the Beverly calving grounds. The number of wolf dens is low on the calving grounds compared to areas near treeline. None of the environmental characteristics examined clearly isolate the calving grounds from their surrounding areas. The general location of traditional calving grounds is likely the influence of several interacting factors including plant phenology and predator avoidance. Traditional behaviour is likely important in explaining the choice of specific location of calving ground. (Au)

xii, 118 p. : figures, tables ; 28 cm.
(Completion report - N.W.T. Wildlife Service, no. 3)

Cover title: Mackenzie Mountain grizzly bears, Northwest Territories.
Appendices.
References.
ACU

In response to concern for the hunted grizzly bear population in the Mackenzie Mountains, N.W.T., a study of bears in a representative area of the Mackenzie Mountains was carried out from 1973 until 1977 by the N.W.T. Wildlife Service. Within the 3000 square km study area which is in the Backbone and Sekwil Ranges of the Mackenzie Mountains bears were captured, measured, tagged and equipped with radio collars. All random observations of bears during aircraft surveys were recorded. Fecal collection and analysis was carried out to determine food habits, and habitat studies were done to determine types and extent of vegetation zones. Den characteristics and denning behaviour are described. From 67 captured bears and a total of 109 random bear observations made from 38 individually marked bears, we determined the age structure and potential growth of the population, and its distribution and abundance. Hunter kill data was used to consider the impact of hunter harvest on the age structure and distribution. The implications to grizzly bear management were then considered. Our data showed mortality rates to be low, and we conclude that this together with the late age of reproduction and the long inter-litter period severely limit the growth potential of the population. Including the observed mortality rates in our model indicates a declining population. We conclude that the Mackenzie Mountains grizzly bear population is marginal and is harvesting, including the current rate, is excessive. (Au)
I-137987

... Portions of the northern Yukon and northeastern Alaska represent an irreplaceable natural heritage woven together by the timeless migration of the Porcupine caribou herd. This is one of the world’s last great herds of the barren ground caribou. Debate over how to preserve this herd and its vast ecosystem spans fifty years. A partial commitment towards protecting the caribou was realized in 1980, when the Arctic National Wildlife Range in Alaska was established, but what about the northern Yukon? Why has it taken so long for Canada to formally designate any form of wildlife and wilderness reserve? Will the Porcupine caribou survive the political gales, or will they go the way of other herds, dwindling to almost insignificant numbers? [The author reviews the early history of caribou study and reconnaissance and the bid for conservation and the establishment of a reserve, which has recently come under opposition from both sides of the border. More critically, he discusses the problems of the Migratory Caribou Convention, and the lack of a positive negotiation of terms and conditions for an international convention for the joint protection and management of the caribou.] (Au)

I-138169
Mid-summer ichthyoplankton populations of Tuktoyaktuk Harbour, N.W.T. / Ratynski, R.A. Winnipeg, Man. : Dept. of Fisheries and Oceans, 1983. iv, 21 p. : figures, tables ; 28 cm. (Canadian technical report of fisheries and aquatic sciences, no. 1218) References. ACU

The ichthyoplankton of Tuktoyaktuk Harbour, N.W.T. and adjacent waters of Kugmallit Bay was sampled by plankton net (mesh size 750 micro m), during July to 16 August, 1982, to determine species composition, abundance, distribution, and growth. There was also limited sampling by epibenthic sled and seine. Rainbow smelt was the most abundant larva in plankton net catches from the harbour followed by Pacific herring and saffron cod. Larval starry flounder and lumpenids-blackline prickelback and/or slender eelblenny were also captured within the harbour. Only rainbow smelt, Pacific herring, fourhorn sculpin, and Arctic cod were obtained outside the harbour in Kugmallit Bay and smelt and herring were far less abundant than in the harbour. A partial temporal separation of larvae in the harbour occurs as a result of different spawning times. Lumpenids, fourhorn sculpin, and gadids would appear first in the ichthyoplankton under the ice followed by rainbow smelt and Pacific herring at breakup and starry flounder in August. There was also spatial separation of larvae vertically. Most rainbow smelt, Pacific herring, and fourhorn sculpin larvae were obtained from the harbour near the surface at the higher temperatures and lower salinities found else the halocline. Saffron cod, starry flounder, and lumpenids were found in the colder, more saline waters of the upper halocline. The size of smelt, herring, and sculpin at the end of August was similar to that reported for other areas in the southern Beaufort Sea. Saffron cod grew very slowly, reaching a mean total length of only 7.5 mm by mid-August. Mean total length of starry flounder in early August was 4.2 mm. (Au)

I-139742

... For all but fifteen or so of the last several thousand years, until escalation of oil and gas exploration activities in the southeastern Beaufort Sea, wildlife was the mainstay of the Delta economy and it continues to be the principal renewable resource base. As such it assumes the economic position taken in more temperate regions of Canada by agriculture and forestry, with an economic potential measured in thousands of years rather than in the decades that are estimated for most oil and gas deposits. ... The following report was written with the purpose of synthesizing information from published historical accounts with that of more recent papers in an annotated list of all vertebrate wildlife species that occur or have been reported in the Delta Region, with a brief discussion of some of these species; and secondly, of providing a list of references that for the most part are readily available to the public. References to less easily obtained consultants reports and unpublished manuscript reports have been kept to a minimum. One of the principal aims has been to make available biological information on wildlife of the Region to people who are not scientists but who, perhaps, have had some high school biology. Technical terms have been explained in a glossary at the end of the report. (Au)

See Also : B-48518, B-107093, B-108162, D-43950, D-43977, D-107174, F-43969, F-43983, F-108561, H-107170, J-79197, U-108090, L-19893, L-36242, L-120598, L-42480, R-108961, Q-107170, Q-11118, Q-11592, Q-12980, Q-13021, Q-13048, Q-23995, Q-26848, Q-31186, Q-40541, Q-43885, Q-43990, Q-23784, Q-32533, Q-107050, Q-107107, Q-107182, Q-107921, Q-108103, Q-116769, Q-116777, Q-116785, Q-118117, Q-118125, Q-118168, Q-118796, S-42250, S-52872, T-9903, T-19512, U-124036, V-57070

J - ECOLOGY - Includes Environmental Protection.

J-4944

Arsenic concentrations were measured in aquatic invertebrates, macrophytes, sediments, and water of lakes in the vicinity of Yellowknife (N.W.T., Canada). ... The arsenic concentration in invertebrates varied with sampling time, place, and taxon. Arsenic concentration factors were calculated, and found to decrease with...
Increasing concentration of arsenic in ecosystem components of the lake. No evidence was found for biomagnification of arsenic through ascending trophic levels. In high-arsenic lakes herbivores had the highest arsenic concentrations, and omnivores the lowest. Pallida, Amphipoda, and Hirudinea were conspicuously absent from high-arsenic lakes. These particular organisms may be more susceptible to the effects of arsenic than others. (Au)

J-16233


...The objectives of the study are: (1) to establish the baseline distribution of particulate pollutants, especially for tar and plastics, in the present-day Beaufort Sea marine environment; (2) to establish areas with natural seepage of crude oil; and (3) to establish the chemical characteristics of hydrocarbons in the present-day beach sediment, nearshore sediment and marine organisms, including fish. ... (Au)

J-16527


...The concentration of most heavy metals in the water of Gordon Lake fell below detectable limits and met Canada Drinking Water Standards and Objectives. The species composition and population characteristics of the phytoplankton, zooplankton and zoobenthos were typical for lakes. Large numbers of lake trout, whitefish and pike, were recorded in the immediate vicinity of the Camlaren mine site. (Au)

J-16721


...The report has three major parts. The first has sections describing the objectives, general environment and methodology. The second part covers the three levels of ecological generalization: the ecoregions, the ecolodistricts and the ecossections. The final part includes sections regarding outstanding phenomena, recent history of man and wildlife habitat. (Au)

J-31437


The fission product radioactivity detected on lichens in the vicinity of the impact area of the Soviet satellite Cosmos 954 does not exceed the background levels found in the general area as a result of past nuclear explosions. (Au)

J-45675


This document describes planned environmental studies for the summer of 1972 to be carried out in the Richards Island region of the Mackenzie Delta. No results are given. (ASTIS)
Environmental assessment and review: the case of 
McKinley Bay / Rees, W.E. 
(Northern perspectives, v. 8, no. 2, 1980, p. 2-12, map, photo.) 
+Footnotes. 
ACU, SSU, NWFSD 

The case study by Dr William Rees, which traces the McKinley Bay permit application through a complex of government committees and agencies, reveals that advice from government experts calling for full review of the environmental consequences of Dome's proposal was circumvented to allow Dome to proceed with all due speed. The documents which follow the McKinley Bay study, and deal with the rapid processing of the Wise Bay land use permit and the prolongation of risky drilling at Dome's Nuvvuq 9-88 drill site last fall, illustrate the same problem. ... (Au) 

Cosmos 954: the occurrence and nature of 
recovered debris / Gummer, W.K. Campbell, F.R. Knight, G.B. Ricard, J.L. 
vii, 60p. : ill., fig., tables, maps (1 fold.) : 28cm. 
ISBN 0-660-10589-6 
Appendices. 
+References. 
ACU 

Cosmos 954, a Russian nuclear-powered 
satellite, re-entered the earth's atmosphere early in the morning of 24 January, 1978. ... Shortly thereafter, visual sightings in the 
Yellowknife area, Northwest Territories (NWT), confirmed that an unknown quantity of debris 
continued towards the ground in a northeasterly 
direction. 

The Atomic Energy Control Board (AECB) was given the responsibility for 
recovery, handling and disposition of debris 
located, that is, for matters related to the 
health and safety of people and the 
environment. ... The search and recovery 
operations and the ensuing analytical work produced a great volume of photographic records 
and detailed chemical and metallurgical 
analyses. A report such as this cannot include 
all the data but will offer typical information 
helping the reader to learn the variety of 
material found, the extent of the search, the 
hazards presented by the debris, the 
precautions taken to minimize these hazards and 
the obvious lessons learned. ... The report also presents summaries of work carried out by others .... (Au) 

Fire studies in the upper Mackenzie valley and 
adjacent Precambrian uplands / Rees, W.E. 
Spittlehouse, D., Johnson, E.A. Jasieniuk, W.A. 
x, 128p. : ill., fig., col. photos., tables ; 28cm. 
([Report] - Canada, Arctic Land Use Research Program. 
North of 60) 
+References. 
ACU, SSU 

This is a report on the second year of research 
concerning fire in the Northwest Territories. 
In 1974 work was continued in the Upper 
Mackenzie Valley and, in addition, studies were 
extended eastward on the Shield. The approach taken to field studies continued to 
be geographic and wide-ranging, with many sites examined for comparative purposes. The 
following objectives were pursued: (1) To 
continue an analysis of fire records and of 
climatic correlates. (2) To study fire recurrence on important terrain types in the 
Valley and on the Shield, using tree ring and stratigraphic techniques. (3) To examine fire 
effects on peat plateaus and on permafrost 
mineral soils. (4) To study the responses of vegetation to fire with attention to the 
auteology of dominant species. ... (Au)
The environment of the northern Yukon is well known in Canada for its diverse and unique land resources and for its archaeological and historical importance. The interests expressed by a host of wildlife, conservation, natural history, and native groups throughout Canada as well as abroad testifies to its national and international significance. The concerns cover a gamut of biological, physical, archaeological, and historical features. This survey served to provide a regional characterization of the wide range of land resources of the northern Yukon within a common framework while at the same time enabling Land Directorate staff to research and further implement a more integrated approach to ecological land classification. The maps produced for the study also represent alternative techniques for the presentation of mapped information. The Lands Directorate is equally concerned with encouraging ecologically based approaches to land planning and environmental impact assessment. ... (Au)

J-90238

Between 22 and 24 July, 1981, the principals of Polar Gas' prime environmental consultants, accompanied by Polar Gas environmental staff, carried out an aerial reconnaissance of portions of the Missi Falls alternative pipeline route. A pipeline system along this route would move natural gas from the Arctic Islands and Mackenzie Delta/Beaufort Sea areas to southern markets. This report describes the environmental characteristics of areas along this route segment as observed from the air. ... (Au)

J-103721

... let me conclude by suggesting that the community of northern scientists was caught in disarray by the onslaught of development proposals. The response, translated by the eager media, was scrambled and so confused that much of our credibility has evaporated - particularly in the north. ... (Au)

J-105899

This report has been prepared as a supporting document to the Environment Impact Statement for Beaufort Sea Hydrocarbon Production. It provides additional environmental information for the Beaufort Sea onshore and Mackenzie Valley regions. Some of this information was excluded from the Beaufort EIS due to overall length and detail. Literature concerning disturbances to the various natural resources is also included in this report. ... This report is divided into two major chapters. The first chapter discusses the sensitivity to disturbance of different natural resources. Resource categories (eg. Soils, Vegetation, Mammals, Birds, Aquatic Resources) are discussed in the same order and general format as in the E.I.S. itself. The second chapter provides detailed information on the distribution, abundance and life histories of birds in the Canadian Beaufort Sea coastal region and the Mackenzie Valley. ... (Au)
The assessment of industrial impact on the northern frontier / Welch, E.R. 
(Canadian issues, v. 2, no. 2, [1979?], p. 45-52)

References.
Paper presented at Association for Canadian Studies of National Conference, Winnipeg,
University of Manitoba, 1978.

ACU

In this paper, I comment on the methodology of social impact assessment, and on the Mackenzie Valley Pipeline Inquiry (Berger Commission) as an example. While this paper has particular relevance to the cross-cultural situation of the frontier, at least some of the things that it says could be regarded as having more general application. The paper is based directly on my observations, experience and reading while I was with the Berger Commission, with which I worked for some three years.

See Also: B-502160, D-74986, F-88307, F-89222, E-88374, F-88382, F-128040, H-11126, H-30163, H-38920, H-43621, H-85200, H-102199, H-127718, H-139891, I-140851, I-34665, I-62022, I-69906, I-89290, I-89303, I-91545, I-107878, I-108526, I-122185, I-124575, I-133937, I-137987, I-137942, L-14257, L-25623, L-25631, L-25640, L-29477, L-29955, L-102130, L-112350, L-120586, N-6238, N-7277, P-16080, P-19615, P-18623, P-20947, Q-108642, Q-112712, Q-113395, Q-103560, Q-105589, Q-106867, Q-107115, Q-107808, Q-108277, Q-108937, Q-109853, Q-109862, Q-112712, Q-113107, Q-113955, Q-115630, Q-115711, Q-115851, Q-116769, Q-116777, Q-116785, Q-116793, Q-118222, Q-118600, Q-118931, Q-118940, Q-119008, Q-120618, Q-122165, Q-1235910, Q-123659, Q-123680, Q-132681, Q-128241, Q-128244, Q-131110, Q-131120, Q-133143, Q-134171, S-6130, S-42289, U-19224, X-30317

-138-

no greater than one year provided that at least one half of the total CAGPL tonnage or three quarters of the Foothills tonnage is moved via Hay River. Dredging for long term traffic growth is the least cost solution provided a convenient highway alternative is not available. (Au)

L-13774

Macplan: Mackenzie Aviation System Area Master Plan study: executive summary / Canada. Air Transportation Administration, Western Region, Civil Aviation Branch, [Edmonton]; Transport Canada. Air Transportation Administration, Western Region, Civil Aviation Branch, 1976.
iii. 26 leaves: maps, tables; 28cm.

ACU

... The objectives of the macplan Study ... are as follows: 1 To conceive, develop, and produce a comprehensive plan of development to 1985 for the Mackenzie Area and Western Arctic which will: a) Recommend an optimum system of airways and air routes including land and water based facilities, air traffic services and facilities, en route and terminal navigation facilities and AES advisory services. b) Determine roles and general locations for a system of airports ... 2 To make recommendations on alternatives for development to 1995 which will allow a flexible response to changing requirements. 3 To broadly identify costs and revenues associated with recommended developments. (Au)

L-14257


Cover title.

ACU

... The overview summary should briefly describe the project, the probable major environmental impacts, the ameliorating and mitigating measures to be implemented by the proponent as specified in the report, and the significance of the residual unmitigated environmental impacts. Any aspects of the development which might stimulate public concern should be described with particular clarity. The summary should also clearly identify data gaps or knowledge deficiencies, and the limitations they have imposed on the Environmental Impact Statement. ... (Au)

L-17949


... Results indicated a first-year 43% mean decrease in plant cover. Evergreen and deciduous shrubs were initially affected, but some later recovery was indicated. Cover loss is not greater than one year provided that at least one half of the total CAGPL tonnage or three quarters of the Foothills tonnage is moved via Hay River. Dredging for long term traffic growth is the least cost solution provided a convenient highway alternative is not available. (Au)

L-11975


References. ACU

... from a purely cost standpoint, dredging exclusively for pipeline construction logistics is the least cost alternative for either the CAGPL or Foothills proposal, for lead times of

K - MEDICINE, HUMAN PHYSIOLOGY, AND PUBLIC HEALTH

See Also: H-100064, T-24171, T-79588, T-104388, T-129188, T-125032

L - COMMUNICATIONS AND TRANSPORTATION

L-11975


References. ACU

... from a purely cost standpoint, dredging exclusively for pipeline construction logistics is the least cost alternative for either the CAGPL or Foothills proposal, for lead times of
L-19593
The porcupine caribou herd and the Dempster Highway north of the
Mackenzie Delta. In general, the report describes the construction of the Dempster
Highway, the environment and social impact of the road and the evolution of the Dempster
Highway Management Plan. (ASTIS)

... The Design Criteria, Pre-engineering
Activities, Construction Techniques and Road
Performance are treated in some detail and
should be of interest to any agency
contemplating similar engineering/construction
activities in comparative Regions of Canada
North. They have also identified need for
further research and experimental work in the
interest of advancing engineering knowledge as
related to highway construction in extreme
Polar climates. (Au)

L-16970
The Dempster Highway - "Road to resources" /
MacLeod, W.G.
[Excerpts from W. MacLeod, The Dempster Highway,
in Northern Transitions, vol. 1, ed. E.B.
Petersen and J.B. Wright (Ottawa : CARC, 1978)
p. 191-250.]
ACU, NFSMO

Describes the construction of the Dempster
Highway, the environment and social impact of the road and the evolution of the Dempster
Highway Management Plan. (ASTIS)

L-23957
Development of the Dempster Highway north of the
Arctic Circle / MacLeod, W.G.
Cover title.
Distributed by APOA. 1972.
2 microfiches ; 11x16cm.
(APOA project no. 3 : Ocean floor sampling
Beaufort Sea. Report, no. 2)
Appendices. References.
ACU, NFSMO

The program was to provide basic engineering
design data for future offshore drilling and
production operations. ... A
development of the Dempster Highway north of the
porcupine caribou herd and the Dempster
Highway, the environment and social impact of the road and the evolution of the Dempster
Highway Management Plan. (ASTIS)

L-24962
Arctic winter evaluation study of transportation equipment / Rymes (J.E.) Engineering Ltd.
[Calgary : Distributed by APOA, 1973.]
4 microfiches ; 11x16cm.
(APOA project no. 46 : Study of Arctic
transportation equipment - Mackenzie Delta.
Report)
References.
ACU, NFSMO

The purpose of the study was to evaluate the
effectiveness of the equipment being utilized for rig moves and logistic operations in the
Mackenzie Delta. In general, the report
examines in some detail the type and mix of
equipment being utilized in these operations, studies the problems and failures of the equipment and discusses possible methods of
resolving the problems including improved
maintenance techniques and design improvements.
In addition, the study reviews and discusses
potential uses of new equipment and more
effective uses of existing equipment. (Au)

L-24716
Arctic winter test and evaluation of Kenworth Truck Model 953A / Rymes (J.E.) Engineering Ltd.
[Calgary : Distributed by APoa]. 1972. 6 microfiches: ill., figures; 11x16cm. (APOA project no. 21: Evaluation of desert type 6 x 6 oilfield truck in Arctic conditions. Report, no. 1-3) References.
Contents: no.1 Initial stage. - no.2 Mid-winter stage. - no.3 Late winter stage.
ACU, NFSMO
A 6 x 6 oilfield truck with large low pressure tires was purchased for cross-country haulin in the Mackenzie Delta area during the winter. This project was designed to evaluate the vehicle's cross-country mobility, its overall performance as an oilfield truck in winter conditions, and the performance of various mechanical components. In particular, the behaviour of the tires in snow was observed and recommendations for tire design were made for work in unprepared terrain. (Au)

L-25534
Report on Phase I of Pressure Ridge and Ice Island Study: Evaluation of hovercraft and Ice reconnaissance / Hatluk, J.
[Calgary : Distributed by APoa]. 1971. 1 microfiche: figures, map; 11x16cm. (APOA project no. 17: Beaufort Sea pressure ridge and ice island scouring. Report, no. 4) ACU, NFSMO
The SRN-6 Hovercraft cannot negotiate jagged pressure ridges in excess of four or five feet in subzero temperatures without damage to the existing skirt. The SRN-6 can be used to quickly reach offshore areas where ice is relatively smooth and should provide a suitable means from which to conduct investigations on multi-year ice and ice islands. The vehicle should be equipped with Decca navigation, lights, bunkers, and cooking facilities before being used. A means of controlling cabin heat should be provided. The cost will be $300.00 per hour plus fuel, accommodation, food, and travel. The minimum is three hours per day, averaged over the period. It is recommended that the SRN-6 Hovercraft be used from which to conduct studies of multi-year and single year pressure ridges and ice islands. A route from Inuvik to Mackenzie Bay, around to the ice islands northwest of Pullen Island and to Tuktoyaktuk should be followed. Return trips to Inuvik and Tuk as necessary for rest, proper meals, and supplies would be necessary. A fuel cache near Shingle Point or at the mouth of the Middle Channel would be required. A Casena 180 out of Tuk or Inuvik could be used at 70 cents per mile for reconnaissance and directing the Hovercraft to a specific floe. In the event of failure of the Hovercraft, a C-214 Helicopter is available in Inuvik which could be used to rescue personnel or complete the project. (Au)

L-25634
In the Interest of avoiding unnecessary environmental disturbance...it is important to schedule the commencement of winter road preparation in such a way that ground conditions are taken into account...This part of the report describes the results of an experimental operation carried out to evaluate the application of a Rolligon RB5S vehicle in preparing a winter road on Richards Island...and moving equipment at the earliest date during freeze-up while avoiding disturbance of the tundra surface. (Au)

L-27448
Dempster Highway Interim management plan / Dempster Highway Working Group.
...it is the aim of the Governments of Yukon and the Northwest Territories to develop a long-term management policy for the Dempster corridor which considers all forms of land and resource use and which guides development in adjacent areas. It is necessary at this point to deal with existing uses of the corridor on an interim basis until sufficient data and information are available to allow rational decisions with respect to a more comprehensive, long-term management policy. The purpose of this report is to present and rationalize, within the data limitations, interim management alternatives. (Au)
Benefit cost analysis of winter operation of the L-29602


Contents. - v.1 Report. - v.2 Low water determinates. - v.3 Test drilling program - v.4 Plans ; 29x48cm.

References.

ACU

The purpose of the Mackenzie River Investigation is to arrive at a definitive cost estimate, timing schedules, and environmental impact of the proposed drilling program proposed on the Mackenzie River by the Northern Transportation Company Limited as required by Treasury Board for their decision criteria. ... (Au)

L-29947


(APOA project no. 38 : APOA-DIAND Transportation study, Report, no. 1) (Report - Canada. Arctic Land Use Research Program, ALUR 72-32-12) (North of 60) References.

ACU, NFSMO

Field tests were conducted at Tununuk (Bar C) on Richards Island, N.W.T., in July 1972 to determine the immediate effects on the tundra surface of operating wheeled vehicles during the summer. Four vehicles were operated on four test sites and the sites were photographed and described by use of the NRL Tundra Disturbance Classification System. The results were compared with those of tracked vehicle tests conducted earlier at the same sites. Although the terrain responded differently to different wheeled vehicle types it was apparent that vehicles with large soft tires created less disturbance than tracked vehicles of the same weight. The test sites should be inspected at two year intervals to confirm predictions of long term effects of wheeled vehicle traffic. (Au)

L-29955


References.

ACU, NFSMO

In 1970 tests were carried out with tracked vehicles on test sites at Tuktoyaktuk and Tununuk, N.W.T., and at Shingle Point, Y.T. During the summer of 1972, the test sites were visited to observe the development of new vegetation on the disturbed ground, and measure changes in rut depth and front depth in the tracks left by the vehicles. ... The major conclusions of the study are as follows: 1) The amount of vegetative regrowth on a disturbed site is dependent on the level of disturbance initially inflicted upon the site. Lower levels of disturbance result from low numbers of passes and from use of light weight vehicles. 2. Thermokarst is related to disturbance level but, for all terrain types tested, stabilizes within two years following disturbance. The permafrost table beneath the vehicle rut is roughly equal to its original depth below the undisturbed ground surface. (Au)

This paper describes Arctic Research and Development if Canada is to construct and operate the Arctic marine systems necessary if oil and gas is to be exploited in the Beaufort Sea and the High Arctic region. Within the next ten years, ... R & D must be intensified in five specific areas: 1. To determine optimum design characteristics and performance expectations for large icebreaker vessels under the full range of possible ice conditions that can exist throughout the Canadian Arctic; 2. To develop techniques which give high resolution measurement of ice properties and conditions from earth satellites in all weather and in darkness; 3. To develop new concepts and practical field methods to break up high strength ice forms such as ice ridges, multi-year ice floes, and ice islands; 4. To obtain improved understanding on the effect of oil in Arctic waters; 5. To develop improved concepts and systems to clean up oil in ice-covered waters. ... A broad spectrum of new technology will be developed peculiar not only to Canada's Arctic needs but to the needs of all polar development. (AU)

L-48666
Arctic ice trafficability : Beaufort Sea area / Hammond, C.W. [Calgary : Distributed by APOA], 1980. 1 microfiche : 11x16cm.

The objective of this study was to determine the feasibility of utilizing standard aerial photography to map routes across the ice for various vehicles, including a hovercraft in particular. ... It has been demonstrated that features of size 1.0 feet can be reliably seen by conventional black-and-white photography taken from an altitude of 10,000 feet. It has been demonstrated that aerial photography can be used to track run from smooth and unobstructed to impassible. (AU)

L-35912

The Dempster, was officially opened to vehicular traffic can be readily seen ... The Dempster's existence itself will likely be used to justify further development along the corridor. The rate of the caribou, falcons, sheep and other wildlife hange precariously in the balance as the controversy over environmental and developmental concerns shows all the signs of becoming a confrontation. (AU)

L-35971

ISBN 0-89996-10-8

Symposium chaired by H.J. Dunbar.
Introduction by Hugh G. Morris, chairman of the Advisory Committee to CARC : "Arctic seas projects.

ACU, NFSMO

This symposium is designed to focus national attention on the opportunities and problems connected with the development and operation of marine transportation systems as an essential component of the future social, economic, and political development of arctic Canada. In so doing, we hope to explore the adequacy of our knowledge and our policies as they apply to arctic regions and, if possible, to throw a strong light on areas where both should be improved. (AU)

L-85402
Ice-maiden voyage / Lawrence, A. (Canadian shipping and marine engineering, v. 50, no. 11, Aug. 1979, p. 28-32, map, photo.)

ACU, NFSMO

This report describes the performance of the Pierre Radisson during its shakedown voyage through the Canadian Arctic Islands, July 10-Oct. 28, 1978. (ASTIS)

L-36242

ACU

... the Dempster, was officially opened to year-round traffic on August 18, 1979 - despite warnings from environmental groups who say the move could well mean the extinction of one of the continent's last major caribou herds, ... Slicing 700-odd kilometers (453 miles) through some of the most ecologically fragile and navigably beautiful terrain in the world, the Dempster links Dawson City, Yukon, with Inuvik, Northwest Territories. ... Crossing both the Ogilvie and Richardson mountain ranges, the highway bisects the migratory route of the Porcupine herd of Barren Ground caribou. This herd represents 10% or perhaps as much as 15% of North America's total caribou population. ... Little or no thought ... has been given to the adverse effect of summer tourist travel on the populations of peregrine falcons, gyrfalcons and Dall sheep in the area. The falcons nest along the Dempster during the summer. They would be easy prey for poachers, who are anxious to secure the high prices offered for the birds on the foreign black market. The sheep, too, would be particularly susceptible to interference because they would have just finished lambing as the summer traffic begins. ... Cautions about the adverse effect of the proposed Dempster Lateral pipeline have already begun. ... The latest declarations by the Yukon government suggest little concern for the impact of the highway on wildlife, and scant interest in the arguments of environmentalists. ... Large numbers of tourists can be expected to follow the route because of the heavy publicity it has received. The Dempster's existence itself will likely be used to justify further development along the corridor. The rate of the caribou, falcons, sheep and other wildlife hange precariously in the balance as the controversy over environmental and developmental concerns shows all the signs of becoming a confrontation. (AU)

L-35944
Propeller repair under the Arctic / (Canadian shipping and marine engineering, v. 51, no. 12, Sept. 1980, p. 6-7, photos.)

ACU, NFSMO

This brief report explains how the Canmar Kigorvik damaged the blades of its LIPS CP propeller and shows how the damaged sections were removed and replaced on-site under the ice. (ASTIS)

L-35204

(Arctic coastal zone management newsletter, no. 17, Jan. 1979)
Partial contents: Who will control the Haul Road: an important test of the Borough's home rule powers / Earle Finkler.

ACU, NFSMD

The Haul Road was originally built as an energy development road to accompany the construction of the Trans-Alaska Pipeline. Now it is the center of controversy, particularly between the North Slope Borough Commission, who want it to remain an industrial road prohibiting regular public use, and those who want an unrestricted wide-open policy. This issue points out the environmental, economic and social impacts foreseen by the NSP if the road is opened and discusses the ongoing conflicts and negotiations between the two sides. Similar problems are also foreseen for the Dempster Highway from Inuvik to Dawson City. (ASTIS)

L-74063

(Pacific marine science report, 80-4)
Appendix, References.
ACU

This report describes Loran-C skywave reception in the Beaufort Sea. The accuracy of Loran-C positions using this mode of reception is evaluated. Omega reception was also monitored in the Beaufort Sea and the accuracy of positions obtained with an MX1105 Satnav/Omega receiver are given. (AU)

L-88943

Canal Road dilemma: is easy access spoiling Yukon's old pipeline route? / Hancock, L. (Canadian geographic, v.102, no. 2, Apr./May 1982, p. 50-57, col. ill.)
ACU

The author describes the Canal Road as it appears today. The character of the road has changed from a project conceived by the U.S. War Dept. to provide a secure source of oil for the defense of Alaska in the event of a Japanese invasion to a tourist route where today hikers, canoeists, hunters and naturalists congregate to enjoy the areas natural beauty. The effect that renewed interest in the area will have on the environment is of importance to the author. (ASTIS)

L-102130

ACU

L-103470

ACU

L-108413


1 microfiche : figures ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWT04)

The expected increase in ship traffic associated with continued offshore exploration and production activities has caused concern among the members of northern communities. It has been suggested that a ship's track may create a serious obstacle to ice travel by snowmobile. A field programme was initiated by Dome Petroleum Limited, Arctic Pilot Project and Gulf Canada Resources to examine the tracks made by the icebreaker Kigoriak. Members of the Inuit communities were invited to participate and representatives from Paulatuk, Holman Island, Tuktoyaktuk, Grise Fjord, Arctic Bay, Pond Inlet, and Inuvik conducted the field investigations. Field programmes were conducted ... [and] it was decided by the representatives of the northern communities that the ship's tracks presented much less of a problem than had been anticipated. It was found that when a route was selected with reasonable caution, refreezing of the track was not necessary for safe crossing. The snowmobile and loaded sled on a ship track appeared to be supported by the buoyancy of the considerable thickness of broken ice left in the track rather than by the track's structural strength resulting from its refreezing. The track was crossed on foot within 100 m of the moving icebreaker and within a half hour of its passage. Track crossings with a snowmobile and sled were made within an hour and a half of the ship's passage. Ice thickness profiles showed the ice in the tracks to be thicker than the surrounding ice cover. Reasons for the accelerated ice growth in ship's tracks are discussed. Thermistors installed to give temperature/depth profiles indicated that the rate of refreezing in ice rubble is much faster than the rate of freezing in undisturbed ice. Recommendations are made for further investigation. (AU)

L-112862

Northern transportation / Giuliani, M. (North/Nord, v. 29, no. 4, Jan. 1983, p. 36-41, ill., map)
ACU, NFSMD

... A major Northern Transportation Conference held 5-7 October 1982 in Whitehorse, Yukon, gathered together representatives of government, industry and interest groups to discuss the challenges facing northern transportation in general and a number of related issues. Sponsored by the Canadian Transportation Research Forum, two federal departments, Transport Canada and Indian Affairs and Northern Development, and the governments of the Northwest and Yukon Territories, the conference sessions focused on: challenges of the 80's, economic, environmental & social considerations, transportation planning, regulatory webs, air transportation operations, delivery of northern natural resources, surface transportation operations, transportation research, marine transportation operations. ... [This article provides] brief descriptions [of ... some of the papers presented during the three-day conference. ... (AU)
Road development potentially can cause significant direct and indirect impacts on wildlife and wildlife habitat. To avoid or minimize detrimental effects associated with road development, wildlife resource concerns must be incorporated during the initial planning stages of development. Three classes of impact reduction measures exist. Spatial measures seek to avoid areas of environmental importance, while timing measures eliminate disturbance during critical periods of the life-cycle. Operational measures embrace codes of good practice that serve to reduce the overall effects during each development phase. Ignoring or failing to undertake comprehensive environmental programs can result in expensive delays and design changes. (Au)

L-117951
ACU

This report describes various aspects of a study to identify and analyze the problems of freezing of ship ballast systems in cold climatic conditions and to propose solutions for the purpose of providing the marine industry with criteria and guidelines for designing, constructing and operating efficient ballast systems. Areas of research and development are identified. ... The study deals with tank and piping systems, valves and other components or products. Ice ingestion of seawater inlets and it identifies areas of research and development. ... (Au)

L-120596
ACU

This paper presents comments on the principal tanker routes, and the anticipated effects of sea traffic on sea mammals and surface animals. The effect on the way of life of native peoples and the need for compensation, employment and training is included. A map indicates sea mammal habitat in the Northwest Passage region. (ASTIS)

L-122637

ACU

Esso Resources Canada Limited's Beaufort exploration drilling program for the winter of 1978-1979 required moving a drilling rig, camp and supplies from Yukon to the middle delta of the Mackenzie River, 40 km west-northwest of Inuvik ... Other commitments for the drilling rig necessitated tight time frames for lease construction, moving the rig, and drilling the well. As a result, 200 km of river ice road had to be built almost three weeks earlier than had been done in previous years. The presentation will highlight the successful completion of this project. Factors discussed are road site selection, ice testing methods and equipment, road and ice bridge construction and equipment, as well as transportation equipment and techniques used to haul the heavy loads associated with this project. (Au)

L-123879

ACU

Kigoriak, Canadian Arctic Class 3 icebreaker, designed and owned by Canadian Marine Drilling Ltd, is a radical departure from conventional icebreaker solutions. It has been tested and it has operated since 1979 in the Beaufort Sea in ice conditions recently going far beyond its actual ice class including operations in multi-year ice. It has never had any icebreaker assistance nor has it ever lost its capability to operate independently even having seen some propeller damages to its single propeller due to steel obstacles impinging upon the nozzle. Kigoriak has shown us that present Arctic regulations are not adequate. Also, it has demonstrated convincingly the very good performance of its novel design features, against its not so positive predictions based on ice model tests. This has meant important innovations for the future of icebreaking ship design. (Au)

L-131326

Text in English and French.

Information taken from 1982 annual report.

ACU

Northern Transportation Company Limited is a Canadian company. It was incorporated federally in 1947 and continued under the Canada Business Corporations Act in 1977. The company is a profit-oriented Commercial Crown Corporation whose primary objective is to provide economic, reliable and comprehensive transportation and related services in Northern Canada and the Arctic. Northern Transportation has provided marine transportation services throughout the Mackenzie River Watershed since 1934, and along the Western Arctic Coast and Islands since 1957. Keewatin operations out of Churchill, Manitoba were inaugurated in 1975 and since then the Company has provided resupply services to five communities along the west coast of Hudson Bay and Coral Harbour on Southampton Island. ... (Au)

L-136077

ACU
Esso's history in the Northwest Territories dates back to drilling the discovery well at Norman Wells in 1920 and production from that field is still continuing. As a result of our extensive experience in the North, Esso has been instrumental in pioneering and developing technology related to many aspects of Northern Development. For example, in the Beaufort region, artificial island technology has been developed and proven by the construction of 18 artificial islands in water depths up to 19 m. This has given us the confidence that permanent production islands are feasible for offshore development in the Beaufort Sea. In addition, six artificial islands will be constructed and used in the expansion of the Norman Wells oilfield. Transportation systems, such as ice roads and the use of large wheeled vehicles have been developed by Esso for protection of the tundra. (Au)

L-136220

The Dempster Highway and western Arctic development / Hill, D. 

ACU

The author discusses the impact the Dempster Highway has had on the western Arctic, and presents statistics on Dempster Highway distances, traffic operations, ferry and ice bridge operations, and environmental considerations. (ASTIS)


M - ENGINEERING AND CONSTRUCTION

M-19461

Pile foundation design and performance of surface facilities in the Mackenzie Delta / Auld, R.G. Robbins, R.J. Rosenegger, L.W. Sangster, R.H.B. 

References.  
ACU

... Imperial Oil Limited has found a thermal simulator model to be a useful design tool in assessing the thermal behaviour of possible foundation designs. The accuracy of the thermal predictions is dependent on a knowledge of the ice content of the permafrost, the ambient environmental conditions, and the thermal properties of the foundation material and the subgrade. The design, construction, and subsequent thermal performance of several foundations built on permafrost will be presented, including fuel usage for both ambient and heated fluids, and heated structures, where temperature data has been recorded to monitor the thermal response. (Au)

M-19500

Foamed sulphur insulation for permafrost protection / Raymond, M.E.D. 

References.  
ACU

... Using pilot plant equipment, sulphur foam was installed in August, 1974 at a site along the Dempster Highway, N.W.T. to test its utility for permafrost protection. Monitoring since the installation has indicated that the foam has fulfilled expectations. ... Predictive thermal analysis of the design confirms field test data. ... (Au)

M-22560


ACU

Papers were concerned with gas pipeline construction, highway construction in the Mackenzie Valley area and the James Bay project in Quebec (ASTIS)

M-39160


References.  
ACU

... The objective of this study was to evaluate the performance of lagoons in arctic regions by a study of the lagoon at Inuvik, N.W.T., over a 1 year period. Results of this study endorse the continued use of sewage lagoons as an effective and low-cost sewage treatment method for small arctic communities. In spite of some serious design and construction deficiencies, and several-fold increase in loading, the Inuvik lagoon has provided reliable treatment to the receiving stream must, however, be seriously questioned. (Au)

M-56480

New approaches to water and sewer services in permafrost area - Norman Wells, N.W.T. / Irwin, W.W. 
(Proceedings - Symposium on Utilities Delivery in Northern Regions. 2nd, Edmonton, March 19-21, 1979. Canada. EPS. Water Pollution Control Directorate. Economic and technical review report; EPS-3-MP-80- 5, p. 807-842, 111. figures, photos.)  

ACU

... This paper is an attempt to provide a brief overview of the design considerations; the development of system concept and design details; the construction techniques and problems, and the post-construction performance of the Norman Wells water and sewer system installed during the period from 1976 to 1978. (Au)
The Inuvik airfield was constructed between 1956 and 1958 on a site underlain by frozen fine-grained soils containing considerable quantities of ice. Its design and performance were therefore of considerable concern. The airfield consists of an embankment of rock fill constructed on the undisturbed ground surface to a thickness sufficient to prevent, or minimize, thawing of the frozen subgrade soils; from 2.5 to 4.2 m, and averaging about 3.5 m. The airfield was paved with asphaltic concrete in 1969. Ground temperatures were measured at several locations in the subgrade and the embankment from 1958 to 1974. All temperature observations showed that the permafrost table moved up at least 0.6 m into the fill after construction was completed in 1958 and remained at about the same level in subsequent years, even after paving. The airstrip has performed extremely well to date and has required little maintenance work. (Au)

M-133132
Instrumentation systems for a cold ocean test structure / Jones, J.M. (C-CORE publication. no. 81-6, p. 35-65, figures). (Technical report - Memorial University of Newfoundland. Centre for Cold Ocean Resources Engineering) References. ACU. NFSMD

The fundamental function of an Instrumentation system for a Cold Ocean Test Structure is to identify and measure the magnitudes of the environmental forces acting on the structure, to evaluate its performance in respect to assumptions made in its design and to develop ice monitoring and management procedures. The geographic area of immediate interest is the Beaufort Sea. The greatest environmental hazard to a structure in this area will be the consolidated multi-year ice ridge. Two types of structures have been proposed by drilling operators to resist the force exerted by these multi-year ridges: the conical monopod and the large caisson type, both of which are intended for year-round production drilling operations. (Au)


N - RENEWABLE RESOURCES

N-6238

... The purpose of this paper is therefore to call attention to the following: 1. Ecological alterations can and have already occurred below
large hydroelectric projects in northern rivers; 2. Northern Floodplains and deltas are most subject to downstream regulation-caused damage. Those that remain undisturbed by man create highly productive habitats that are utilized by a significant number and variety of fish and wildlife; it is argued that regulation creates a complex array of mostly detrimental alterations to alluvial habitats, and consequently to the people who still harvest species of wildlife that base their reproductive success on such habitats. (Au)

N-7277
Environmental and floristic evidence is presented to show that, after removal of the White Spruce (Picea glauca) and willow-alder (Salix spp. - Alnus crispa) canopies from exposed sites within the boreal woodland of the Mackenzie River Delta, Northwest Territories, Canada, environmental degradation is such that secondary succession of low Arctic tundra heath, mosses, and lichens takes place. The extreme exposure of cleared sites enables a hardy group of tundra plants to compete with the local flora and invade the previously forested location. (Au)

N-20710
... The Environmental Management Service of Fisheries and Environment Canada has undertaken the preparation of a series of land use information maps as part of the ALUR Program. ... The purpose of this report is to provide such data based on fisheries field operations and literature reviews in order to compliment the map series. The report contains a general description of the river systems sampled and tabular results of fish species, numbers caught, fish maturity, water temperatures and dates of sampling. (Au)

N-25960
The domestic Beluga hunt in the Mackenzie estuary was surveyed during the period 1973 to 1975. The number of whales harvested totaled 165, 113-118 and 127-139 for each respective year. In addition it is estimated that a number equal to two-thirds of those landed are killed but not retrieved by hunters. This is mainly due to the present hunting practices being used. Suggested improvements in hunting techniques are listed in the text and a description of the traditional and modern hunt is provided. (Au)

N-42480
The objective of this study was to determine if and how the distribution and movement of game and Fur-bearing animals are affected by seismic lines. As a corollary, the study was to ascertain to what extent seismic lines are used by trapper-hunters in preference to traditional routes. In order to obtain this information, it was necessary to first examine the effects of seismic lines upon the vegetation and small mammals which support the game and fur. This study was conducted in the vicinity of Aubry and Colville Lakes, N.W.T. ... 27 May to 31 August 1976, 7 April to 10 May 1977 and 1 to 24 August 1977. ... I have seen no evidence that seismic lines in the area benefited the wildlife or the trapper-hunters of Colville Lake. On the other hand, I find it difficult to believe [they] have had a substantial effect on the abundance of the region for the fur-bearers or game animals. It is difficult ... to predict ... accumulative effect ... (particularly for caribou) if additional seismic operations were conducted. (Au)

N-75396
Interactions between wildlife, trapper-hunters and seismic lines in the Mackenzie Valley region, N.W.T., Canada. Part II: Fort McPherson / Canada. Northern Affairs Program. Ottawa : Indian and Northern Affairs Canada, Northern Affairs Program, 1980. iv, 28p. : figures, maps ; 28cm. (Environmental studies - Canada. Northern Environmental Protection and Renewable Resources Branch, no. 12) ISBN 0-662-10795-0 The first part of this study was conducted in the Central Mackenzie Valley Region in the vicinity of Aubry-Colville Lakes. References. ACU
... The use of seismic lines by trapper-hunters varies from one physiographic unit to another. In the Delta, trappers occasionally follow lines but only for short distances. Snowmobile travel on the lines in the southern portion of the Delta is restricted because of high channel banks. The river channels are the most important travel routes in the Delta. Neither are seismic lines used on the barren slopes of
Apart from the oil industry activities, the Mackenzie Delta and Beaufort Sea region has also been the scene of various commercial enterprises during the past 90 years based upon the harvesting of the north's renewable resources. One of the success stories in harvesting renewable resources is the domestic reindeer herd located in the Mackenzie Reindeer Grazing Reserve. This reserve covers approximately 46,620 square kilometres (18,000 square miles) and includes within its boundaries all of the present major oil industry shorebases, including the operations at Tuktoyaktuk and McKinley Bay, and various onshore drilling sites such as Atkinson Point, Mayogtak, Parsons Lake and others. There is another northern wild mammal that may have similar potential for resource harvesting. That mammal is the muskox. The muskox has been thriving on Banks Island in the Beaufort Sea, so much so that the species may be over-populating the large, 38,850 square kilometre (15,000 square miles) island. An experimental harvest of the animal took place on Banks Island in 1982. Approximately 100 animals were harvested over three days. The early indications from the experimental harvest at Banks Island, and the research underway at the University of Saskatchewan, point to the feasibility of muskox herding. Both the meat and wool of the muskox are of high quality and either, or both, may be marketable. Within a few years it may be possible to create a northern muskox herd, providing employment for northern residents. (Au)
P-19615

A biological, sediment and water quality survey was conducted ... to determine the impact of the operations of Giant Yellowknife Mines Ltd. on Baker Creek and Yellowknife Bay. The discharge of effluent from the tailings ponds of the mine has caused a marked elevation in the concentration of toxicants and downstream water. ... The sediments of Yellowknife Bay contained high levels of toxicants up to at least 3 km from the mouth of Baker Creek. ... (Au)

P-19623

The effects of the operations of the Canada Tungsten Mining Corporation Limited on the waters, sediments and biota of the Flat River were studied ... While the concentrations of heavy metals downstream and downstream of the mine were generally similar during the study period, elevated concentrations of heavy metals were measured in the sediments as far as 20 km downstream of the operation. ... Effluent discharged from the tailings area into an unlined excavation was shown to be acutely lethal to fish under laboratory bioassay conditions. ... (Au)

P-25828

Source tests carried out at the roaster stack of Giant Yellowknife Mines Ltd. were undertaken to verify the applicability of "Standard Reference Methods for Source Testing: Measurement of Emissions of Particulates from Stationary Sources" to the controlled release of arsenic from the roaster off-gas dust control system. Tests for sulphur dioxide were also conducted. A brief description of the ore roasting process and off-gas dust control system is provided. The stack sampling and analytical methods are also summarized. It is recommended that further testing for arsenic be performed on a controlled source to validate recommended changes to the source testing code. (Au)

P-37621

... The decisions made regarding the mine are analyzed in the context of the federal government's changing policies towards northern development. In particular, the decision of Pine Point is important to illustrate the nature of the government-industry negotiations. ... Pine Point also provides a lesson about economic development in an "underdeveloped" region of the North, and the environmental and socio-economic impacts associated with such large-scale projects. Finally, the Pine Point experience confirms the need to consider alternative approaches for resource development in the North. ... (Au)

P-45691

This report describes mining and mineral exploration in the Northwest Territories (N.W.T.) during 1975. ... For the first time in this series on the N.W.T. we present the results of research into geological problems carried out in cooperation with Canadian universities. ... Each report is presented as a separate chapter. ... (Au)

P-53937

These reports review initial construction activities at Cominco's Polaris lead-zinc mine on Little Cornwallis Island and at Echo Bay Mines' gold property near Contwoyto Lake, Hudson Bay Mining and Smelting Company Limited's underground exploration at the lead-zinc-silver claims in Tom Valley near MacMillan Pass, Y.T., Amex plans for development of its MacTung tungsten orebody in MacMillan Pass, and Esso's Norman Wells oilfield expansion hearings. (ASTIS)

P-62592

The importance of arsenic as a serious pollutant in Canadian gold mining has recently been receiving increased attention. A critical examination of mining and milling operations at two sites in N.W.T. has shown that the difficulty has not been completely answered, and the present report endeavours to shed some light on this ecologically-sensitive...

The purpose of the study was to analyse the major socio-economic problems that are likely to arise from a cessation of operations of gold mines in Yellowknife. It was found that there are three groups of people - home owners, older residents and the native people among the mining fraternity - who might be particularly confronted with special socio-economic problems as a result of the closing of the mines. Their problems might range from their inability to obtain employment in Yellowknife, to their unwillingness to move to another region in search of employment. For these people and others who will be unemployed with the closing of the gold mines in Yellowknife, their ability and/or willingness to use the Federal Government's special training, mobility and manpower adjustment programs may well be a solution to most of their unemployment problems. (A)


This report includes the effect of Pine Point mine on indigenous employment in the area of Great Slave Lake. (LET)


Studies of lode gold deposits in Archaean greenstone belts reveal a number of common chemical and fluid-dynamic features. The following results are synthesized from analysis of over 700 samples from Au-bearing vein and stratiform chemical sediments of the Yellowknife, Red Lake, Porcupine and Val d'Or-Malartic goldfields. The average abundances of selected elements in ppm is Au 10; Ag 2; Pt 0.80; Pd 0.10; As 1200; Sb 700; Cr 180; Ni 110; W 270; Co 40; Cu 50; Pb 30; Zn 80; and V 70. In general, the rare and relatively immobile elements (Au, Ag, Pt, Pd, Cr, Ni, W) are enriched in lodes relative to the abundant and mobile base metals (Co, Cu, Pb, Zn, V). This separation may be accounted for if fluids are generated under conditions of low water/rock ratio and high temperature such that the absolute abundance of rare elements in solution is not constrained by solubility, whereas base metal solution concentration is. At Yellowknife, detailed two-way chemical mass balance calculations reveal that volume changes accompanying hydrothermal alteration of metabasic wallrocks adjacent to veins are in order of -100 % 600%. These results, combined with data from other examples of extensive Au-bearing vein systems, enable prediction of the optimum thermal interval for Au precipitation, and the upper cutoff temperature. (A)


Shear zones transecting the metabasalts of the Yellowknife greenstone belt are the sites of economic lode gold deposits. Three vein systems each with a distinctive geometry and relationship to other structures are present in the shear zones. Each vein system has characteristic geochemical features indicative of differing fluid transport regimes. The geometry of their vein systems indicates that all three systems formed by hydraulic fracturing under conditions of very high fluid pressures. The changing conditions are conveniently illustrated by means of Mohr diagrams. (A)


This paper briefly discusses the chemistry of host rocks at Yellowknife, the chemistry of mineralization at Con Mine, and the genesis of Yellowknife gold ores. (A)


The Yellowknife Volcanic Belt, host to the most important gold deposits in the Northwest Territories, lies along the west margin of an extensive supracrustal basin towards the southern exposed edge of the Archaean Slave Structural Province of the Canadian Shield. Since operations at the Con Mine began in 1938, the auriferous quartz-carbonate-sericite-chlorite shear zones
and related quartz veins have produced over 10 million ounces of gold. (Au) Extensive geological work in the Yellowknife Volcanic Belt, much remains to be done to solve the many geological problems that have been encountered. (Au)

P-105480
The gold discovery of '38 / Hanby, L. (North/Nord, v. 29, no. 1, Spring 1982, p. 38-41, col. 111.) ACU This article gives the historical background of the Thompson-Lundmark Mine, a gold mine discovered by Fred Thompson in 1938. (ASTIS)

P-106470
Case study of the Camlaren Mine project / McCormack, J. (Northern mining in the 80s: proceedings of the Northwest Territories Chamber of Mines 'Mining Days 1980', Yellowknife, May 7-8, 1980 / Edited by M.J. Wojciechowski. Kingston, Ont.: Queen's University, 1980, p. 69-77) ACU The Camlaren Mine encompasses a small gold-bearing quartz vein structure located on the southeast of Muir Island in Gordon Lake approximately 52 miles northeast of Yellowknife. At peak activity the property will employ between 60 and 70 persons. It is anticipated that this peak will occur during May and June when mill construction and underground development are ongoing. It is hoped that a high percentage of our employees will come from the Yellowknife area. However, there will be a heavy demand for skilled miners which is unlikely to be filled locally. (Au)

P-106488
Case study of the Cadillac property / Hicks, H.B. (Northern mining in the 80s: proceedings of the Northwest Territories Chamber of Mines 'Mining Days 1980', Yellowknife, May 7-8, 1980 / Edited by M.J. Wojciechowski. Kingston, Ont.: Queen's University, 1980, p. 79-83) ACU The Cadillac property is in the Nahanni district, just north of Nahanni Park, 210 miles north of Fort Nelson and about 300 miles west of Yellowknife. The mining we have planned is the quite conventional cut and fill mining. We have taken an option on the former Churchill mine. We are planning a 1,000-ton-per-day production rate. The plan is to knock down the Churchill mill this summer and to transport it over the winter road into the camp along with all the necessary supplies and other construction materials. The total crew will be 215 people. We hope to recruit as much northern labour as possible and we have been quite assiduously working with the Indian bands in these two closest villages of Fort Liard and Fort Simpson. The Indian bands have been very forceful on the subject of training and we have assured them that we are planning to institute a training program. (Au)

P-111406
Appendix 1. Demographic implications of mineral developments in Canada's north: the Eastern Arctic Study case studies / Wojciechowski, M.J. (Proceedings, Northern Population Workshop IV: Regional development and the role of population research. Actes du Quatrième Colloque sur les Populations Nordiques: Development régional et rôle de la recherche démographique / Edited by K. de la Barre. - Montreal: Comité on Northern Population Research, Université de Montréal, 1983, p. 208-223, figure) ACU This paper is an outline of objectives and study methods used in the Eastern Arctic Study of four mineral development cases (Nantisilik, Polaris, Baker Lake, and Beaufort Sea). Notes for each of these developments deal with project description, communities affected, chronology, major issues arising from development, and the environmental, social and economic impacts for each area as a result of resource development. (ASTIS)

P-115428
Macmillan Pass/Howard's Pass task force / Foster, T. (Northern mining in the 80s: proceedings of the Northwest Territories Chamber of Mines 'Mining Days 1981', Yellowknife, April 8-9, 1981 / Edited by M.T. Wojciechowski. Kingston, Ont.: Queen's University, 1981, p. 87-90) ACU At an initial meeting on planning for future mineral development in the region held in Whitehorse in December 1980 it was decided... to set up a 'task force' of key industry and government representatives. The purpose of the task force is to provide an industry-government forum for discussion and cooperation to ensure that the mineral deposits in the Macmillan Pass/Howard's Pass regions are developed in an orderly manner and in the best interests of the people of the region. To facilitate decision making, the task force is operating within well-defined guidelines. The task force will discuss and reach agreement-in-principle regarding: 1. the standard and location of all the infrastructure, facilities and support services needed for the region, including the rebuilding of the North Canol Road, a permanent access road to the Howard's Pass area, a regional airport, power supply, worker accommodation and training facilities; 2. the responsibilities of each level of government and each mining company for planning, designing and constructing or implementing the necessary infrastructure and services; 3. the funding of the necessary infrastructure and services, including provisions for possible cost-sharing between government and industry; 4. [collecting and compiling] the necessary information for carrying out a preliminary cost/benefit analysis of the proposed mineral developments to justify public expenditures for infrastructure and support services; 5. the responsibility to oversee and direct the operation of any subcommittee established by the task force. (Au)

See Also: B-122734, B-122840, B-122890, F-7137, J-4944, J-7129, Q-116184, R-77585, T-106178

Q - PETROLEUM, NATURAL GAS, AND PIPELINES

Q-485
A review of application techniques of dispersants and physical environments is presented, and on the basis of this review, three application platforms appear to be worthy of further study: a heavy lift helicopter, such as the Sikorsky S-6, the Canadian CL-215, and the Lockheed L-100-30. Dispersants were analyzed for their applicability to the Arctic environment, and it is recommended that concentrate dispersants be examined further. A cost and time analysis of using dispersants in the southern Beaufort Sea is performed. Under "best-case" conditions the total cost to disperse 20,000 cubic metre of oil is calculated to be $10,000,000 over an 8-day operational period. These costs relate only to dispersant purchase, shipping and application, and do not include manpower or ancillary support, such as shelter, food, waste disposal and recovery of empty drums. (Au)

Q-2850


Prepared by the Canadian Wildlife Service and funded by the Environmental-Social Program, Ottawa, Government of Canada.

References:
ACU, SSU

The routes of the proposed Mackenzie Valley Pipeline were surveyed in order to identify potential conflicts with Dall sheep (Ovis dalli) or their habitat. Preliminary surveys in 1971 and 1972 identified possible areas of conflict, and more intensive studies were carried out in 1975. The pipeline route avoids sheep habitat throughout the upper reaches of the Mackenzie Valley. No direct destruction of sheep habitat seems likely as a result of pipeline construction, but activities associated with both construction and maintenance of the pipeline might be detrimental to the sheep populations. Additionally, there is concern for a small group of sheep in the Firth River area of the British Mountains. That group is not near a pipeline route, but they are on a natural aircraft flight corridor through the mountains that would be heavily used if the coastal pipeline were built. (Au)

Q-2858

Waterfowl populations observed along the proposed Mackenzie Valley gas pipeline route (1973) was surveyed by aircraft to document waterfowl and aquatic bird numbers and species. Detailed maps and charts delineate individual and groups of wetlands that provide essential requirements for significant numbers of waterfowls and aquatic birds. These data suggest that pipeline routing does not directly influence the more valuable wetland habitats of the region. (Au)

Q-2863

Some questions about the Arctic gas pipeline / Canadian Arctic Gas Pipeline Limited. / Toronto : Canadian Arctic Gas Pipeline Limited. 1976. 1 portfolio : map : 30cm.

ACU

A folder containing questions and brief answers on the proposed Arctic gas pipeline - its feasibility, environmental aspects, economic benefits, and its impact on the native peoples' land claims. (ASTIS)
Q-3280
3v.: ill., photos., maps (part. fold.), tables, charts; 28cm.
Prepared for Panarctic Oils Ltd. and Elf Oil Exploration and Production Canada Ltd.
References.
ACU, AGPO

This study was undertaken to assess the possible impact of summer drilling activity on the wildlife and terrain of Banks Island. The report contains an extensive literature review and covers such subjects as: arctic fox, caribou, muskoxen, lemming, snow geese, wolves, polar bear, fisheries and hydrology, and terrain. (ASTIS)

Q-3972
(technology development report - Canada. EPS. Environmental Impact Control Directorate. EPS-4-EC-77-5)
References.
ACU

With increasing levels of offshore petroleum exploration in the Beaufort Sea, there is an urgent need to be able to define the behaviour and fate of a major winter oil spill. Much of the drilling activity centers on the area of dynamic ice called the transition zone, between the 20 and 100-m water contours. This report combines data from a months winter field study of ice conditions, with other sources such as AIDJEX and satellite photography. The resulting statistical description of ice conditions in the Beaufort Sea is then used to generate a model of oil disposition under a moving ice sheet in the event of an oil blowout. Major areas for future study are identified as oil migration in multi-year ice, the effects of gas on oil behaviour and hourly ice drift rates. Realistic spring oil migration rates through the ice sheet are applied to a typical set of ice conditions and a rough mass balance estimate is made of oil remaining at the end of the first summer. Oil films are generally thin (<0.5 cm). Based on available ice drift information, less than 10% of the contaminated area could be partially cleaned by burning. Evaporation would account for between 35 and 55% of the oil. By September it is estimated that about 30 to 50% of the original oil volume would remain on the water, ice or shore. (AU)

Q-5037
References.
ACU

The Mackenzie Valley Pipeline Inquiry, conducted by the Honourable Mr. Justice T.R. Berger, undertook to explore thoroughly the issues surrounding the building of a northern pipeline. In doing so, the Inquiry provided a forum for the display of the technical and environmental issues with very personalized social and cultural concerns. As a process, it reached out beyond the direct participants: It became one in which all Canadians, north and south, participated. It touched some of Canada's deepest concerns - concerns about energy policy, resource allocation, the price and priority of industrial development, cultural sovereignty, and self-definition. These have become national concerns, not just regional. And so, no matter what the final decision is about the pipeline, the Inquiry will have a profound and lasting national influence. (AU)

Q-5444
References.
ACU

In connection with recent natural gas discoveries in the Mackenzie Delta Area of the Northwest Territories, Imperial Oil Limited is planning the construction of a gas gathering and processing facility. Present production occurs from well clusters from which natural gas will be transported through flow lines to the processing plant. The gas will be processed for entry into a main gas transmission line system. Associated with the plant will be various surface facilities including a dock, airstrip, connecting roadway system and pads. The clusters, flow lines, plant and support facilities are to be located in the flood plain of the Mackenzie Delta. The construction of roads, pads and an airstrip involves the placing of fill material in various configurations on permafrost. The design of these facilities has required extensive consideration of the thermal and hydrologic regimes in the area. The results of studies dictate that embankments be generally five feet thick with two inches of insulation. Total granular and insulation requirements for the project are approximately 1.5 million cubic yards and 13 million board feet respectively. Current planning and execution of the project are based on completion of construction for the plant, support and surface facilities, coincidental with the completion of the gas transmission line. (AU)

Q-6351
The prolific pipeline: finding oil for Canol / Barry, P.S. (Dalhousie review, v. 57, no. 2, Summer, 1977, p. [205]-223, map)
ACU

Describes the oil exploration and production conducted in the Mackenzie Valley to provide crude oil for the Canol Project during 1942 to 1945. (ASTIS)

Q-6360
The prolific pipeline: getting Canol under way / Barry, P.S. (Dalhousie review, v. 56, no. 2, Summer, 1976, p. [252]-267, map)
ACU

Conceived and financed by the U.S. War Department during W.W.II, the Canol project entailed the building of a pipeline to carry crude oil from Imperial Oil's Norman Wells oil field on the Mackenzie River to a refinery at Whitehorse, Yukon where the fuel would be accessible for military traffic on the Alaska Highway and the Northwest Staging route.
Originally estimated to cost $30 million, later figures estimated the cost at $130 million. The rise in cost was attributed to the numerous ancillary projects that were generated in connection with Canol, i.e., the building of roads, construction of accommodations for troops, construction of barges for freighting machinery. (ASTIS)

Q-6394
Top. : 28cm. ISBN 0-88862-164-7
A guide to Northern Frontier, Northern Homeland: the report of the Mackenzie Valley Pipeline Inquiry. References. ACU

This guide has been written to assist Canadian secondary school teachers to explore uses of the Berger Report in their classrooms. The Report challenges Canadians to face very serious questions concerning the nature of Canada, the value of its unique environment, the worth of each individual within its borders and the processes of development in its communities and throughout the world. The Berger Report cannot be ignored by the government of Canada. If only for this reason, it should not be ignored by our schools. (Au)

Q-7978

ACU

In reviewing the Report, it became evident that Justice Berger developed several scenarios to support his case. These were based on incorrect or inadequate interpretations of much of the data presented, the use of scientific opinion rather than substantiated scientific data, and statements made that were often backed with no data or reference to facts presented to the Inquiry.... Seldom is the Arctic Gas Consortium given credit for having designed and planned construction of a project based on scientifically sound environmental and ecological data inputs. (Au)

Q-7986

ACU

The second volume of the Mackenzie Valley Pipeline Inquiry conducted by Justice Berger deals with the conditions and regulations to be imposed if a pipeline were built through the Mackenzie Valley. .... It would seem fair to say that most people would consider the recommendations of the Inquiry to be realistic and to be suitable for reducing the harmful impacts on the environment, as well as promoting a strong traditional economy. The only danger is that the indigenous and other people may be deceived by believing that "living off the land" is more productive than is scientifically demonstrable. (Au)

Q-8532

... CANOL, with 1,600 miles of pipeline - twice that of the Alaska Pipeline - and 9,000 miles of supply routes, was built in 21 months by 4,000 U.S. Army engineer troops and 10,600 civilian contract employees. It cost about $133,000,000 and was shut down 11 months after it was completed. .... (Au)

Q-8679

Brief description of sea ice interaction with marine drilling operations on Beaufort and CANMAR in the Beaufort Sea and Sverdrup basin. (ASTIS)

Q-8973

A study of the social and economic effects of CANMAR's drilling operations on the communities of Inuvik, Tuktoyaktuk, Aklavik, Sachs Harbour, Paulatuk and Holman. Short-term boom type industrial activities as they affect the native, the non-native northerner and the transient worker are analyzed and suggestions and options for the future are given. (ASTIS)

Q-8881

... The focus of this review of Cannar's socio/economic impacts is the seven communities in this region. They are Aklavik, Coppermine, Holman, Inuvik, Paulatuk, Sachs Harbour, and Tuktoyaktuk. .... the interests of the communities have focused increasingly on the potential benefit ... for employment and training and, to a growing extent, local services. .... (Au)

Q-11118
Research was initiated in March 1976 to resolve the question of whether or not seismic exploration is injurious to musk rat populations. Three main types of investigations were undertaken, namely: (1) direct effects experiments (injury and stress caused by explosions), (2) population studies (changes in numbers and reproduction), and (3) activity studies (pushup abandonment and behavioral alteration). (Au)


... This paper attempts to evaluate the effects of crude oil on ringed seals primarily, and on harp seal whitecoat pups. Studies were conducted on both the effect of immersion in oil and ingestion of oil on wild and captive seals... (Au)


... The objectives of this study were to: 1. determine if a biodegradation potential exists in the south Beaufort Sea. 2. determine rates of degradation at various temperatures including 0 deg. C by various cultures isolated. 3. determine optimum temperatures for oil degradation and the requirements for nitrogen and phosphorus at optimal and sub-optimal temperatures. 4. determine, if possible, in situ rates of biodegradation. (Au)


... This book is one of a series of six examining the ramifications of possible oil spills during either the initial drilling or extraction and transport stages of the petroleum recovery process. As the title implies, this volume deals with the anticipated effects of an undersea oilwell blowout, or a major spill from a submersed pipeline or tanker ship in ice-cluttered arctic waters. (Au)


... Drilling sump fluids possess chemical characteristics such as high dissolved, total suspended and volatile suspended solids, barium, aluminum, chromium, potassium and chemical oxygen demand which are capable of creating water pollution problems. Screening of the chemical characteristics in relation to acute lethal toxicity results failed to identify any one single parameter responsible for acute lethal toxicity in all samples, but several parameters were implicated for various samples. (Au)

Monitoring of two exploratory drilling sites in the shallow regions of Mackenzie Bay / Hraday, S.E., McMullen, J.D. [Edmonton]: Environmental Protection Service, Northwest Region, 1975. iv. (unpaged); ill., fig., tab.; 28 cm. ([Report] - Industry/Government Working Group in Disposal Waste Fluids from Petroleum Exploratory Drilling in the Canadian North, v. 4) Appendices. References. ACU

Discusses drilling operations, waste inventory, and receiving water monitoring from Imeark B-48 and Adgo F-28, two offshore drilling operations from artificial islands in Mackenzie Bay. (ASTIS)


... This study was undertaken to gather preliminary acute toxicity information on the drilling fluid discharge of an active well... Acute toxicity bioassay procedures involved exposing rainbow trout (Salmo gairdneri Richardson) to varying concentrations of drilling fluid discharge under static conditions for 96 hours... (Au)


... This study was undertaken to gather preliminary acute toxicity information on the drilling fluid discharge of an active well... Drilling fluid discharges from these operations were evaluated in the laboratory using acute toxicity bioassay procedures involving exposure of rainbow trout (Salmo gairdneri Richardson) to varying concentrations of drilling fluid discharge under static conditions for 96 hours... (Au)

Studies were done to determine the toxic effects of four oil well drilling waste fluids on phytoplankton, chironomids, amphipods, and fish from the Mackenzie Delta, N.W.T. Different levels of toxicity were detected in these wastes, and the organisms showed different degrees of sensitivity to the toxicants. (Au)


... Laboratory studies were conducted to assess the effects of thin (1, 3 and 7 mm) layers of waste fluids on the survival of larvae of the chironomid Chironomus tentans (Fabricius), using the emergence of adults as an index of survival. An average of 64% of the organisms emerged as adults from control tanks. Populations treated with 1 mm, 3 mm or 7 mm layers of drilling wastes achieved only 61%, 47% or 12% emergence, respectively. (Au)


... This study was undertaken to assess the magnitude of any water pollution problems associated with abandoned (reclaimed) sumps in the Mackenzie Delta and Arctic Islands. The assessment was to be based on determining whether pollutant leaching from abandoned sumps into subsurface and surface waters occurs. (Au)

Guidelines to prepare an environmental impact statement of the proposed Mackenzie Delta gas project. (ATIS) Presents guidelines in the preparation of an environmental impact statement of the proposed Mackenzie Delta gas project. (ATIS)


... The scope of the present impact study is limited to assessment of the physical and chemical parameters of the ice covered Arctic sea subjected to under-ice crude oil discharges, especially those parameters which strongly influence marine plant growth such as light intensity. These have been correlated with algal activity, diversity, and abundance. (Au)


... The work described in this report concerns the behaviour of the oil/gas mixture as it leaves the pipe exit, its transport to the sea surface, and the locally induced water flows. ... Two separate experiments were undertaken, a full-scale simulation of the gas bubble plume in 60 m of seawater using air compressors, and a tank experiment investigating the behaviour of gas/oil mixtures at an underwater pipe exit. As these two experiments were separate investigations, they are presented as self-contained sections and the major consequences are delineated in a separate section describing a probable blowout scenario. (Au)


The amount of crude oil which may be released to the environment during drilling in the Beaufort Sea is estimated. The effects of oil in terms of the Beaufort Sea surface heat budget are briefly discussed. Considering the amount of oil likely to be released in exploratory drilling, its movement, and its effect on the surface heat budget, it is
estimated that no important climatic effects are likely. (Au)

Q-15855

... The objectives of the investigation are: (1) to establish the baseline hydrocarbon levels in the Southern Beaufort Sea drilling area by measuring classes of hydrocarbons and identifying some specific hydrocarbons in sea water, marine organisms, fish and surface sediments, (2) to assess the origin of present day hydrocarbons, whether anthropogenic or naturally-occurring, and (3) to understand the probable hydrocarbon pathways in case an oil spill or blow-out occurs in the area. ... (Au)

Q-15806

... The program was carried out on behalf of the petroleum industry's participation in the Beaufort Sea Project. ... The purposes of the information program was to develop a two way communication process about the environmental program between the public - particularly the people of the north and industry. ... (Au)

Q-16241

Presents a detailed study of petroleum pollution of sea ice and ice-covered waters by investigating several areas of oil and ice interaction: the plume, area of contamination, incorporation, migration, effect of oil on ice growth, effect of oil on ice depletion, clean-up, and environmental impact. (ASTIS)

Q-16470

A summary of three previous reports on socio-economic-cultural matters, environmental impact and technical aspects of Dome/CANMAR 1977 drilling program. Financial considerations, extension of program into 1978 and 1979 seasons, federal-territorial relations, international aspects and interdepartmental consultations are briefly discussed. Recommendations resulting from the social-economic-cultural review are presented. (ASTIS)

Q-16489

Examines CANMAR's compliance with the Environmental Operating Conditions (E.O.C.). Assesses the adequacy of the E.O.C., oil spill contingency plan and equipment, quality and accuracy of the weather forecasting system, and the transportation support systems. Reviews the extent of environmental monitoring and surveillance and the general weather and ice conditions. Recommends improvements, alterations and modifications of the E.O.C. for proposed continuation of the drilling program in 1978 and future years. (ASTIS)

Q-16487

Assesses the social, economic and cultural impact on the communities of Akavik, Inuvik, Tuktoyaktuk, Sachs Harbour, Holman Island, Coppermine and Paulatuk. Reviews CANMAR's success in meeting with the terms of their Socio-Economic Agreement with the Government of Canada, and the report prepared by Mary Collins Consultants Limited on the social impact of the drilling program on Tuktoyaktuk. Includes recommendations on a program to maximize net benefits to the Beaufort Sea communities. (ASTIS)

Q-16500

Presents results of the technical assessment with regards to Canadian content in equipment purchases, construction, contract services, and compliance with equipment specifications, technical operating conditions. Evaluates the adequacy of control regulations and conditions in order to recommend improvements, alterations
or modifications to technical operations. (ASTIS)

Q-17019

Cover title: ACU

Presents guidelines in the preparation of an environmental impact statement for the construction and operation of a pipeline for the delivery of natural gas from a Mackenzie Delta gas processing plant to the Alaska Highway Gas Pipeline. The environmental impact statement should include an overview summary, description of project - including information on alternatives, associated projects, construction, operation and maintenance, investigation of the environmental, land, resources, demographic and social settings, assessment of environmental impacts and mitigation of impacts. (ASTIS)

Q-17485


Report submitted to Environmental Emergency Division, Environmental Protection Service, Northwest Region. ACU

... Test sections of four potential liner materials were installed at a tank farm near Yellowknife, N.W.T. The four liner systems were: a processed bentonite, which was mixed with in-situ soils; a molten, spray-applied sulphur, which formed a rigid liner; two urethane coatings, spray-applied onto a fabric backing; and two types of urethane foams. ... (Au)

Q-18309

[Economic and technical review report - Canada. EPS. Environmental Impact Control Directorate, EPS-3-EC-78-12) ISBN 0-662-10180-4


ACU

The work consisted of the development of a reliability analysis capable of generating blowout probability predictions for artificial island and drillship drilling systems used for exploratory drilling in the South Beaufort Sea. Human, environmental, and equipment failure risk factors were considered in the analysis. ... (Au)

Q-18775

ACU, NFSMO

... This report is an environmental assessment and by assuming hypothetical worst-case oil well blowout scenarios, examines the nature of the transport and fate of oil in the Beaufort Sea and draws conclusions regarding the impact of the oil on the environment, including climate, seabirds, marine mammals and other marine organisms. ... (Au)

Q-18783

(Journal of Canadian Petroleum technology, v. 17, no. 2, April /June 1978, p. 73-79, ill.)


References. ACU, NFSMO

... The islands have been designed to withstand waves in the area plus loading of ice sheets of up to 7 feet thick. Imperial has constructed 13 islands in water depths ranging from 6 feet to 28 feet employing three different construction techniques. ... (Au)

Q-19321

ACU, NFSMO

... I will briefly outline the physical environmental conditions to which the islands are exposed; describe how the island design contends with the environmental conditions; and, finally touch on some of the construction and operational constraints in building artificial islands in the area. (Au)

Q-18950

... Gas hydrates possess ice-like physical and electrical properties which make possible their detection by appropriate logging methods. Their
[20p. : 28cm.]
References.
ACU


Sump studies / French, H.M. Canada. Arctic Land Use Research Program. Ottawa : Dept. of Indian and Northern Affairs, 1978 -.
vol. III. maps : 28cm.
(Environmental studies - Canada. Northern Environmental Protection and Renewable Resources Branch, no. 6)
ISBN 0-662-10182-0
Prepared for the Arctic Land Use Research Program.
Contents: Phase 1. Terrain disturbances.
References.
ACU, SSU

Forty-seven abandoned wellsites in the Mackenzie Delta and Arctic Islands were analysed with respect to terrain and land use problems encountered. Approximately 30% of the sites visited experienced problems related either directly or indirectly to sumps and/or the containment of waste drilling fluids. ... A number of possible alternate sump fluid disposal methods are mentioned. ... (Au)

[20p. : 111., figures : 28cm.]
Cover title.
Q-23248
[66] p. : figures ; 28 cm.
(Annex - Canada. DIAND. Steering Committee on Dome/CANMAR Operations, no. 3)
ACU, SSU, NFSMO

Modifications to Dome/Cannar's vessels and equipment recommended in the 1977 Technical Review Report were completed during the winter period of the drillship fleet. Further modifications and improvements to equipment were undertaken during the 1978 drilling season and together with a maintenance program, helped to increase efficiency. The Primary and Supplementary Conditions of the Drilling Authorities were met by Dome/Cannar during the 1978 drilling season. ... (Au)

Q-23256
(Final report - Canada. DIAND. Steering Committee on Dome/CANMAR Operations, 1978)
Appendices.
ACU, SSU, NFSMO

As directed by Cabinet in May 1977, the Beaufort Sea Drilling program of 1978 has been subjected to a thorough review. The object of this report is to acquaint Cabinet with the findings of this review in terms of social-economic-cultural matters, environmental impact and technical aspects. (Au)

Q-23240
Feasibility study exploratory drilling systems Beaufort Sea / Acres/Santa Fe Pomery Arctic Services. [Calgary : Distributed by APDA, 1971]. 7 microfiches : 11 x 16 cm.
(APDA project no. 12 : Feasibility study of exploratory drilling in the Beaufort Sea. Report, no. 1, 2)
Appendices: ACU, NFSMO

... The study area was confined to within the 200 ft. isobath, stretching east-west from Cape Bathurst to Herschel Island, encompassing therefore, both polar pack ice and shore-fast ice. The project was started in November 1970 and completed in October 1971. Design criteria were developed for eight design zones within the study area. In the first part of the study some 59 alternate designs for year-round concepts were developed and seven seasonal concepts were considered. In the case of year-round concepts, preliminary designs for concepts were provided together with fairly comprehensive cost estimates for concepts, ancillary and support units such as dredges, derrick barge, supply boats, etc. Also considered were methods of construction, logistics problems and preliminary schedules for final design and construction, transportation and operation. Problems of mobilizing a major structure in the Arctic or round Point Barrow and those of Arctic field construction were investigated in the second part of the study. A more detailed study was performed on a conical structure for a maximum water depth of 120 ft. A detailed cost estimate was worked out including all charges for design, construction, towing, insurance and ancillary equipment. (Au)

Q-23388
(Socio-economic program - Polar Gas Limited) Appendices.
References.
ACU, DON

... To serve as a guide to their documentation. In 1976, Polar Gas requested a review of the key documents produced with respect to pipeline projects in Alaska and the Mackenzie Valley. The purpose of the review was to sort out the hypothesized impact mechanisms, effects, and suggested ameliorative measures, and to check many of the more important assumptions or conclusions against actual experience. ... (Au)

Q-23396
Bibliography: p. [144-147].
ACU

... This report discusses the results ... for the period of October 1970 to November 1971. Caribou were not seriously disturbed by exploration equipment during the fall of 1970 and 1971. The appearance, noise and possibly odour from the camps was attributed to an avoidance of them by caribou. Few observations of the reaction of muskoxen to seismic exploration camps have been obtained. Circumstantial evidence suggests muskoxen will avoid camps but reoccupy areas after the camps have departed. ... Arctic fox whelps were attracted to staging sites on the coast and to mobile camps inland. Some foxes followed the camps for periods of up to 3 weeks during the fall of 1970. Foxes were associated with permanent staging sites for a longer period of time than with seismic camps. This is probably due to the availability of food and permanent shelter. ... (Au)

Q-24449
Arctic drilling barge study / Westburne International Industries Ltd. Foundation Company of Canada Limited. SEDCO, Inc. [Calgary : Distributed by APDA, 1971]. 4 microfiches : diagrams, tables ; 11 x 16 cm.
(APDA project no. 13 : Arctic drilling barge study. Report)
Appendices.
References.
ACU, NFSMO

Purpose: To determine the best configuration for a self-contained exploratory drilling barge capable of offshore drilling in the Beaufort Sea for the maximum number of days during what is known as the "open water season". It must also be able to work through the longer winter season either by transferring equipment to a land site, or by drilling with the vessel frozen into a sheltered harbour, or both. Estimate the capital and operating costs involved and provide an overall daily operating cost. ...
cost based on two and five year contracts. The study includes the following main sections: (1) Study of the conditions and development of criteria for design, operation and access. (2) Preliminary design of drilling equipment, living quarters, barges, mooring system and wellhead equipment. (3) Operating efficiency, logistics and costs. The study covers the Beaufort Sea within the 600 foot isobath from the coastline to 70 deg. N and from a line 139 deg. W to a line 128 deg. W. The prime work area is in water depths less than 250 feet with maximum interest in areas with water depths between 50 feet and 150 feet. ... (Au)

Q-24481

Purpose: Study of the actual and potential economic benefits of oil, gas and minerals to northern settlements. Systems analysis of the economics of resource in the north, the contribution to the national livelihood and ways of increasing this contribution. Analysis of labour requirements and skills locally available. The study will be primarily based on the collection and interpretation of existing data. (Au)

Q-25589
Beaufort Sea exploratory drilling system / Westburne International Industries Ltd. SEDCO, Inc. [Calgary: Distributed by APDA], 1971. 2 microfiches: figures, maps, tables: 11x16cm. (APDA project no. 30: Beaufort Sea exploratory drilling systems. Report, no. 1) ACU, NFSMO

... The purpose of this study is to investigate, compare and recommend the most advantageous drilling system for the area. Consideration must be given to the maximum operating time coupled with the minimum capital and operating costs. The study will be safety - both to personnel and to the environment. More specifically, the object of this study is to: 1) Review environmental data and reports furnished by bonus block owners. 2) Study, evaluate and recommend a drilling system. 3) Estimate capital and equipment costs, plus estimated operating and standby day rates calculated on a five-year program. 4) Forecast drilling days in the specific areas of interest. 5) Evaluate relative safety of operations. 6) Evaluate various exploratory drilling plans for summer and winter drilling. ... (Au)

Q-24520
Arctic offshore pipeline feasibility study in Mackenzie River Delta area / Brown (R.U.) and Associates. [Calgary: Distributed by APDA], 1973. 9 microfiches: figures, maps, tables: 11x16cm. (APDA project no. 39: Arctic offshore pipeline feasibility study. Report) Reviewed by document number 42277. ACU, NFSMO

Purpose: To determine the technical feasibility of installing pipelines offshore Mackenzie Delta to the 150' water depth contour. Estimates of installation costs are to be provided in order to establish economic feasibility. Laybarges, Pull, and Real-barge pipelaying methods are to be considered. Limits of technical applicability for each method are to be established and problems identified. Thermal effects of the pipeline will be examined and adequate measures to prevent melting of any existing offshore permafrost will be considered. The study will analyze available scarf information, evaluate risk and determine pipeline burial requirements and costs. Trenching techniques form an important aspect of the study. The project is essentially a feasibility study of Arctic offshore pipelines and not a detailed design for a specific line and route. ... (Au)

Q-25410

... This report summarizes the Alaska Highway Pipeline Panel's assessment of the physical, biological and socio-economic impacts of the Dempster pipeline and associated activities. In making this assessment it has been necessary to evaluate the impacts of the recently completed Dempster Highway as well as pipeline, gas gathering systems and other consequential support activities that will inevitably follow if a gas pipeline is built. It has a sound management strategy is planned and there is assurance that it will be implemented, even correct prediction of impacts will be of little use. ... (Au)

Q-25577
Study of Beaufort Sea exploratory drilling systems / Global Marine Inc. Gulf Oil Canada Limited [Sponsor]. [Calgary: Distributed by APDA], 1971. 2 microfiches: figures, maps, tables: 11x16cm. (APDA project no. 30: Beaufort Sea exploratory drilling systems. Report, no. 2) ACU, NFSMO

... Safety of the environment, personnel, well and vessels has received primary consideration. This is reflected in the recommendations of equipment and techniques. The environmental considerations are discussed and certain characteristics are quantified by hindcast techniques or actual measurement. A matrix presents the candidate drilling systems and summary results of the evaluation. The Ice Breaking Drilling Ship (IBDS) design considerations, approach and development are described. Consideration is also given to the ship's non-arctic deployment. Representative ship equipment selections, special features, outfitting, drilling and subsea equipment are included. A Safety Intelligence Room (SIR) is described, encompassing the vessel's communication and intelligence center. Ice detection, identification and tracking systems will receive data and a central plot will be established, integrated communications and environmental (meteorological) reports will also be handled in this area. One of the most important and least predictable duties of the support vessels will be to encounter and divert moving ice floes which present a potential hazard to the moored drilling ship. An analysis of this situation is included. ... (Au)

Purpose: To assess the impact on the local ecology of possible hydrocarbon development in the Mackenzie Delta area. The study will supply environmental advice and services based primarily upon an assessment of potential impact of the construction, operation, and maintenance of natural gas production, processing and associated gathering facilities on the land and water of this ecological system. A comprehensive projection of the type and extent of environmental impact will be prepared at the conclusion of the study. (AU)


This report summarizes results of field experiments designed to demonstrate some practical aspects of weathering and burning of crude oil in a water-and-ice environment. The program investigated: (1) weathering and burning characteristics of light (Norman Wells) and heavy (Swan Hills) crude oil; (2) effectiveness of burning as a method of clean-up as compared to weathering and losses through evaporation; (3) methods of ignition; (4) effectiveness of fire promotive and wicking agents; (5) characteristics of unburned residue. Experiments were carried out during the period from April 28 to May 28, 1976 at Yellowknife, N.W.T. (AU)


In the event of an oil spill or blow-out in the Beaufort Sea, the number of waterfowl that become oiled could be reduced by the activation of a contingency plan that includes effective means of both dispersing birds from the area and deterring birds entering the area. This study was conducted during July and August 1977 to test the effectiveness of three devices to deter and/or disperse water birds (primarily moulting waterfowl) from a semi-enclosed bay on the Beaufort Sea coast. The devices tested were a propane-operated cannon, an Av-alarm electronic sound-generating system, and a helicopter. (AU)

Proposal to evaluate an oil containment boom for use in ice-infested waters / Arctic Canada Limited. Canadian Marine Drilling Limited [Sponsor]. [Calgary : Distributed by APOA], 1975. 1 microfiche : ill., figures ; 11x16cm. (APOA project no. 100 : Evaluation of the Bennett Canmar oil containment boom. Report, no. 1) References. ACU, NFSMO

This proposal presents a methodology for testing a new type of oil containment boom which has been recently developed by Bennett Pollution Controls Ltd. and Canmar Drilling Ltd. The tests proposed will allow a conservative evaluation of the maximum sea state in which the boom can contain oil. The test series will include various endurance tests in a cold-environment of the boom materials. Finally, tests will be conducted to evaluate the boom's icing tendencies in a simulated sea state. It should be noted that the tests proposed herein are not construed as a complete evaluation of the Arctic boom. The tests are designed to provide answers to three questions: 1. What sea states can the boom function in? 2. Are its materials suitable for their intended use? 3. Will the boom's performance be seriously degraded in icing conditions? (AU)

... The purpose of this study was to evaluate the behavior of the boom and of its components in Arctic conditions. The tests were to be used in three ways: 1. As a basis for modifications to the boom to improve its effectiveness. 2. As a basis for comparative evaluation for purchase. 3. As documentation of the suitability of the boom as a major component of a Beaufort Sea oil spill contingency plan. In order to document the boom characteristics, the test program has been conducted to provide data on: 1. physical and biological environments / Alaska Highway Pipeline Panel. Interdisciplinary Systems Ltd. (Winnipeg : Alaska Highway Pipeline Panel, 1978. 2v. : ill., figures, maps (part. fold.), tables : 28cm.) Contents: Report 1: Dempster and Klondike segments. Report 2: North Delta segment. References. ACU

... Each of the ... research reports deals with a specific component of the environment: land, water, air, mammals, birds, fish, vegetation, heritage and land use. Each of these reports describes the nature of the problems arising from the effects of future activities within the Dempster Corridor on various parameters, presents the environmental setting and problem definition for each parameter, and gives conclusions and recommendations to control or mitigate potential impacts. ... (Au)


... The overall conclusion from the studies to date are that both crude and diesel oil act as defoliants, but neither completely eliminates below-ground storage organs at the intensities we have used. Above-ground effects are very severe, but certain species are capable of survival or of producing new shoots in the first few years following a spill. ... the initial effects of a crude oil spill on vegetation has many similarities to that of a fire. Post-spill data indicate that in addition, post-recovery patterns may also be quite similar. ... (Au)
countermeasures, logistics, and environmental sensitivities in the study area are documented on maps, overlays and supporting text. Two summers of fieldwork were required to collect the site specific and operational information pertinent to oil spill response. ... (Au)

0-30058
Oil spill countermeasures for the southern Beaufort Sea / Logan, W.J., Thornton, D.E., Ross, S.L. Victoria, B.C. : Beaufort Sea Project, Dept. of the Environment, 1975. 2 vols. : Ill., maps, graphs, tables : 28 cm. (Technical report - Canada, Beaufort Sea Project, no. 31a, 31b) (APDA project no. 72 : Beaufort Sea Environmental Program. Report, no. 31a, 31b) Bibliography: p. 124-126 Contents: no. 31a Report - no. 31b Appendix. No. 31a also available in microfiche. ACU, NFSMO This report discusses the feasibilities of controlling and cleaning up an oil spill in the Beaufort Sea as a result of an exploratory well blowout. It is likely that, in waters with up to 10% ice concentrations, currently available oil spill countermeasures equipment and techniques could be employed in sea conditions up to Beaufort 3. No equipment is available for use in higher sea conditions. If the blowout were to occur in the landfast ice zone, oil that would accumulate at the under-ice surface during winter could be incinerated in place when the oil migrates to the ice surface in the springtime. No viable techniques or proven countermeasures equipment are available for use in the seasonal pack, shear zone and the polar pack zone. The cleanup and restoration of oil contaminated shorelines would be limited to sand beaches and to a lesser extent, shingle beaches, which together comprise 37% of the Beaufort Sea shoreline. Remote sensing of oil spills, although untried in the arctic environment, would be limited to periods of good visibility. In general, the logistical base required to support an effective oil spill countermeasures operation is not available in the areas adjoining the Beaufort Sea. (Au)

0-30074
Resources and planning of the federal government for oil spill countermeasures in the Beaufort Sea / Ross, S.L. (Proceedings - Arctic Environmental Workshop, 6th, Fairmont Hot Springs, B.C., April 17-20, 1977 / Edited by J.G. Gainer, W.J. Logan [and] D. Mackay. Ontario : Institute for Environmental Studies, [1977]. Publication - Toronto. University, Institute for Environmental Studies. EE 6, p. 43-53, maps) ACU, NFSMO My responsibility in this presentation is to outline the activities in the federal government directly related to the development of an oil spill countermeasures capability in the Arctic, and in particular, in the southern Beaufort Sea. ... I would like to ... outline what these activities are; briefly explain the thinking and history that has led to present programs; discuss the apparent and/or real problems that have to be solved; and finally make a case for better coordination of government and industry planning and efforts in this area. ... (Au)

0-30082
The physical environment of the Beaufort Sea related to oil, ice and water interactions / Milne, A.R. (Proceedings - Arctic Environmental Workshop, 6th, Fairmont Hot Springs, B.C., April 17-20, 1977 / Edited by J.G. Gainer, W.J. Logan [and] D. Mackay. Ontario : Institute for Environmental Studies, [1977]. Publication - Toronto. University, Institute for Environmental Studies. EE 6, p. 43-53, maps) ACU, NFSMO A main reason for this workshop is to stimulate new ideas and concepts for oil spill countermeasures in the Beaufort Sea. ... I will cover, briefly, the main features of its physical marine environment in relationship to oil pollution which could result from a subsea oil well blowout. ... (Au)

0-30090
Workshop on Arctic offshore environmental concerns ... (Proceedings - Arctic Environmental Workshop, 6th, Fairmont Hot Springs, B.C., April 17-20, 1977 / Edited by J.G. Gainer, W.J. Logan [and] D. Mackay. Ontario : Institute for Environmental Studies, [1977]. Publication - Toronto. University, Institute for Environmental Studies. EE 6, p. 65-78) ACU, NFSMO ... the Arctic Offshore was defined as those Canadian Arctic waters of the Beaufort Sea, those surrounding the Arctic Islands, Hudson Bay, Hudson Strait and the Baffin Bay, Davis Strait and Labrador Sea regions. The session was subdivided into four topic areas, the first three being established on the basis of predetermined "questions" and the fourth dealing with the Eastern Arctic Marine Environmental Study. ... (Au)

0-30104

0-30120
Experimental crude oil spills on Arctic plant communities / Wein, R.W. Bliss, L.C. (Journal of applied ecology, v. 10, 1973, p. 671-682, tables) (APDA project no. 37 : Arctic environmental research, tundra and ecological studies on the Mackenzie Delta and Devon Island. Report) References. ACU, NFSMO ... the objectives of this study were to determine the initial and long-term effects of crude oil on the survival and re-invasion of Low Arctic plant species. Supplementary measurements of physical and moisture balances in the soil aided interpretation of the plant responses. The research was conducted at three sites in north-western Canada just to the east of the Mackenzie Delta. Inuvik is located 115 km from the Arctic coast. Tuktoyaktuk is on the coast and Tununuk Point is about midway between the two. The community types, soil surface characteristics, maximum active layer depths, plot sizes, and date of oil application are given ... (Au)
Interim report to APOP, Steering Committee, Mackenzie Delta and Devon Island. Report


ACU, NFSMO

...Fire stimulated the growth and flowering of Eriophorum vaginatum subsp. ssimus and Calamagrostis canadensis. The recovery of dwarf heath shrubs from rhizomes was relatively rapid while lichens and mosses showed no early recovery. Crude oil spilled in different plant communities killed the leaves of all species, yet regrowth occurred on some woody species the same summer and more species showed regrowth the second summer. Oil spilled in early winter (October) and in wet sedge communities in summer appeared to be most detrimental. Percentage plant removal has been significantly reduced with changed seismic technology in the past 6 years. Native species, often from rhizomes, made all lines through recovery on peats and by native grasses appears most rapid. Winter roads of compacted snow were less detrimental to wetland sedge communities than to upland shrub-sedge-heath ones. ... The different plant community-topographic-soil-ground ice landscape units or system respond differentially to the different surface disturbances tested to date. This is true in both the Low and High Arctic. (Au)


...Experimental areas in the Mackenzie Delta were located at Inuvik, Tuktoyaktuk and Tununuk Point (on the southern tip of Richard Island). Five landscape units (vegetation, climate-topography-permafrost conditions) were selected as study sites. At each site crude oil was applied in the spring, summer, and late fall. The last treatment was applied within the snow cover was eight inches deep. ...In conclusion it should be pointed out that although oil spills on land have occurred many times before and have been studied scientifically, we do not know how much of this information is applicable to the Arctic tundra. (Au)


...The purpose of this Interim Report is to update the understanding of the concerns and perceptions of the various publics. In so doing, it provides a "Design" for future communication activities which will be directed to developing a climate of mutual understanding between all those with an interest in the long term status of the Beaufort Sea. This work is particularly oriented toward the environmental surveys being conducted by the federal Department of the Environment and members of the Arctic Petroleum Operators Association. ...Public attitudes, particularly in the potentially affected communities, has been examined. Our description and assessment of these attitudes and apprehensions are described ... (Au)


...the oil industry has come a long way in the exploration of the Canadian frontier: - in their capability to operate efficiently in increasingly harsh environments; - in their knowledge of the geology of the frontier basins and the habitat of oil and gas in those basins; and most of all, - industry is learning and more readily accepting the need to operate in such a manner so as to minimize the environmental and social consequences of conducting exploration activities. Four large frontier areas in Canada are the most attractive areas in which major frontier oil discoveries can be anticipated: Labrador offshore, Baffin Bay, Offshore Beaufort, Arctic Islands. (Au)


In this paper the author reviews three major environmental studies: The Beaufort Sea Project; Eastern Arctic Marine Environmental Studies (EAMES); and, Offshore Labrador Biological Studies (OLABS). He discusses the Environmental Assessment and Review Process (EARP), the Initial Environmental Evaluation (IEE) and the Environmental Impact Statement (EIS) and their particular place in off-shore oil and gas projects. (ASTIS)


The panel, using the discussion format and case studies, concerned itself with man's actions with reference to the petroleum industry on a) the environment, and on b) the cultural, social and economic conditions including policies, legislation, programs, projects or operational procedures in the Canadian Arctic. Two min
workshops developed from this and the results of each are presented. (ASTIS)

Q-31070
A proposed study of oil and gas under ice / Canadian Marine Drilling Limited. Pistruzak, W.M. (Spill technology newsletter. v. 4, no. 5. Sept.-Oct. 1979, p. 304-313. figures, map) ACU, NFSMO

It is Carrnam's objective to conduct a field experiment this coming winter to determine how successful burning would be as a countermeasure and to optimize burning techniques for oil and gas released from a Beaufort Sea Blowout under first year ice, and to optimize burning techniques. The experiment has the following main goals: a) Understand how the oil behaves in the ice, and especially how gas affects the rates of oil migration to the surface in the spring during the melt period. b) Understand how the oil accumulates on the melting ice, i.e. the thickness, degree of weathering, area, and drift due to wind and melt-water flow. c) To elucidate, if possible, the optimum time for burning oil contained on melt pools so that environmental damage can be minimized. d) Devise and test under realistic conditions, devices which can ignite the oil. e) Measure how much oil is burned, how much remains as solids, and to obtain data on the chemical nature of the residue. Should Dome/Carrnam receive government approval to proceed with the experiment, ... then Carrnam would proceed to discharge oil and gas under Beaufort Sea ice during two different periods of winter (early December and early March) and to monitor the subsequent results. (Au)

Q-31178

"A report fulfilling the requirements of the Scientist and Explorers Ordinance of the Northwest Territories, prepared for Panarctic Oils Ltd." ACPD

... Beak visited the Gulf East Reindeer C-38 and Gulf East Reindeer P-61 sites. ... to determine. In a semi-quantitative manner, the effect of spilled drilling mud on arctic vegetation. ... The approach was mainly through observation with some support using quantitative data. ... The thickness of mud determines the type and quantity of vegetation recolonizing a mud spill. Tussock forming species tend to recolonize the mud spill. Mosses and lichens are usually killed. ... (Au)

Q-31186
Seismic activities and muskoxen and caribou on Banks Island, N.W.T. / Beak Consultants Ltd. Panarctic Oils Ltd. [Calgary; Beak Consultants Limited], 1975 1v. : ill. ; 28cm.

Study conducted for Panarctic Oils Ltd. References. ACU, ACPD

A seismic programme carried out from January 27 to April 9, 1975, on Banks Island, N.W.T. provided an opportunity to study the effects of this activity on muskoxen behaviour, and, peripherally on the caribou. The study concluded that the disturbance is minimal and that at no time were either groups of animals overly disturbed. (ASTIS)

Q-31398
The Dempster pipeline / Foothills Pipe Lines (North Yukon) Ltd. [Calgary] : Foothills Pipe Lines (North Yukon), 1979. 1 portfolio : map ; 29cm.

Describes what the Dempster pipeline project is, who is planning it, what studies are being done for it, and the opportunities for individuals and communities to participate in the construction and operation stages. This information kit is meant to be distributed to residents of the area through which the proposed pipeline will be built. (ASTIS)

Q-32018
The Canol Project : a poorly planned pipeline / Karanasinski, T.J. (Alaska journal. v. 9, no. 4, Autumn 1979, p. 17-21, map, photos.) References. ACU

The lessons learned during the building of this World War II defense project can serve as healthy reminders of what not to do and how not to do it. (Au)

Q-32085
The Dempster Lateral Gas Pipeline Project / Foothills Pipe Lines (Yukon) Ltd. Calgary : Foothills Pipe Lines (Yukon), 1979. 8 vol. : ill., maps : 30cm.

References in each volume.

These materials are the application and supporting information, including facilities required and financial details, environmental and socio-economic impact statements, maps, provision for facilities expansion, and considerations of an integrated transmission system, submitted by Foothills Pipe Lines in order to obtain permission to construct and operate a natural gas pipeline from the Mackenzie delta to connect with the Alaska Highway Gas Pipeline system near Whitehorse. (ASTIS)

Q-32220

ACU, NFSMO

... The purpose of this book is to trace the drift of oil flowing unchecked in an imaginary offshore blowout through the seasons of the year. No mathematical models of oilspill trajectories will be developed. Mathematical representations of sea, wind and ice interactions in the Beaufort Sea lie beyond our present abilities. Much of the text is devoted to the oceanography of the Beaufort Sea and features such as sediments, storm surges, and ice. Diagrams near the end of the book show the possible spread of oil from a blowout for the spring, summer and winter. These predictions show where and when the oil is most likely to appear but do not forecast its actual drift; this cannot be done with any more accuracy than next summer's weather can be foretold. ... (Au)

Q-35386
The need for action-oriented R and D in the Canadian Arctic / Harriston, G.R. Dome Petroleum Limited. (Proceedings - Symposium on Marine Transportation and High Arctic Development :

The world’s most exciting new frontier region is entering a critical phase. When Canada’s Dome Petroleum... announced its first potentially commercial oil strike in the Beaufort Sea, many will have asked the question: ‘Now they have found it, how will they possibly exploit it?’ Our international editor Adrian Cottrill has been to find the answer and discovered that the company already has some fairly clear ideas. He talked with senior Dome engineers in their Calgary Offices, and during a four-day visit to the North, overnighted on a drillship and at Tuk base, to sample the realities facing operations there. His review of Dome’s R and D looks in particular at how Dome is tackling its two chief challenges: evolving an oil production and transportation system for this unique area; and extending the season for the world’s most costly drilling operations. (Au)


With sufficient reserves to make a pipeline economically feasible, the Polar Gas project group is now looking at four alternative routes... to bring Arctic Islands and Mackenzie Delta gas to markets, with each alternative consisting of pipelines from the Delta and the Islands combining into a single line near Great Bear Lake. (Au)

Families of crude oils and condensates in the Beaufort-Mackenzie basin / Snowden, L.R. Powell T.O. (Bulletin of Canadian petroleum geology. v. 27, no. 2, June 1979, p. 139-162, 111., figures, tables) References. ACU

Crude oils and condensates from the Beaufort-Mackenzie Basin have been analyzed chemically in order to establish a genetic classification scheme. The chemical properties of crude oils and condensates are a function of thermal and biological processes as well as the type of source organic matter. By examining many chemical parameters, the effects of biodegradation and primary or secondary thermal alteration have been circumvented as much as possible. ... (Au)
Part I contains a summary of the 1975-1976 activities of the Beaufort-Delta Oil Project Limited together with six background reports. The six background reports describe reviews of the Arctic Petroleum Operators' Association, Report no. 39, on a Beaufort Sea pipeline, project development programs for an offshore pipeline, a review of prior geophysical and environmental studies, geophysical, geothermal and environmental aspects of the southern Beaufort Sea, compiled by EBA Engineering Consultants Ltd. ACGO, NSFMO.

Q-42463

Under the Beaufort : Canada drills in the Arctic / Canada, DIAND.

[Ottawa]: Indian and Northern Affairs Canada, [1980].
42p. : ill., col. photos. ; 26cm.


ACU

A brief overview of the search for oil in the Beaufort Sea, and the Beaufort Sea pipeline project development programs for an offshore pipeline, a review of prior geophysical and environmental studies, geothermal study, shallow seismic, side scan sonar and fathometric data were obtained along with samples of bottom sediments, geophysical measurements and sea water temperature and salinity profiles. (and) then integrated with prior information, analyzed and compiled as Part II in three volumes. Prepared by EBA Engineering of the report and volumes II and III, related maps and drawings. (AU)

Q-43346

A rational and economical solution for the transportation of North Slope of Alaska and Canadian oil and natural gas to the Canadian and U.S. east coast markets / Tikkoo, R.N.

Ottawa : Canadian Arctic Resources Committee, 1980.
4p. : 36cm.

(Arctic seas bulletin, v. 2, no. 5, May 1980)


ACU

The author discusses the favourable aspects of Arctic marine transportation systems as the solution to problems of getting oil and natural gas from remote production areas in Alaska and the Canadian north to the eastern North America markets. (ASTIS)

Q-43885

1976 summer aquatic studies, Arnek L-30 artificial island site and Tuft Point Borrow site / F.F. Slaney & Company.


Prepared for Imperial Oil Limited.

Appendices.

ACU

... This report provides the results of an intensive bio-physical program of aquatic studies at the Arnek L-30 sacrificial beach site before, during and following construction. The environmental effects associated with this major uncontrolled hydraulic fill operation were determined to be of short duration and limited to a maximum radius of approximately 5 km for all bio-physical parameters examined. This report also contains the results of an environmental survey program conducted to assess environmental concerns associated with the construction of a protective breakwater and subsequent dredging activities at Tuft Point on the Tuktoyaktuk Peninsula. (AU)

Q-44504


4 microfiches : 111., figures, maps : 11 X 15 cm.

(Beaufort E.I.S. reference work, no. RWE15V1, RWE15V2)

References.

ACU

This is a two-volume report on a program of environmental impact assessment. Volume I relates research findings to the industrial process being assessed. It comprises an environmental impact statement. Volume II contains an accounting of ecological and other kinds of surveys and research undertaken to provide a factual basis for assessment. It describes environmental studies. (AU)

Q-44857


(Contribution - Washington, University. Dept. of Atmospheric Sciences, no. 522)

(Contribution - Washington, University. Dept.
From field observations this paper describes the growth of first-year sea ice and its interaction with petroleum. In particular, when sea ice initially forms, there is an upward salt transport so that the ice surface has a highly saline layer. Regardless of whether the initial ice is frazil, columnar, or slush ice. When the ice warms in the spring, because of the eutectic condition, the surface salt liquifies and drains through the ice, leading to the formation of top-to-bottom brine channels and void spaces in the upper part of the ice. In winter, oil is released at the surface of these melt ponds, then the oil becomes entrained in thin lenses within the ice. In the spring, this oil flows up to the surface through the newly-opened brine channels and distributes itself within the brine-channel feeder systems, on the ice surface, and in horizontal layers in the upper part of the ice. The paper shows that these processes probably form from the interaction of the brine drainage with the percolation of melt water from surface snow down into the ice and the rise of the oil from below. Finally in the summer, the oil on the surface leads to melt-pond formation. The solar energy absorbed by the oil on the surface of these melt ponds eventually causes the melt pond to melt through the ice, and the oil is again released into the ocean. (Au)

0-48920
Constraints of geologic processes on western Beaufort Sea oil developments / Grantz, A.: Dinter, D.A.
(Oil and gas journal. v. 78, no. 18, May 5, 1980, p. 304-319, maps)
ACU, NFSMO

This article details geologic, bathymetric, geomorphic, and sea ice and permafrost characteristics of western Beaufort Sea which present considerable problems to offshore exploration and pipeline construction between Point Barrow and the International boundary. (ASTIS)

0-46175
Mackenzie delta gas development system / Gulf Oil Canada Limited. Imperial Oil Limited. Shell Canada Limited.
6v., 111 maps; 28cm.
References

ACOOG

These documents outline the techniques and facilities necessary to produce natural gas in the Mackenzie delta area and condition it for transmission to southern markets. (ASTIS)

0-46566
Countermeasures for oil spills in Canadian Arctic waters: the Arctic Marine Oilspill Program / Ross, S.L.
(Ottawa : Canadian Arctic Resources Committee, 1980.)
Excerpts from a paper prepared for the Arctic Marine Oilspill Seminar, Edmonton, 3-5 June, 1980.
ACU

This short report describes the history and activities of AMOP. Details of five projects involving the experimental spilling of oil in a variety of Arctic marine environments are discussed. (ASTIS)

0-47503
(Canadian shipping and marine engineering, v. 81, no. 8, May 1980, p. 23-35, map, ill.)
References
ACU, NFSMO

... In this paper we describe the ice conditions in the southern Beaufort Sea and review the studies that have been carried out of oil-ice interactions. Applying the results to a Beaufort Sea blowout, we estimate the likely physical effects and the disposition of the oil after a winter. ... (Au)

0-47740
Controlling Arctic oil spills / Ross, S.L.
(Spill technology newsletter. v. 5, no. 2, Mar.-Apr. 1980, p. 55-63, ill.)
Based on a paper presented at the ninth annual Environmental Workshop on Offshore Hydrocarbon Development held at Fairmont Hot Springs, B.C., May 4-7, 1980.
ACU, NFSMO

This article discusses the public perception of oil spills, effects of major spills, the different problems posed by a spill during exploration or during production and transportation, how to deal with tanker spills, and the important administrative factors of preparedness and cooperation. (ASTIS)

0-48712
Oil and gas potential of the Arctic / Kirering, F.E.
(Petroleum economist, v. 48, no. 8, Aug. 1980, p. 299-341, map)
ACU

This synthesis of petroleum exploration and discoveries in the Beaufort Sea area and Sverdrup Basin includes a discussion of federal energy policy commitments and technological considerations which may affect the economics and timing of the development of these resources. (ASTIS)

0-48852
Pyramids in the northern sea: newest chapter of the Beaufort saga.
(Oilweek. v. 31, no. 23, July 14, 1980, p. 40-46, ill., map, photo.)
ACU, NFSMO

This article discusses the economic prospects of Dome Petroleum's Kopanoar oil reservoir and the development plans to bring it into production. (ASTIS)

0-49917
Polar Gas adapting proven technology for Arctic lines / Kaustinen, P.M.
This article describes results of Polar Gas' $75 million investment in various studies to determine the best means of transporting gas from the Arctic Islands to market. The "ice hole bottom pull" method of laying a submarine pipeline is described. (ASTIS)
E.C. Taylor.

This article describes how Halliburton Services uses a flexible system of pneumatic silos on transport barges and a tank storage depot at Tuktoyaktuk to supply drilling fluids, muds, and cement products required by Canmar. (ASTIS)

Q-53329
Dome's Beaufort breakout / Sorenson, J. Hartwell, J.-L. (Canadian petroleum, v. 20, no. 6, June 1979, p. 28-30, photos.) ACU, NFSMO

These two articles describe the refitting, including the addition of an ice-breaking bubbler system, done to the new Canmar Explorer No.4 drillship and outline the drilling season start-up activities at Dome's Tuktoyaktuk base and Summer's Harbour, Booth Island. (ASTIS)

Q-55333
Beaufort Sea drilling: can production be far behind? / Keeley, M.A. (Canadian petroleum, v. 21, no. 8, Aug. 1980, p. 12-15, 16-17, 111., photos.) ACU, NFSMO

This article is based on an interview with Canmar president Gordon Harrison. It outlines research in progress on ice-breaking tankers, engineering problems associated with ice forces on proposed deepwater production islands, and the development of improved off-shore drilling techniques. (ASTIS)

Q-55322
LNG pipeline design / Canuck Engineering Ltd. Canada. ENR. (Oil and gas journal, v. 77, no. 35. Apr. 30, 1979, p. 57-60, ill.)

This is a series of three articles assessing the technology for large-scale LNG pipelines ... (is) based on a study made by Canuck Engineering Ltd. for Canada's Department of Energy, Mines, and Resources. The study covers a hypothetical 1,430-mile LNG pipeline from the Mackenzie River Delta, Northwest Territories, to Carolina, Alta., to transport 2,500 MMcf/d. The three articles concentrate on not only the pipe requirements, but on the insulation, hydraulic, pumps, and refrigeration equipment as well. (Au)

Q-54011

Summary of a speech presented at the 5th International Ocean Development Conference, Tokyo, Sept. 1978. ACU, NFSMO

This article describes Dome's activities in the Beaufort Sea, projections for future finds, equipment and capital requirements, and the economics of production and transportation of Arctic gas and oil. (ASTIS)

Q-54038

This article describes escort and support activities of the CCGS John A. Macdonald icebreaker in the Beaufort Sea during a year-long service contract with Canmar. (ASTIS)

Q-54410

Several things are needed before development of Beaufort Sea oil and gas can proceed. ... it must be proven that commercial size reserves exist ... that acceptable knowledge exists of ice forces and in the performance of a production platform system subject to such ice forces. ... that an acceptable knowledge exists of the predicted performance and attendant cost of tankers loading oil in the Beaufort Sea and moving it through the Northwest Passage to markets. Finally ... that environmental risks can be reliably predicted for both production and transportation activities and that such risks are acceptable. (Au)

Evolution of ice research for exploratory drilling / D'Orourke, J.C. (POAC 79 : the Fifth International Conference on Port and Ocean Engineering under Arctic Conditions, at the Norwegian Institute of Technology, August 13-18, 1979, proceedings, v. 3, p. 441-496, II., maps, photos.) AUC, NFSMO

A great deal has been learned about how to operate in the moving pack ice since 1975, and a number of concepts have been developed which permit [Dome] to extend our drilling season, using drillships in the ice. These concepts include: a shorefast ice drilling system, application of coal dust and icecutting to permit the ships to break out of a winter harbour through 5-6 feet of ice, icebreaking operations which permit the drillships to drill in newly-forming ice in the moving pack ice up to 24 inches thick. New concepts are being developed to permit exploratory drilling operations and production operations year-round in the pack ice. These include: a turret-moored drilling system capable of operating in up to 90 feet first-year pressure ridges. Bottom-founded monocoques and caisson structures. We have also designed an icebreaker with novel icebreaking features as a prototype to larger icebreaking vessels and year-round Arctic Class 10 tankers. ... the Beaufort Sea places an additional requirement for research in the areas of: establishing ice and sea bottom design criteria; structural design for Arctic conditions; and a number of support facilities such as navigation, ice prediction systems, and oilspill countermeasure systems. (Au)

Drilling, drilling & pipelaying jobs from Norman Wells expansion. (Northern development, v. 12, no. 4, Fall 1980, p. 8-10, map) AUC, NFSMO

A brief description of the proposed expansion at Norman Wells, N.W.T. (ASTIS)

Terrenn, land use and waste drilling fluid disposal problems, Arctic Canada / French, H.M. (Arctic, v. 33, no. 4, Dec. 1980, p. 794-808, figures, table) AUC, NFSMO

A survey of over 60 abandoned wellsites in the Mackenzie Delta, the Arctic Islands and the interior Yukon Territory indicated that approximately 25% of the sites experienced terrain problems related either directly or indirectly to sumps and/or the containment of waste drilling fluids. These problems are classified as follows: (A) non-containment during drilling, (B) melt-out problems during summer operations, and (C) restoration problems. Fewest problems are associated with one-season winter drilling operations. Two-season winter drilling, in which the sump is left open during the summer, and one-season summer drilling operations present more problems. (Au)

Since 1971 the Environment Protection Board has gathered baseline data for assessing potential environmental impact along portions of the proposed gas pipeline from Prudhoe Bay to southern markets. Major areas of concern are caribou, birds, other wildlife, fish, construction materials and permafrost, water, revegetation, winter roads, fire and training of construction personnel. This report summarizes findings on these areas of concern and outlines further research needs. It offers some preliminary recommendations to eliminate or ameliorate pipeline construction and operation impact on the environment. The report also sets forth the Board's philosophy of environmental protection and sets the stage for impact assessment of this project. (Au)

Mackenzie Valley and two from the Saskatchewan area and their microbiological digestibilities, were investigated under laboratory conditions at 4 deg. and 30 deg. C for the presence of micro-organisms capable of using Prudhoe Bay crude oil as their sole carbon source. (Su)

0-63762


The Mackenzie Valley Pipeline, if it is built, will be the largest single development project ever undertaken in the Western World. It will alter forever the nature of the world's largest remaining unexploited river valley. It will also change, forever, the lives of the Canadians who inhabit that river valley - Dene, Inuit and "other". The Past and Future Land is a book about the people, their land and the proposed pipeline... their voices are heard here just as they have been heard by Mr. Justice Thomas Berger whose Inquiry into the Mackenzie Valley Pipeline has produced one of the most important, and most exciting public dialogues in Canadian history. Martin O'Malley followed the Inquiry from the beginning and in this book he offers a sharply etched portrait of land and people, partly in the words of the people themselves, partly in his own... (Au)

0-63916


References. ACU, SSU, NFSMO

A multi-million dollar environmental research program consisting of thirty-three wildlife, biological, oceanographic, meteorological, sea ice and oil clean-up studies related to the southern Beaufort Sea is described. The studies are designed to provide ecological baselines, a better understanding of the physical environment, knowledge related to the consequences of a possible oil spill and means of oil clean-up in ice-infested waters. Government agencies co-ordinate the program with considerable management and scientific input from oil industry personnel. (Su)


Field and laboratory experiments have been carried out to study the factors which influence the microbial utilization of crude oil. Experiments were designed to investigate the effects of fertilizers (Urea-phosphate) and oil-utilizing bacteria on the alteration of oil applied to plots in the Norman Wells area, N.W.T. and the Swan Hills area of north central Alberta. The relationship between the chemical composition of three oils originating in the Mackenzie Valley and two from the Saskatchewan area and their microbiological digestibilities, were investigated under laboratory conditions at 4 deg. and 30 deg. C for the presence of micro-organisms capable of using Prudhoe Bay crude oil as their sole carbon source. (Su)

0-64025


... Volume One... deals with the broad social, economic and environmental impacts that a gas...
pipeline and an energy corridor would have in the Mackenzie Valley and the Western Arctic. In it certain basic recommendations are made. Volume Two ... set[s] out the terms and conditions that should be imposed if a pipeline is built. (Au)

Q-65811
Meeting the Arctic challenge / Pallister, J.M. (APDA review. v. 4, no. 1, May 1981, p. 9-17, 111., maps)
Further reading: p.17.
ACU, NFSMO

This article defines permafrost, sea ice and the environment as the main challenges to petroleum operations in the north. Presented are some of the systems and solutions being investigated to deal with each unique condition, with particular reference to the five main areas attracting the oil companies: Norman Wells, Mackenzie Delta region, Beaufort Sea, Lancaster Sound/Baffin Bay and the Davis Strait. (ASTIS)

Q-65883
ACU

In 1976, marine drill systems were applied in the Arctic Ocean for the first time. These systems are engaged in oil and gas exploratory drilling 350 km north of the Arctic Circle in the Canadian portion of the Beaufort Sea. They are operated by Canadian Marine Drilling Ltd. (Canmar). These systems comprise a fleet of Canadian drilling vessels including ice-reinforced drill ships, ice-breaking support vessels and a staging base at Tuktoyaktuk. The ships, drilling programs and operating practices are specially designed for and have proved effective in ice conditions that occur during a four month period each year from July through October. Drilling results are promising. Drilling difficulties arise from unique factors such as permafrost and hydrates caused by cold temperatures that existed during the recent history of this geological basin. Special measures are required to prevent ice damage to wellheads caused by the keels of ice floes which plug the drill bit. Offshore research and development has upgraded the technology of these drill systems and brought about realistic concepts for second generation systems. More recently, the focus of this research has been widened to find the technology needed for offshore production and marine transportation of oil and gas in the Arctic Ocean. (Au)

Q-67660
Canol - a northern pipeline 35 years later. (Pipeline, 1981, Mar., p.[1]-[2], photos.)
ACU

The Northern ecosystem can respond on its own and in some ways be enhanced as a result of development ... Built, operated and abandoned in a span of three years from 1942 to 1945, Canol was likely the most hurried, short-lived project of this scale ever undertaken in the north. Unlike pipeline projects today, little effort was made to protect the environment. ... a 120 km (75 mi.) segment of the Canol located above timberline in the Northwest Territories ... has remained virtually untouched since it was abandoned 35 years ago. Revegetation and associated recovery in this tundra section of the project have been natural. (Au)

Q-69264

Appendices.
References.
ACU

A study was performed to locate landfill disposal and temporary storage sites for oiled debris from sand and shingle beaches along the Beaufort Sea Coast from the Alaska-Yukon border to Cape Bathurst. Approximately 317 landfill disposal sites and 223 temporary storage sites have been located. These sites are shown on 1:180,000 scale strip maps and on 1:120,000 scale aerial photographs in the report. This study involved establishing guidelines for site selection, design, construction and reclamation for landfill disposal sites, temporary storage sites and access roads. Limitations on construction, utilization and reclamation due to seasonal problems with terrain stability, logistical support and cost effectiveness were considered. All of the sand and shingle beaches in the study area were identified using aerial photographs and these beaches are shown on 1:150,000 scale strip maps. In addition, alternative or novel landfill disposal and temporary storage techniques were reviewed. (Au)

Q-71323
ACU, NFSMO

... the most serious potential impact from offshore exploration for oil in the Beaufort Sea ... [is] the risk of an oilwell blowout. The concern for such an event arising ... resulted in a series of technical and environmental operating conditions being attached to the Drilling Authorities which are the site-specific final approvals to drill a well. This concern also led to two other interrelated initiatives on the part of the Government: (1) to begin an intensive research and development program of new and improved Arctic oil spill countermeasures techniques and equipment; and (2) to develop a "back-up" Government Contingency Plan for major oil spills in the Beaufort Sea. This latter project is the main subject of this paper .... (Au)

Q-71331
ACU, NFSMO

In the 1970's the Canadian Government decided to issue drilling licenses for oil and gas exploration in certain areas of the Beaufort Sea. In recognition of the remoteness of the areas and the potential for damage in the Beaufort ecosystem, the Canadian Government...
sponsored the development of a plan to deal
with a major spill incident or oil well
blowout. As part of the development process
for the plan, two exercises BREX I, and II
(Beaufort Response Exercise) were held in 1976
and 1977. These exercises made use of scenarios
and problem-solving workshops to assist in
production of the plan. BREX III was the 1978
exercise designed for the purpose of evaluating
the organization and procedures established in
the plan. It was more complex than BREX I or II
in that it required the application of
organizational, managerial, communications and
operational procedures in a simulated setting.
The exercise objectives included: evaluation of
the capacity of the organization to plan,
direct and control response to a major oil
spill in the Beaufort Sea; identification of
organizations and procedural gaps in the plan
and supporting documents; and familiarization
of participants with the working relationships
in this special organization. BREX III was held
from 31 May to 2 June 1978 in the Yukon
Territory Government offices, Whitehorse. ... (Au)

Q-7747

Incendiary device for oil slick ignition / Meikle,
K. M.
(Spill technology newsletter, v. 6, no. 2,
References:
ACU, NSMDO

This article describes results of tests carried
out at McKinley Bay to compare a sandwich
device and a canister-shaped
device and a sandwich configuration, to ignite
oil slicks on Arctic melt pools and other
remote water surfaces. (ASTIS)

Q-7749

Dome Petroleum's oil and gas undersea ice study /
Dome Petroleum Limited, Bulst, I. A.,
Pieczarka, W. M., Dickens, D. F.
(Spill technology newsletter, v. 6, no. 3,
May-June, 1981, p. 120-146, figures, tables)
References:
ACU, NSMDO

... To tie all the previous work on oil
migration and in situ burning together, Dome
undertook a major oil spill experiment during
the winter of 1979/80 in the Beaufort Sea.
Dome's objective in this field experiment was
to determine how successful burning would be as
a countermeasure and to optimize burning
techniques for oil and gas released from a
Beaufort Sea blowout under ice. ... The
experiment took place in three phases,
approximately eight kilometres offshore in
McKinley Bay in the Beaufort Sea. In first-year
sea ice. Approximately 19 cubic m of crude oil
were discharged under the ice in conjunction
with gas (air). This oil surfaced in the spring
in pools thick enough to burn. Some 80% of
the oil discharged was removed from the marine
environment. (Au)

Q-7752

Marine transportation of Arctic hydrocarbons /
Mackenzie, M. B., Johansson, B. M., Dome
Petroleum Limited.
(Proceedings - Offshore Technology Conference,
11th, Houston, Texas, April 30-May 3, 1979,
Dallas : Offshore Technology Conference, 1979,
v. 4, p. 2367-2376)
(DTC paper, 3631)
Document not seen by ASTIS. Citation from NRIS,
NSMDO

Arctic marine delivery systems provide an
alternative to pipelines in transporting oil
and gas from the Arctic, particularly for
extensive geological plays identified offshore
in the Alaskan north slope, in the Canadian
Beaufort Sea, and in the Canadian Arctic
Islands. Arctic Class ships must be able to
operate year round in these areas and have a
minimum capability of breaking eight feet of
first-year ice continuously. To achieve
this, ships will have to be constructed to
strength levels even greater than that required
by Canadian regulations. ... Arctic marine
development program is working to demonstrate
the feasibility of Arctic marine transport by
1982, and to build commercial Arctic ships for
1985 operation. The AML-SX4, to be operational
this year, is one in a series of research
vessels to be tested in the program. (NRIS)

Q-7756

[Proceedings] - Federal Environmental Assessment
Review Office Seminar on the Beaufort
Sea/Mackenzie Delta Development Plan, November
13, 1980 / Federal Environmental Assessment
Review Office Seminar on the Beaufort
Sea/Mackenzie Delta Development Plan, November
13, 1980. Canada: Federal Environmental
Assessment Review Office, Environment Canada.
92 p.: 28 cm.
ACU

... The purpose of this seminar was] to inform
participants about the review process
[hold] a presentation on the initial plans of
the proponent, and then to discuss the issues
that those present saw as germane to the
review. This is a transcript of the seminar
excluding the presentation of the proponents
which was to be available separately. (Au)

Q-7757

Hydrocarbon development in the Beaufort Sea -
Esso Resources Canada Limited.
Gulf Canada Resources Inc.
[S.l.: s.n.], 1981.
1 microfiche : 111., figures, maps : 11 X 15
cm. (Beaufort E.I.S. reference work, no. RWE31)
ACU

... In July 1980, the Minister of Indian and
Northern Affairs announced ... that hydrocarbon
development in the Beaufort Sea-Mackenzie Delta
Region would be reviewed through the Federal
Environmental Assessment and Review Office
(FAERO) of the Department of Environment. ... (FEARO) has requested that the Environmental
Impact Statement ... must project the possible
effects of responsible development to the year
2000. ... up to now [FEARO] has not required
any industry to project the effects of
development over such a long period of time.
... Identifying possible impacts is a vital
part of impact assessment and development
planning. This evolving process begins with
scenarios based on the industries' best
estimate of technical requirements. Aspects of
initial scenarios are modified to enhance
benefits and mitigate environmental and social
problems during the preparation of the EIS and
ongoing development planning. At the present
time, this evolving process is underway. It
will be completed in the fall of 1981. Hence,
the scenarios presented ... in this document
are to be viewed as those which may be
technically achievable but not necessarily
those which, in the final EIS analyses, are
considered acceptable. (Au)

Q-7758

The Beaufort Sea hydrocarbon production proposal:
draft guidelines for the preparation of an
environmental impact statement for Canada.
Federal Environmental Assessment Review Office.
References.
ACU

Adgo C-15 and Adgo J-27 are artificial islands constructed by Esso Resources Canada Ltd. for exploration drilling in the Beaufort Sea. Adgo C-15, constructed and drilled in 1975, used drilling mud contaminated with mercury, zinc, arsenic, and other heavy metals. Adgo J-27, constructed in 1975 and drilled in 1979, used drilling mud that was very low in heavy metal concentrations. Both islands are in the direct influence of the Mackenzie River Plume, in about 2 m. of water. This study investigated the differences in benthic invertebrate populations between the islands in relation to heavy metal concentrations in the sediments. Invertebrate population densities were examined and correlated with concentrations of metals in the sediments. Multiple regression analysis was used to determine correlations between sediment contamination and invertebrate density. There was no correlation between metal concentrations in the sediments and density or distribution of invertebrates but invertebrate density at one island is significantly different from the other. It appears that the presence of the island may have caused a more favourable habitat to be produced. (Au)

Development of Beaufort Sea hydrocarbons : an opportunity for Canadian industry / Dome Petroleum Limited. Todd, M.B.

Canada is one of the few countries in the world that has the capability to become energy self-sufficient in this decade. There is another potential benefit, however. That benefit results from the industrial stimulation associated with the development of new oil and gas reserves. The undeveloped frontier hydrocarbons will make Canada self-sufficient in the next decade are not easily accessible and require technical innovation and sophisticated equipment and facilities in order to bring the product to market. The development of the necessary technology in Canada and the construction and operation of the facilities to develop, produce, transport and process the oil and gas will provide attractive opportunities for every area of the country, particularly those where strong industrial bases have already been established. (Au)

This report is organized around the Management Assessment Model. Chapters two, three, four, and five are devoted to the main divisions of the model: agency, planning, implementation, and general guidelines or characteristics. Most of the information pertains to Scotland, although much is also included on Alaska. The experience in the Shetlands - and to a lesser extent, Alaska - is considered in greater detail and some major points of comparison are made about the environment and the economic, social, and political circumstances within which oil development has taken place. Chapter seven includes detailed information on the major oil development in the Beaufort Sea and the extent to which these have been controlled by the management system. The final chapter contains some major principles that have emerged, especially from the Shetlands experience. Recommendations are also made for the management of Canadian...
concludes that, before the project can proceed, important deficiencies in the Proponents’ planning and in the preparedness of government need to be rectified. (NPB)

Q-78913
ACU, NFSMD

Beaufort is published ... to provide the general public, and interested parties, background information on the long range development and production of hydrocarbon fuels from the Beaufort Sea and Mackenzie Delta. In terms of engineering and technical skills production is attainable in this region by the mid-80s. Before approval in principle is obtained from the federal government, a detailed report on the possible effects and impacts of such production must be prepared. This report, known as the Environmental Impact Statement, was completed in the fall of 1982. The E.I.S. addresses issues and concerns raised by the production scenario. Beaufort is continuing to report on the progress of E.I.S. activities and the energy industry’s evolving plans. (Au)

Q-79430
Encouraging strikes spur search in U.S., Canadian Beaufort Sea.
(Oil and gas journal. v. 79, no. 51, Dec. 21, 1981, p. 21-26, figures)
ACU, NFSMD

This article presents a run down on Beaufort Sea leases currently being tested. The Beaufort Sea prospects are discussed and evaluated from both the Canadian and American perspectives. (ASTIS)

Q-79634
ACU, NFSMD

The vast computing abilities in today’s microprocessors are assisting Dome Petroleum in its progress toward production from the Beaufort Sea. The various applications of mini-computers and the question of suitable models and hardware are discussed. (ASTIS)

Q-80462
(COOSRA project report, no. C502) Appendices. References. ACU

This report describes the results of field experiments conducted in Waterloo, Ontario and McKinley Bay, Northwest Territories between December, 1979 and May, 1980. The project involved three main phases: wind hardening or natural containment tests of crude oils on a water surface; combustion tests with wind-hardened slicks; and the combustion of snow/oil mixtures in ice cracks. ... Results from these tests for all oil types, showed a good correlation between the thickness of the

---

Beaufort Sea oil and gas development. (Au)

Q-74195
North American Arctic review / Cottrill, A.
ACU, NFSMD

... the Arctic has increased ever more in significance for the offshore oil and gas industry, with major Canadian discoveries now close to being declared commercial and with the start of drilling in Alaska’s Beaufort Sea. In preparing this review, Dr. international editor Adrian Cottrill has talked with top engineers in all the major Canadian and U.S. companies with Arctic interests, to provide the most comprehensive review yet published of Arctic events, outlook and state-of-the-art. (Au)

Q-74381
ACU

The submissions contained in this document result from a request by the Environmental Assessment Panel for public and government agency input to the development of a set of Guidelines for the preparation of an Environmental Impact Statement (EIS) by Dome Petroleum Limited, Esso Resources Canada Limited and Gulf Canada Resources Incorporated. The EIS is to describe predicted environmental and socio-economic effects associated with the Dome-Gulf-Esso proposal to extract oil and gas from the Beaufort Sea/Mackenzie Delta area and transport it to markets. These submissions, along with submissions received by the Panel at the public meetings to be held in November and December, 1981, will be used by the Panel to make amendments to the draft guidelines and produce a final set for transmittal to Dome, Gulf and Esso. (Au)

Q-77542
Document not seen by ASTIS.
ACU

An economic evaluation of Gulf’s Northern Resident Employment Program as implemented in the Mackenzie Delta operations during the 1972-73 and 1973-74 seasons. (NPB)

Q-77720
Document not seen by ASTIS.

Environmental Impact assessment report which

...
oil slick and the two factors of wind velocity and oil volume. An increase in any of the two factors results in a corresponding increase in oil slick thickness and consequently the efficiency of wind burning. A mathematical model of the effect of wind on the burning of crude oil is presented, which can be used to compare the theoretical results with the experimental combustion results. (Au)

Q-80470

Appendices : volume 2.

References.
ACU, NFSMO

Dome Petroleum undertook to simulate a sub-sea blowout under first year ice. The major objectives of this experiment were: 1) to further understand how oil and gas behaved when discharged under ice; 2) to field test various clean-up techniques, particularly in situ burning using air-deployable igniters; 3) to assess the capability to cleanup oil spilled from a sub-sea blowout under ice; and 4) to investigate water-in-oil emulsion formation. Overall, approximately 80% of the total oil discharged was removed from the marine environment by in situ burning, evaporation and manual cleanup. Overflights and shoreline surveys subsequent to breakup revealed no traces of the remaining oil. (Au)

Q-80516
Prospecting for hydrocarbons with geochemical models / Snowden, L.R. [Geos. v. 10, no. 4, Fall 1981, p. 6-10, ill., figures] ACU, NFSMO

Locating prolific high quality source rocks is vital where exploration and exploitation costs are high. Modelling provides oil companies with a sophisticated exploration tool, and helps governments in resource evaluation and management. A different oil generation model was developed for the Beaufort-Mackenzie Basin. This model satisfactorily explains the petroleum discoveries made in wells drilled from Isunngnak, an island built by ESSO Resources in the Beaufort Sea. (Au)

Q-80683

Appendix.
ACU

Because a comprehensive review of the 1979 drilling season was not undertaken this report largely utilizes statistical information whereas in previous years a substantial amount of information gathered in the field was used. This report presents a socio-economic overview of the four years of drilling in the Beaufort Sea, emphasizing economic aspects more than social. The economic and social impact of any sizeable development is impossible to determine without detailed fieldwork over time. This has not been possible. As an alternative generally acceptable indicators have been monitored. In theory, abrupt changes in the indicators suggest economic and social change. These indicators are presented in the following pages. (Au)

Q-80681

Appendix.
ACU, NFSMO

As directed by Cabinet in May 1976, and confirmed by Cabinet in Spring, 1980, Dome Petroleum Ltd.'s Beaufort Sea drilling program conducted by Canadian Marine Drilling Co. (CANNAR) has been subjected to an annual comprehensive review. This report informs Cabinet of the findings from a review of social-economic-cultural matters, environmental impact and technical aspects of Dome Petroleum/CANNAR's 1980 operations in the region of the Beaufort. (Au)

Q-80705

Appendices.
ACU, NFSMO

The regulatory conditions of the Department of Indian and Northern Affairs (DINA) for drilling in the Beaufort Sea during 1979 were virtually the same as in 1978, except for end-of-season termination procedures for drilling operations. In addition to these restrictions, the Ice Alert System was modified and updated so that operations could be terminated at any time throughout the season, dependent only on assessment of hazards due to weather, ice and sea conditions or of a meteorological forecast. This report is concerned with the technical review of the Dome/Cannar drilling operations in 1979, and is based on data provided by the Regional Oil and Gas Conservation Engineering staff in the N.W.T. (who conducted the technical assessment of drilling operations), by Dome/Cannar, and by the Department's engineering and geological staff (Ottawa). This assessment complements other separate reviews of the environmental and socio-economic aspects of the Dome/Cannar 1979 operation. (Au)

Q-80799
ACU, NFSMO

No offshore boom research and development was undertaken during the first year of AMDP. The Arctic boom had been developed specifically for the Beaufort Sea. Several offshore booms were commercially available, the development of improved equipment for use in ice-free waters was underway in the United States, Norway and elsewhere, and it had been accepted for the time being that no further effort would be expended on development of Canadian offshore booms. (Au)

Q-80853
ACU, NFSMO
To tie all the previous work on oil migration and in situ burning together, Dome undertook a major oil spill experiment during the winter of 1978/80 in the Beaufort Sea. Dome's objective in this field experiment was to determine how successful burning would be as a countermeasure and to optimize burning techniques for oil and gas released from a Beaufort Sea blowout under ice. ...

Q-83880

Disposal of waste drilling fluids in the Canadian Arctic / Brook Consultants Ltd. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1974. 4 microfiches : 111., figures, tables : 11x16cm.

(APOA project no. 73 : Research program on pollution from drilling fluids. Report)

Appendices.

References.

ACU, NFSMO

... environmental aspects of disposal practices of drilling fluids in the shallow marine environment from offshore exploration wells on the Mackenzie Delta were examined. This study included intensive literature reviews and laboratory testing to document the delta environment, drilling fluid characteristics, the status of waste drilling fluid treatment technology, and related pollution problems. The rigorous and extremely seasonal environment of the delta and the nature of the resident biotic communities can handicap adequate treatment and discharge of waste drilling fluids. No serious consequences of direct sea bed disposal were identified. No additional treatment is recommended and no environmental advantage is seen in land disposal. The solids settle rapidly in saline waters blanketing the local bottom sediments. The effect of this to the delta ecosystem is insignificant. No serious environmental disruption or pollution hazard is likely from sea bed disposal. (Au)

Q-83852

Beaufort Sea monopod conceptual design / Swan Wooster Engineering Company Limited, Khanne, J. Lindsay, R.M. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1973. 2 microfiches : 111., tables : 11x16cm.

(APOA project no. 110 : Conical and cylindrical gravity structures for southern Beaufort Sea. Report, no. 1)

Appendices.

ACU, NFSMO

This report describes the conceptual design for a steel Monopod structure for use as a year-round semi-mobile petroleum drilling platform in the offshore waters of the Beaufort Sea at locations with 10-30 feet of water. The purpose of this report is two-fold, first, to provide technical information for use in a preliminary submission by Imperial Oil Limited to the Government, and second to provide a basis for final design of the concept by Earl and Wright Consulting Engineers. Design and Operating Criteria are presented herein. The details for the construction and transportation of the Monopod to the drilling locations are described and project schedules are developed. The Mechanical Support Systems for the Monopod are outlined and a general layout of the various storage areas provided. The site preparation procedures are described including a discussion of the dredging equipment and the expected tolerances on the preparation of the sea bed. ...

Q-83879

A monopod drilling system for the Canadian Beaufort Sea / Imperial Oil Limited. [Calgary : Distributed by APOA], 1972. 6 microfiches : 111., tables : 11x16cm.

(APOA project no. 110 : Conical and cylindrical gravity structures for southern Beaufort Sea.

Report, no. 2)

Appendices.

References.

ACU, NFSMO

This report describes a year-round Monopod-type drilling system for use in shallow waters in the Canadian Beaufort Sea. In addition to the engineering design work, the report contains comprehensive design criteria and environmental data acquired and developed from 22 studies and field projects. ...

Q-83887

Monopod drilling unit for the Beaufort Sea : design criteria / Earl and Wright Consulting Engineers. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1973. 2 microfiches : 111., tables : 11x16cm.

(APOA project no. 110 : Conical and cylindrical gravity structures for southern Beaufort Sea.

Report, no. 4)

Appendix.

ACU, NFSMO

The design specifications for a monopod for the Beaufort Sea are presented. Such aspects as structural design criteria, mechanical support systems, storage capacities, heating and ventilation criteria, well drilling system, electrical system, and ice load capacity are discussed. (ASTIS)

Q-83865

Monopod drilling unit for the Beaufort Sea : cost estimate / Earl and Wright Consulting Engineers. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1973. 3 microfiches : 111., tables : 11x16cm.

(APOA project no. 110 : Conical and cylindrical gravity structures for southern Beaufort Sea.

Report, no. 5)

ACU, NFSMO

The cost estimate for a monopod for the Beaufort Sea is outlined. The cost estimate includes a break down of: shipyard contract, owner-furnished equipment, engineering and overhead, Canadian subsidy and interest, and mobilization costs. (ASTIS)

Q-83909

Monopod drilling unit for the Beaufort Sea : final cost estimate / Earl and Wright Consulting Engineers. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1974. 6 microfiches : tables : 11x16cm.

(APOA project no. 110 : Conical and cylindrical gravity structures for southern Beaufort Sea.

Report, no. 6)

Appendix.

ACU, NFSMO

The final cost estimate for a monopod for the Beaufort Sea is outlined. The cost estimate includes a break down of: shipyard contract, owner-furnished equipment, engineering and overhead, Canadian subsidy and interest, and mobilization costs. (ASTIS)

Q-83917

Monopod drilling unit for the Beaufort Sea specifications : construction and outfitting / Earl and Wright Consulting Engineers. Imperial Oil Limited [Sponsor]. [Calgary : Distributed by APOA], 1974. 7 microfiches : tables : 11x16cm.
These specifications and contract drawings are intended to contain the requirements and information governing the materials, construction, outfitting and all appurtenances and their installation, of a complete seaworthy, bottom supported, enclosed drilling unit, ready for operation, to the Owner's requirements. The contract includes the supply and installation of all materials, labor, machinery, equipment, furnishings and fittings other than equipment and materials supplied by the Owner; and the installation of materials, machinery, equipment, furnishings and fittings supplied by the Owner. ...

A steel Monopod has been designed for use as an exploratory drilling platform in the Canadian Beaufort Sea in water depths of up to 60 feet. Due to the large estimating costs of the steel Monopod, the question has been raised whether sizeable economy can be gained through the use of concrete instead of steel for a major portion of the Monopod structure. This report describes a preliminary assessment of the feasibility of a concrete Monopod for which a detailed design has been provided by Earl and Wright. The design loads used for the concrete Monopod structure are essentially the same as those used for the steel Monopod.

The Beaufort Sea Monopod drilling unit was conducted to determine the vessel's seakeeping, towing, and lowering characteristics. Motions and accelerations were measured during regular and irregular wave seakeeping tests. Resistance curves in three sea states were determined. The vessel's ballasting characteristics were observed and documented. The report covers the model test set-ups and test results.

Model studies of the Imperial Arctic Monopod drilling unit were conducted to determine the vessel's seakeeping, towing, and lowering characteristics. Motions and accelerations were measured during regular and irregular wave seakeeping tests. Resistance curves in three sea states were determined. The vessel's ballasting characteristics were observed and documented. The report covers the model test set-ups and test results.

This report describes the shear key test program which . . . will consist initially of a series of model laboratory tests, and subsequently a series of field tests, of the shear key system used in the design of the Beaufort Sea steel Monopod. The main objective of the model tests is to verify analytical procedures used in the shear key design. In particular, it is intended to verify the efficiency of shear keys as influenced by normal load. In addition, the model tests are expected to yield significant qualitative information such as the type of failure, expected movements during failure, and the effects of adhesion.

[This report] is a brief study . . . of the cost advantage associated with substituting a fixed concrete cone for the sliding steel conical collar of an equivalent Moncone. The disproportionate high cost of the steel collar for relatively shallow water Moncones (up to 70 feet of water) made such a study desirable. Results indicate a saving of some $24 Million, or about 30% of the cost of a Moncone, with only a minimal loss of lightweight draft. The study required a preliminary design...
of the thick wall concrete conical shell while the hull was generally adopted from the Monocone with only minor changes. Further work is necessary prior to detail design but it would appear that for up to 70 feet of water and given the high cost of fabricated steel, the fixed cone may be the best alternative for a mobile gravity platform. (Au)


... a comprehensive series of model tests were carried out at the Marine Dynamics and Ship Laboratory of NRC in order to evaluate hydrostatic and hydrodynamic aspects of the design of a proposed monocoone structure for exploration of hydrocarbon deposits beneath the sea in Arctic regions. . . . . Model tests were carried out to determine: a) The performance on tow of the gravity base and the conical collar, both separately and assembled, from a construction site on the West coast of Canada to the Canadian Arctic, the tests including course stability and resistance in calm water and motions and resistance increase in waves. b) The procedures for set-geared for the monocoone base alone in 60 ft. of water, leveling the trim of the conical collar alone using water ballast, and set-down and lift-off of the complete structure in 135 ft. of water... c) The hydrodynamic drag associated with moving the structure from one exploration site to another by partial unballasting and tilting of the base on the sea bed and subsequent dragging along the bottom. (Au)


Ringed seals, Phoca hispida, showed rapid absorption and clearing of hydrocarbons from Norman Wells crude oil in body tissues and fluids when exposed experimentally by immersion and ingestion. Measured fluorometrically, excretion. (Au) relatively low but significant levels were found in tissues, blood, and plasma following external exposure. Levels in bile and urine were higher indicating these to be routes of excretion. (Au)


Under its Commissioner, Thomas R. Berger, the Mackenzie Valley Pipeline Inquiry had a significant influence on the federal government in particular and Canadian public opinion in general. Attention was focused by the Inquiry and by the extensive media coverage it received not only on oil and gas resources in the North and suitable methods for their transportation to southern markets, but also on all aspects of life in the North: Indian and Inuit culture, native land claims, ecological and environmental issues, social affairs, wildlife, and governmental structures. The publicity generated by the Inquiry's hearings and its final recommendations led to the abandonment of plans to build a pipeline down the Mackenzie River Valley and shifted attention to the Alaska Highway and other routes for bringing northern resources to southern markets. With the approval of Mr. Justice Berger, the records of the Mackenzie Valley Pipeline Inquiry were transferred to the Public Archives of Canada ... from the Department of Indian Affairs and Northern Development. ... (Au)


As part of the documentation required in support of its proposal for oil production in the Beaufort Sea, Dome Petroleum Ltd. has assessed the potential impact of the project upon the environment in terms of a finite number of specific spill scenarios in which oil enters the marine environment from accidental events such as production-well blow-outs and tanker explosions and groundings. The present report is intended to provide a detailed description of the methods used to calculate the movements and distributions of the spilled oil masses. The description is divided into two main components, namely: the underlying oil spill trajectory model, / And the specific configurations of wind, current and ice chosen for each of the scenario calculations. In each case indications are given of the accuracy of both the calculatinal assumptions and the representations of the acting environment. In the latter instance justifications are also provided for our particular choices of "typical" environmental conditions. (Au)


Data for 2,501 worldwide offshore operational accidents (1955 to mid-1980) were analyzed in order to establish causes for the accidents and to identify methods to prevent such accidents in future development and production operations in the Beaufort Sea. The majority of
analyses of Beaufort Sea and Prudhoe Bay crude oils / Mackay, D. Hosain, K. Shiu, W.Y. Dome Petroleum Limited [Sponsor].


1 v. (various pagings) : ill., tables ; 28 cm.

(Reiunss. ACU

O-87592

When crude oil is spilled on water it is subject to physical, chemical and biological processes which control the oil's location, area, thickness, and the extent of transfer to the atmosphere by evaporation and into the water column by dissolution and dispersion.

In this paper we address the question of which properties should be measured, and provide some illustrative data for selected crude oils. Three oils were studied; an oil from Prudhoe Bay used in the 1980 Beaufort Sea Experimental Spills at McKinley; a sample of Kopanoar crude oil supplied by Canning in late 1979 and a sample of Kopanoar crude oil supplied earlier and believed to be contaminated with an unknown amount of other oils, possibly diesel fuel. The latter oil, referred to here as the "Kopanoar mixture", was not subjected to the same degree of analysis because of its uncertain history.

(Au)

O-87602


1 v. (various pagings) : ill., figures ; 28 cm.

(References. ACU

This report presents the results of 10 annual simulations (1969-1978) of the fate of oil discharged from a continuously running blowout in the southeastern Beaufort Sea. The periods simulated ran from July 15 to October 30 and the blowout site was chosen as (70.3 degrees N, 135 degrees W). These results supplement and expand the statistical basis of an earlier simulation of the August 1-September 30, 1978 period (Marko and Foster, 1981), utilizing the same submodel configurations, spreading assumptions, dissolution and wellhead data, and calculational procedures.

(Au)

O-87600


1 v. (various pagings) : ill., figures (some folded), tables ; 28 cm.

(References. ACU

The risk analysis was based on conventional tanker accident statistics, accident case studies, and Arctic tanker design information. Spill accident scenarios were developed and portrayed in fault tree networks, as sequences of events leading from basic, initiating events, to release accidents. After the adjustment of those basic event probabilities that would be reduced by Arctic tanker design features, and the adjustment of route-related probabilities to reflect Arctic conditions, the safety advantage of the Arctic tanker was evaluated. The general conclusion reached is that the risk for an Arctic tanker would be at least two orders of magnitude smaller than that of the conventional tanker, where risk is measured as spill volume expected per barrel transported. In addition to the overall spill...
risk comparison, which showed the Arctic tanker to operate with 120 to 160 times less risk than the conventional tanker. Sensitivity analysis methods were applied in order to evaluate the risk reduction attributable to each of the Arctic tanker's design features. The greatest benefits were found to result from the Arctic tanker's strengthened double hull, segregated ballast construction, and tank inerting system. (Au)

O-87769

This study was designed to evaluate the impact of summer petroleum exploration activity on Banks Island, N.W.T. Specific emphasis was placed on the potential impact that year round drilling operations might have on the terrain and wildlife of the Island. The project included: a) permafrost active layer measurements, and b) studies of bird, white fox, muskox, caribou, and other wildlife populations, and their inhabitants; in order to determine what effect summer drilling activities would have on same. (Au)

O-88838

Two sumps, one at the Panarctic Bent Horn 1-01 wellsite on Cameron Island and the other at the Gulf Ogruknang M-31 wellsite in the Caribou Hills, were present during 1976-77 winter to monitor geothermal conditions in the enclosing permafrost. Numerical simulation based upon observed field data is used to predict geothermal changes. Bent Horn 1-01 was a one season winter drilling operation; Ogruknang M-31 was a two season winter drilling operation in which the sump was left open during summer and infilled during the second winter. At 1-01 sparse data indicate that sump fluids froze virtually instantaneously upon entering the sump and have remained frozen after site restoration. At M-31 the sump fluids were not completely frozen at the time of infilling. At both sides, permafrost temperatures beneath the sump rose significantly during the period of well drilling. Data from M-31 indicate (a) temperatures at a depth of 0.5 m below the sump floor rose rapidly from -14 to -4 degrees C during the early stages of sump use and then rose slowly to -0.5 degrees C by mid September 1977. (b) permafrost at M-31 during the summer of 1977 was restricted to the sump wells, (c) at a depth of 2.5 m below the sump floor geothermal disturbances became minimal, and (d) July 1978, temperatures at a depth of 2.0 m below the sump floor had achieved a quasi-equilibrium of -1 to -2 degrees C. These data suggest that the use of below ground sumps to contain waste drilling fluids at the two localities described does not lead to permafrost degradation, and that sump fluids, if not completely frozen at the time of infilling, eventually freeze in situ in the permafrost.... (Au)

O-88862

... This report reviews the many physical and biological processes which cumulatively determines the rate at which the oil is degraded, and hence control the duration of the recovery period. The study indicated the feasibility and desirability of enhancing recovery rates by artificial measures such as containment, fertilizing, or burning. The results of several experimental studies are reported and their implications discussed. These include observations and analyses made at oil spill sites at Norman Wells, Inuvik, Tuktoyaktuk and Richards Island (NWT). Results are presented of the recovery rates of a series of experimental spill sites in Southern Ontario. A laboratory study of evaporation rates from soils is described in which equations have been developed and validated which permit these rates to be calculated for the first time. Sampling and analytical procedures have been developed for improved monitoring of oiled soil sites. A novel vapour extraction procedure has been devised to permit quantitative recovery of volatile soil components. The implications of the results for enhancing rehabilitation of oiled sites are discussed and recommendations are made for procedures for mitigating the effects of oil spills on arctic terrain. (Au)

O-89010

Studies were conducted from January to May 1977 to determine the effects of seismic activity on the normal behavior and activity of muskrats. The Study Area consisted of an 11 ha lake located at 68 degrees 33' N latitude and 134 degrees 27' W longitude in the east central part of the Mackenzie Delta ... Seismic drilling contributed to a short-term decrease in levels of activity, apparently the result of associated helicopter traffic. It had no effect however, on either daily activity rhythms or number of daily movements. Post-blasting activity patterns did not differ significantly from predisturbance levels in
terms of either mean daily activity or number of daily movements. ... Seismic activity had no discernible effect on use of muskrat dwellings. Pushup use was not related to either distance from disturbance or distance from bank burrows. Changes in burrow use included a significant increase in use of the burrow nearest a shoothole, indicating the absence of an avoidance reaction after blasting. (Au)
Subsea pipelines for the Beaufort.

(Beaufort, v. 1, no. 4, May 1982, p. 20-23, 111.)

ACU

This article discusses the design and construction of a network of interlinked subsea pipelines in the Beaufort Sea. (ASTIS)


(Beaufort E.I.S. support document, no. BEISSDO1)

References.

ACU

This report summarizes existing information on the potential biological effects of activities, disturbances and wastes associated with petroleum hydrocarbon exploration and production in the Beaufort Sea region and fauna of the Beaufort Sea region as well as the activities, wastes and disturbances which may be associated with this development. Major sections of the report discuss the biological effects of (1) common disturbances, activities and wastes, (2) wastes and disturbances associated with both exploration and production drilling, (3) production, storage and transportation-related sources of disturbance, and (4) environmental emergencies including gas blowouts, crude oil spills or blowouts, and refined fuel spills. A separate section describing the biological effects of chemically dispersed oil has been included within the discussion of environmental emergencies since this cleanup measure, if approved and undertaken, could result in significantly different biological effects than those which may be associated with crude or refined oils alone. ... (AU)

Identification and delineation of impactors of shorebase and support activities / Montreal Engineering Company Ltd. Dome Petroleum Limited [Sponsor]. [Calgary : Dome Petroleum Limited], 1979. 1 v. (various pagings): figures, tables (some folded); 28 cm.

(Beaufort E.I.S. support document, no. BEISSDO4)

Appendix.

References.

ACU

The objective of this study is to provide as concise a statement as possible ... of the nature, zone of influence, and duration in time of the various impactor functions associated with shorebase development. ... This report is presented in 5 parts. ... Part 1 serves as an introduction to the study and sets the scope of work. Part 2 describes the characterization of the shorebase into project components, then defines the scale of impact of these components: impact indicators. The Impactor Function Matrix then illustrates how these two criteria are combined to develop the overall magnitude of shorebase impactors. Part 3 presents the results of the study and fulfills the study objective. Part 4 presents the time factors developed to present the one platform to 16 platform development sequence. Part 5 applies the results of Part 3 to the shorebase development scenario for Tuktoyaktuk presented in the Impact Source Study and thereby serves as an example and summary of the method of measuring the impact of Beaufort shorebase development presented in this report. (AU)


(Beaufort E.I.S. support document, no. BEISSD12)

References.

ACU

The following sections discuss the potential local and regional impacts of a hypothetical tanker collision on the marine resources of the northeastern Beaufort Sea. Information regarding the marine flora and fauna which could be affected by an oil spill in this area was obtained from EPL and ESL (1981), Volume 3A (Chapter 3.0) as well as original literature cited in these overviews. Primary sources of information regarding the biological effects of petroleum were a summary of an evaluation of 100 oil spill case histories ... and several reviews of laboratory research concerning the effects of petroleum hydrocarbons. ... (AU)


(Beaufort E.I.S. support document, no. BEISSD13)


References.

ACU

... One of the best predictive tools for analysis of the biological consequences of oil spills are the case histories and followup studies associated with past spills. This study examined the documented effects of oil spills as a function of the circumstances surrounding past spills and the biological resources affected. The overall purpose of this investigation was to summarize our current state of knowledge regarding the biological effects of oil spills on coastal marine environments. Literature sources and methods used during the completion of this study are described in Section 1.3. An overview of the location, season, type and size of spills that have occurred during the last two decades is presented in Section 2, while Section 3 discusses the documented or suggested biological effects of past spills as a function of oil type, size of spill, time of year, type of environmental conditions, cleanup response and latitude. Section 3 also discusses the long-term impacts of oil spills and subsequent recovery of various community types, where this information is available. The text of the report is concluded with a summary which identifies dominant biological effects of oil spills (Part 4), as well as probable impacts of spills or blowouts on arctic marine ecosystems (Part 5). Oil spill case history summary data sheets are provided in Appendix A and B, respectively. (AU)
Mackenzie Delta - Beaufort Sea development plan

The scenario described in this report is one of a series of descriptions of potential effects of oil spills under specified circumstances in various areas in the Beaufort Sea and Northwest Passage. The particular scenario described in this report is one involving a pipeline collision at a spill of oil. The pipeline system is assumed to be a large-diameter crude oil pipeline system or to a central terminal such as North Point for subsequent delivery via subsea pipeline to offshore tanker loading facilities. Based on existing discoveries, it is estimated that approximately 300 km (180 miles) of small diameter buried pipelines would be required in the Mackenzie Delta and Tuktoyaktuk regions. It is expected that additional onshore discoveries will be made over the next 20 years, however, their location is unknown at this time. Prudent planning of the onshore pipeline network will ensure that future discoveries will be connected to the system via the shortest possible route to minimize disturbance of the sensitive tundra. Within the framework of the total development plan, it is expected that onshore production facilities and associated pipeline systems from known reservoirs will be constructed in the late 1980's. (AU)

Mackenzie Delta - Beaufort Sea development plan

Crude oil discoveries have been made in the nearshore and onshore regions of the Mackenzie Delta and Tuktoyaktuk Peninsula. These discoveries are relatively small in size compared to the potential of offshore reservoirs. The oil from these fields will be shipped to a central terminal such as North Point for subsequent delivery via subsea pipeline to offshore tanker loading facilities. Based on existing discoveries, it is estimated that approximately 300 km (180 miles) of small diameter buried pipelines would be required in the Mackenzie Delta and Tuktoyaktuk regions. It is expected that additional onshore discoveries will be made over the next 20 years, however, their location is unknown at this time. Prudent planning of the onshore pipeline network will ensure that future discoveries will be connected to the system via the shortest possible route to minimize disturbance of the sensitive tundra. Within the framework of the total development plan, it is expected that onshore production facilities and associated pipeline systems from known reservoirs will be constructed in the late 1980's. (AU)

Mackenzie Delta - Beaufort Sea development plan

This report contains the results of a study for a pipeline project which consists of the construction and operation of an oil pipeline system from the northern tip of Richards Island in the Northwest Territories to Edmonton, Alberta. Since a considerable portion of the line must be constructed in terrain containing permafrost, it has been designed to accommodate conditions not normally encountered in more southerly climates. The project includes a design for the northern areas in which the maximum flowing temperature of the crude oil will be limited to 27 degrees C (80 degrees F). In ice-rich soils where thawing resulting from the presence of a buried warm pipeline might cause loss of structural support due to excessive settlement, the pipe will be supported aboveground on steel piles and insulated. The pipeline route and major facilities are shown... (AU)

Environment Impact Statement for hydrocarbon development in the Mackenzie Delta region

This report contains the results of a study for a pipeline project which consists of the construction and operation of an oil pipeline system from the northern tip of Richards Island in the Northwest Territories to Edmonton, Alberta. Since a considerable portion of the line must be constructed in terrain containing permafrost, it has been designed to accommodate conditions not normally encountered in more southerly climates. The project includes a design for the northern areas in which the maximum flowing temperature of the crude oil will be limited to 27 degrees C (80 degrees F). In ice-rich soils where thawing resulting from the presence of a buried warm pipeline might cause loss of structural support due to excessive settlement, the pipe will be supported aboveground on steel piles and insulated. The pipeline route and major facilities are shown... (AU)
provides the environmental setting for the marine shipping corridor which lies to the east of the Beaufort Sea. The region extends from approximately Banks Island through Viscount Melville Sound, Lancaster Sound, Baffin Bay and Davis Strait, to 60 degrees north latitude in the Labrador Sea. Emphasis has been placed on those subjects deemed to be most relevant for the purposes of assessing possible impacts of shipping operations on the environment .... (Au)

0-9223
Volume 3C of the Environmental Impact Statement provides the environmental setting for the Mackenzie River Valley pipeline corridor. The 'Mackenzie Valley corridor' extends from the Mackenzie Delta to the Northwest Territories-Alberta border. It includes the Mackenzie River and lands on the adjacent east bank generally 30 to 100 km wide .... The 'Mackenzie River Valley' is generally used to describe lands drained by the Mackenzie River. Emphasis has been placed on those subjects deemed most relevant for the purposes of assessing possible impacts of pipelining operations on the environment .... (Au)

0-92231
The purpose of this volume of the Environmental Impact Statement is to describe the potential for and the fate, cleanup and effects of accidental spills of oil and hazardous materials. The geographical regions addressed in this volume are within Canadian lands and waters north of 60 degrees N latitude, and include the Beaufort Sea - Mackenzie Delta region, the Mackenzie Valley and the Northwest Passage. The regions potentially involved in hydrocarbon development .... The focus in this volume is on large crude oil spills, as these are perceived to be a potential major impact associated with the proposed development. Smaller, more refined and waste oils and spills of hazardous materials are also discussed at the end of the volume. (Au)

0-92240
ACU
In the Panel's Terms of Reference issued by the Minister of the Environment, the Panel is directed to develop a comprehensive outline of the procedures governing the conduct of its review. The following Operational Procedures which are in response to this directive have been formally adopted by the Panel. The Operational Procedures, which are based in part on the experience of previous Panels, are intended to assist all those wishing to participate in the review. The procedures may be amended by the Panel and such amendments will be made public. In order to assist readers in understanding the various terms and expressions used in this document, an Appendix on Definition of Terms is included. (Au)

0-92258
Text in English and French. ACU, NFSMO
... This interim report has been prepared following public meetings on the draft Environmental Impact Statement (EIS) Guidelines. The Beaufort Sea hydrocarbon production and transportation proposal was referred in July 1980 by the Honourable John Munro, Minister of Indian Affairs and Northern Development, for a formal public review under the EARP. The letter of referral requested that physical, biological and socio-economic effects associated with the proposal be considered and that meetings be held to obtain public input into the completion of the Guidelines for the preparation of an EIS. The EIS is to be prepared by the proponents of the proposal: Dome Petroleum Limited, Gulf Canada Resources Inc. and Esso Resources Canada Limited. .... (Au)

0-92266
The objectives of the volume are: to clarify and predict the probable size and nature of oil and gas generated growth and development in the northern territories; to demonstrate how such growth may affect northern populations, economic structures and social institutions; and to recommend policies that would enhance the positive and beneficial aspects of oil and gas development and mitigate the negative aspects. (Au)
Q-92312

... This report is an environmental assessment and by assuming hypothetical worst-case oil well blowout scenarios, examines the nature of the transport and fate of oil in the Beaufort Sea and draws conclusions regarding the impact of the oil on the environment, including climate, seabirds, marine mammals and other marine organisms. Assuming a "worst-case" sub-sea oil well blowout, major conclusions are presented. (Au)

Q-92320
Gulf's proposed drilling systems for the Beaufort Sea / Marks, A. (APDA review, v. 5, no. 2, Fall 1982, p. 9-12, figures, tables) ACU, NFSMDO

Gulf's concept is comprised of three basic elements: first, two special design non-propelled drilling units; second, four support ships; and third, two bases for logistic support. The drilling systems will be used to explore land-holdings where Gulf is the operator, that is, 1.5 million acres in the Beaufort. Gulf is committed to an exploration program from 1982 to 1988 in the Beaufort at an estimated cost of one billion dollars. (Au)

Q-92371

The Beaufort Sea Planning Model was developed to assist in analyzing the development options available for the Beaufort Sea-Mackenzie Delta Region. The model allows planners to test various assumptions related to development which assist in narrowing down scenarios to a small group of feasible schemes. Final selection of a development plan for the Beaufort Sea-Mackenzie Delta Region will still be based on discovery rates, operational practicability, technical and economic feasibility as well as social and environmental concerns. The planning model is not intended to predict a specific development plan but rather to indicate the requirements (within a reasonable order of magnitude) necessary to attain different levels of activity. Some of the requirements indicated by the output are: grade volumes, number of islands, number of drill rigs, manpower, steel tonnage, machinery, ships, capital flow and transfer payments. The main factors considered in the model which control the timing of development are the construction of production islands offshore and the construction of onshore production facilities. (Au)

Q-92366

A "King Point Development Zone" consisting of 70 square km is being considered for development by Dome Petroleum Ltd. This zone is located within the Northern Yukon Park Wilderness Area which, in 1978, was withdrawn from further development by an Order-in-Council. The wilderness area includes a segment of the calving grounds of the Porcupine caribou herd, and the lowlands and coastal waters are used by hundreds of thousands of migrating and staging waterfowl. Current plans for the King Point area include two separate developments: 1. a quarry site and transportation facilities for providing the large quantities of rock required for armour in off-shore islands, 2. the establishment of a major shorebase support facility. This report provides a preliminary assessment of the potential impacts of activities associated with the quarry site and the shorebase development on the terrestrial wildlife and freshwater fish in these areas. (Au)

Q-92338
Description of the shorebase network. (Beaufort, v. 2, no. 1, Aug. 1982, p. 7-9, 111.) ACU

Over the many years that the oil industry has been exploring the Mackenzie Delta and Beaufort region, logistical support for these activities has been provided by shorebases and marine docks. Currently the most important centres for these support systems is Tuktoyaktuk, where two of the major operators, Esso and Dome, have major facilities and Gulf is building a base of operations as well. (Au)

Q-92354
Aircraft and helicopters: their importance to northern operations / (Beaufort, v. 2, no. 1, Aug. 1982, p. 14-16, 111.) ACU

Aircraft are an essential link in the transportation chain from southern Canada to the Mackenzie Delta and Beaufort Sea. The movement of people and high priority freight is entirely dependent upon fleets of airplanes and helicopters. (Au)

Q-92362
Supply lines to the Beaufort Sea: the story of logistical support for northern exploration / (Beaufort, v. 2, no. 1, Aug. 1982, p. 17-19, 111.) ACU

An offshore drilling and exploration program like that in the Beaufort Sea would not be possible without a pyramid of logistical support services, linking the Arctic region to southern resupply centres, and sending an orderly stream of equipment, perishable goods, drilling supplies, fuel and other material to the Mackenzie Delta. All modes of transportation are used to resupply the Beaufort operations including trucks driving over the Dempster Highway and winter ice roads, barges towed up the Mackenzie River, ocean going ships and large transport aircraft and helicopters. (Au)

The objectives of this study were ... to identify entrepreneurial opportunities which may result from pipeline and/or highway development in the western N.W.T. ... (and) to assess the viability of these opportunities with a view to maximization of local participation in those which are financially feasible. It was felt that the best way to accomplish these objectives was to take an action-oriented approach rather than an academic one. ... Expressed in very general terms it involves applying the best technical and entrepreneurial expertise available to a given opportunity in conjunction with local, unskilled, less entrepreneurially-oriented human resources on a joint venture basis. ... There is a severe financial constraint to implementation of the study findings. The Indian Economic Development Fund (I.E.D.F.) is at present the only practical source of concessional development financing available in the N.W.T. for projects of this kind and magnitude. ... No structure exists which would enable non-Indian N.W.T. residents to avail themselves of these opportunities. This constraint can only be alleviated by access to a non-ethically based development financing facility. (Au)


Appendices. ACU

This volume provides an overview of the main body of the Environmental Impact Statement contained in Volumes 2, 3A, 3B, 3C, 4, 5, 6 and 7. It begins with a BRIEF REVIEW intended to capture the essence of this volume and some of the major issues related to Beaufort development. CHAPTER 1 describes the need for oil, the development plan proposed to extract the oil and the possible Canadian benefits which would result. ... CHAPTER 2 examines the Beaufort Sea-Mackenzie Delta region, the principal area where the ongoing exploration and production related activities would take place. This chapter provides a brief description of its regional features, followed by a summary of possible environmental and socio-economic impacts in the region. CHAPTER 3 considers the Northwest Passage region, the area through which Arctic tankers would travel to deliver Beaufort Sea oil to eastern Canadian markets. CHAPTER 4 focuses on the Mackenzie Valley region, the area which would be most affected by an overland pipeline, another transportation option to deliver oil. At the end of this volume, an APPENDIX outlines the companies involved in the preparation of the Environmental Impact Statement and describes how it was produced. (Au)
training, as well as recommended training programs. ... (Au)

Q-95761

Employment Impact of Arctic Gas Pipeline in northern Canada / Gemini North Ltd. Canadian Arctic Gas Study Limited [Sponsor]. Yellowknife : s.n., 1973. 105 leaves ; tables ; 28 cm. ACU

The purpose of this study as part of the broader socio-economic impact study is to evolve estimates of the employment impact of a natural gas pipeline in northern Canada, ... Contact gas pipeline jobs in northern Canada are estimated in Chapter Two. Chapter Three estimates jobs indirectly associated with gas pipeline development. Chapter Four establishes potential northern participation in direct and indirect gas pipeline employment from estimates of available northern labour supply. ... (Au)

Q-95777


The results of the study of the socio-economic impact of production and transportation of gas from Pointed Mountain indicates that: 1) Local native men have worked on different construction phases. 2) Native workers adjusted rapidly to camp life and their work performance was satisfactory. 3) Most natives held labourer's jobs, and exposure to acquire experience for other positions was minimal. 4) The right-of-first-refusal for short-term jobs is probably a better method to promote native employment than a quota system. 5) Short-term employment, for as few natives, has continued after the gas was on stream. 6) The men employed in the twelve permanent jobs, are rotated to jobs in southern Canada on a weekly basis. (LET)

Q-95840


This report is the outcome of studies undertaken for the Northwest Territories Association of Municipalities (NWTAM) and is intended to provide to the Association and its member municipalities an indication of the magnitude and nature of impact that might be anticipated as a result of the construction and operation of the proposed Mackenzie Valley Gas Pipeline. The report is further intended to voice the concerns of the Municipal councils relative to pipeline construction and operation. Finally, this report is intended to provide recommendations relating to those actions which might be considered in order to minimize the negative aspects, and maximize the positive aspects of anticipated social impact. (Labour and wages are among the social concerns) ... (Au)


The main purpose of this volume of the Environmental Impact Statement is to discuss and to review the environmental research and monitoring programs carried out over the past approximately 25 years in the Canadian Arctic ...

Chapter 3 begins by outlining the types of existing environmental operating conditions (EOCs) placed on the various facilities and operations in the Beaufort Sea region by government. Many of these EOCs include research and monitoring programs. This discussion is followed by descriptions of present and future environmental projects being undertaken or proposed by the proponents in conjunction with associated companies.
government agencies or other groups. These include physical, biological, spill clean-up and socio-economic programs. Chapter 4 consolidates, by field of study, the proposed future programs as envisaged by the proponents at this time. ... (Au)

Q-105589
Document not seen by ASTIS. Citation from NPB-VI.

This report is concerned with the people, the natural environment and resource use in the Mackenzie Valley and the Northern Yukon, and how these aspects might be affected if pipelines were built to move natural gas or oil to Southern markets. It includes a description of the present demographic aspects of the population; statistics on birth rate, death rate, rate of natural increase, sex distribution and trends in school enrolment, vocational training and labour force. The estimated labour supply and demand related to pipeline construction and operation is also examined. (NPB)

Q-105686
Application to the National Energy Board in the matter of the National Energy Board Act and in the matter of an application by Interprovincial Pipe Line (NW) Ltd. for a certificate under Parts III and IV of the Act and for an order under Part IV therof in respect of an oil pipe line from Norman Wells, Northwest Territories to Zama, Alberta / Interprovincial Pipe Line (NW) Ltd. [S.1.]: Interprovincial Pipe Line (NW) Ltd., 1980. 8 v. (various pagings); figures (some folded); 26 cm.

ACU

This is an application by Interprovincial Pipe Line (NW) Ltd. for authorization to construct an oil pipeline from Norman Wells, N.W.T. to Zama, Alberta. (ASTIS)

Q-105011
Document not seen by ASTIS. Citation from NPB-VI.

ACU

... The Mackenzie Delta Contingency Plan was based on the Canadian Arctic Gas Pipeline proposal; the larger of the two proposals to construct a natural gas pipeline system in the Mackenzie Valley. The purpose of this study is to outline changes in the level and type of public sector spending which would be required as a result of the pipeline and other developments proposed for the Mackenzie Delta. ... (Au)

Q-102890

ACU

Q-103560
Oil in the Beaufort and Mediterranean seas / Mackay, D. (Arctic, v. 30, no. 2, June 1977, p. 93-100)

ACU
Q-106100
7 v. Volume 1: summary.
Document not seen by ASTIS. Citation from NPB-V1.
Examines the economic impact of the proposed Mackenzie Valley gas pipeline on the people of the Northwest Territories. Reports in 7 volumes contain logistical information and assess the impact of a pipeline on transportation facilities, resource development, Yukon Government policies, traditional hunting and trapping activities and the population and labour force. (NBP)

Q-106828
Government of Yukon position on Beaufort development proposals : submission to Beaufort Sea Environmental Assessment Review Panel / Y.T.
(Decrease E.I.S. government position statement) Appendices.
Copy unbound.
References.
ACU
... The Government of Yukon, in supporting Beaufort development activities, is committed to the preservation of Yukon's wildlife and environment. It is resolved to ensure that Yukoners obtain equitable business, employment and training opportunities so that resident Yukoners' participation in Beaufort work can contribute to the social and economic development of Yukon. The Government of Yukon, too, holds that its involvement in Beaufort development will be in a manner that will contribute to the political evolution of the territory, while preserving the ability of native peoples to engage in their traditional lifestyles. ... Following a brief overview of development proposals from Yukon's perspective, this paper outlines some contemporary and historic factors related to Yukon's involvement with the Beaufort. It sketches the mandate under which the Government of Yukon conducts its work on Beaufort development. It lists major socio-economic and environmental positions, describes Yukon's planning approach to Beaufort development, and it summarizes current and anticipated activities related to Beaufort hydrocarbon development plans. ... (AU)

Q-106836
Submission to the Beaufort Sea Environmental Assessment Panel on the Beaufort Sea hydrocarbon production and transportation proposal / N.W.T.
(Decrease E.I.S. government position statement) Appendices.
Copy unbound.
References.
ACU
This section provides an overview of the structure and mandate of the Government of the Northwest Territories (GWT). Departmental responsibilities related to the proposed development are briefly described and policy statements of significance to Beaufort Sea development are reviewed. (AU)

Q-106844
Statement to the Beaufort Environmental Assessment Panel from the Department of Indian Affairs and Northern Development / Canada. DIAND. Ottawa : Indian and Northern Affairs Canada, 1982. iii, 87 p. ; 26 cm.
(Decrease E.I.S. government position statement) Appendices.
Copy unbound.
ACU
... DIAND's Northern Affairs Program ... remains responsible for the policy and planning aspects of hydrocarbon development in the North. The Program and the territorial governments are now working together to set goals for northern development that will meet the objectives of the National Energy Program as well as the interests of northern people. Environmental protection and the interests and concerns of northern people in relation to hydrocarbon development are of primary importance to the Department. And the balance among the social, economic and environmental factors implicit in hydrocarbon production is being strongly emphasized. This paper provides an overview of DIAND responsibilities, programs and initiatives and the wide range of factors currently being considered with respect to the Beaufort Sea Proposal. (AU)

Q-106852
(Decrease E.I.S. government position statement) Copy unbound.
Contents: Mandate and activities of the Office of Industrial and Regional Benefits: a brief prepared for a hearing of the Special Committee on the Northern Pipeline, Ottawa, September 15, 1982 / Industry, Trade and Commerce and Regional Economic Expansion.
ACU
... This policy outlines the federal government's view of the industrial development objectives and guidelines which should be followed by major project sponsors in carrying out their projects in Canada. At the same time, the Minister announced the establishment of a Committee on Majorproject Industrial and Regional Benefits (C-MIRB) to act as a focal point for discussions with major project sponsors and the creation of the Office of Industrial and Regional Benefits (OIRB) to support and guide the activities of the Committee. A description of the origins of the government's industrial and regional benefits policy for major projects, the guidelines for major project sponsors, and the responsibilities of OIRB and C-MIRB is contained in the attached briefing for the Special Committee of the Senate on the Northern Pipeline. (AU)

Q-106860
(Decrease E.I.S. government position statement) Appendix.
Copy unbound.
ACU
... This document discusses the legislation and mandate that underlies the activities, policies
and programs of EMR. The general nature of the activities in the energy sector are outlined, as are those of the earth sciences sector. These descriptions will provide the Panel with an understanding of the capability of the department to deal the economic as well as the scientific and technical aspects of the Beaufort Sea development. The Energy Research and Development Program is then presented, with particular emphasis on the Oil and Gas "task", especially the work that is relevant to environmental problems associated with frontier hydrocarbon development. This particular aspect of the envelope R&D program is, in part, a reflection of the Federal government's response to the regulatory and scientific requirements of this industrial activity. A brief overview of major events since the NEP is then presented to indicate the general view on the changing nature of the energy scene. ... (Au)

Q-106879
Beaufort Sea hydrocarbon production proposal
Department of Communications position paper / Canada. Dept. of Communications. Ottawa : Dept. of Communications, 1982. 10 leaves ; 28 cm.
(Beaufort E.I.S. government position statement) Copy unbound.
ACU
There is concern that development will overburden existing or expanded communication systems degrading service to northern residents and cause increased costs to the public. It is therefore recommended that companies shall describe their plans to fulfill their communication needs no later than two years in advance of proposed requirement date for the telecommunications services. The Department of Communications has been asked by the Panel to comment on two subjects: northern communication needs at present and in the future, especially if full scale oil and gas development proceeds; and the ability of the Federal Government to provide a communications infrastructure in a timely and effective manner. (Au)

Q-106887
The implications of the Beaufort Sea hydrocarbon production proposal to the Department of Fisheries and Oceans / Canada. Dept. of Fisheries and Oceans. Ottawa : Dept. of Fisheries and Oceans, 1982. 1, 18 leaves ; table ; 28 cm.
ACU
The Beaufort Sea Environmental Assessment Panel has requested that the Department of Fisheries and Oceans ... provide it with a Position Statement on the Beaufort Sea Hydrocarbon Production Proposal. ... In response to the Panel's request, this implications paper outlines DFO's mandate and relevant legislation, its relevancy to present and future programs and activities, and summarizes the implications of Beaufort Sea hydrocarbon production to DFO and vice versa. (Au)

Q-106885
(Beaufort E.I.S. government position statement) Appendices. Copy unbound.
ACU
The purpose of this paper is to provide the information requested by the Beaufort Sea Environmental Assessment Panel ... It is hoped that, in addition to meeting the information requirements of the Panel, this paper will contribute to a better understanding by other government agencies, industry, native organizations, citizens groups, and the public of Environment Canada's concerns and proposed approaches to Beaufort Sea hydrocarbon development. A better understanding should set the stage for more dialogue and better rapport with those sharing our interest in preserving Canada's arctic environment. (Au)

Q-106909
(Beaufort E.I.S. government position statement) Copy unbound.
ACU
The C.E.I.C. position paper on the Beaufort Sea Hydrocarbon Production Proposal will review the Commission's existing legislation, mandates and responsibilities and describe some of the programs and services of the Commission as they relate to hydrocarbon development in the North. To the extent possible, the effects of the Beaufort Sea oil and gas production in the Commission's current and planned programs, policies and activities will be catalogued, and vice versa. Finally, attached as appendices 1, 2 and 3, is information concerning the new National Training Act, which will be the cornerstone of the federal government's future involvement in the Canadian labour market. (Au)

Q-106917
(Beaufort E.I.S. government position statement) Copy unbound.
ACU
The Department of External Affairs is the Canadian government agency responsible for the conduct of Canada's relations with foreign countries in the field of foreign policy and trade. ... The Beaufort Sea proposal contains elements which involve the responsibilities of the Department of External Affairs vis-a-vis Canada's two northern neighbours, the U.S.A. and Denmark. Canadian activities associated with oil and gas developments in the area could have an impact on the territory and inhabitants of Alaska and Greenland, necessitating that these activities be brought to their attention and that their legitimate interests be taken into account in Canadian consideration of this proposal. (Au)

Q-106925
(Beaufort E.I.S. government position statement) Appendices. Copy unbound.
ACU
... The principal concerns of ... the Department of National Health and Welfare ...
arising from the proposal relate to socio-economic and psycho-social impacts, with risks to existing social and family structure. Mental health problems, alcohol abuse, sexually transmitted diseases and family breakdown have all been previously recognized as adverse effects of energy development. The northern social fabric, for a number of reasons, is relatively fragile in any case, and potential adverse effects will be greater there than in a more mature, stable society. This paper was researched and prepared by officials of this Department who are sensitive to the special problems of the north and represents our best forecast of the consequences. We have also tried to anticipate the special and extra demands that will be placed on this Department to respond to the health and welfare needs that would arise. ... (Au)

Q-106923

The National Museum of Man is the sole federal agency responsible for prehistoric and historic archaeology in areas of federal jurisdiction (with the exception of National Parks). Furthermore, archaeology in the Yukon and Northwest Territories falls under federal jurisdiction. This, and the National Museum of Man’s own mandate have led it to be involved in a number of research projects dealing with segments of the area under consideration, including many major excavation projects since 1914. ... (Au)

Q-106941

The Northern Canada Power Commission is essentially an electric utility operating on a commercial basis and has no authority in the area of environmental regulations. The position paper reflects this relationship to the proposed Beaufort Sea activities and discusses two primary areas of concern: 1) the effect on demand for electricity either for production or to serve the community, and 2) the availability of fuel supply for the Commission’s operations. (ASTIS)

Q-106950

... Public Works is a common service agency which responds to requests from other departments and agencies. Thus any plans or new initiatives resulting from Beaufort Sea development will depend upon the activities of other departments and of the proponents. The impact of Beaufort Sea development on Public Works activities will consist mainly of an increase in the demands made for accommodation, marine and transportation services from other government departments and agencies in support of their activities. This will mean that PWC could receive requests for upgrading and extension of northern highways, for dredging and marine facilities, for northern housing and for Government of Canada buildings as well as for design, construction, technology and research services related to the above. (Au)

Q-106968

The production and transportation of Beaufort Sea oil and gas to southern markets can be expected to have an impact on police services that are provided by the R.C.M.P. in the N.W.T. As indicated in the Summary portion of Part V of this paper, the impact the development will have on the R.C.M.P. will depend on future decisions that are taken. Once these decisions are made, then the Force will be in a better position to identify program, policy and enforcement responsibilities, as well as establishing overall resource needs to adequately meet demands for police services. ... [Some of the aspects which need to be considered are: rate of development, product transportation routes, sites, accommodation, recreation, hiring policies, company security posture, crime increase, native policing, and crime prevention]. (Au)

Q-106976

... The purpose of this paper is to discuss the effect that the Beaufort Sea Proposal will have on the Western Arctic air transportation system over the next twenty years, and to identify possible implications for the Canadian Air Transportation Administration. (Au)

Q-106984

... The Department of Transport is responsible for the development and operation of a safe and efficient national transportation system that contributes to the achievement of government objectives. The department has provided marine services to all parts of Canada, including the Arctic, for many years. However, until now, Arctic activities have been limited to the
summer season when weather and ice conditions have permitted navigation by vessels of modest icebreaking capability. Industry's plans for year-round operations will now require that the department increase its Arctic capability by a quantum step. It is intended that suitable Arctic marine regulations will be put in place when and where required in anticipation of this demand. Transport is taking policy and program initiatives. This submission outlines the existing mandates and responsibilities of the department, describes the policies and programs for Arctic transportation development and responds to several specific concerns identified by the panel. (Au)

Q-107069

This contingency plan will serve as Dome's plan of action for any oil spill. It is the third edition of the plan and will be updated as new equipment and techniques become available. This plan contains techniques that would be used to deal with the oil spill and which might be encountered in the Beaufort Sea and is based on past experience and knowledge. The choice of the most appropriate technique in any spill will be influenced by the ice and weather conditions, type and quantity of oil spilled and how predictable, the fate and consequences of the oil spill. Information to aid and clarify this plan is included in the appendices, Book 2 of Dome oil spill contingency plan. (which) should be used in conjunction with Book 1. Book 2 is basically split into sections: Appendix 4-16 equipment and techniques available for Oil Spill countermeasures. (Au)

Q-107107

In Mackenzie Bay, sampling of the benthos was performed by diving biologists in July and September 1981, before and after gravel dredging, respectively. In September, following dredging, there was an increase at control stations in sedimentation which might be related to suspension of fine sediments by dredging. The distribution and types of macrobenthos observed were similar to those found in July. An edited version of the video recordings is presented as a separate report. The faunal composition of benthic samples was generally highly diverse. However, the diversity of benthos was reduced in dredge tranches. A total of at least 158 species was identified in the July samples. The identifications were only completed to the family level for all September samples and for some taxa in certain July samples, the biomass of the benthos was generally lower compared to other studies nearshore areas of the Beaufort Sea. The data on faunal composition were analyzed for community structure and habitat preferences by the Zurich-Montpellier (Z-M) method. Stations were clustered according to faunal composition into muddy, sandy, intermediate, gravelly and dredged groups. The station clustering corresponded well with the sedimentary characteristics of the sampling sites. Many of the organisms represented are apparently adapted to the heterogeneous sedimentary conditions of the gravel bars in Mackenzie Bay. Based upon the degree of recovery noted in September and on the conditions favouring recolonization it is considered that the recolonization of dredged areas by the benthic fauna would likely be relatively complete in about two years. From the 1981 level of dredging activity, the impact on the benthos was found to be localized to the dredge tranches. Furthermore, the total disturbance from dredging was spread over a large area on the gravel bars, due to the diffuse patterns of dredging. (Au)
... The object of this study was to obtain information on the presence and effect of oil-degrading microorganisms in inter-tidal sediment and beach samples from the Tuktoyaktuk area of the Northwest Territories in the vicinity of the Camran camp. Microbial activity will be reported in terms of changes in the saturated fraction of Camran oil brought about by microbial activity. The effect of the amount of nitrogen and phosphorus added to representative sediment samples on the rate of change of the chemical composition of a Camran oil will also be investigated. (Au)

Q-107883
Norman Wells oil spill response / Esso Resources Canada Limited.
[5.1.]: Esso Resources Canada Limited, 1981. 4 microfiches: figures, maps, tables; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWCO3) Appendix. ACU

The manual is intended as a handbook for use to respond to an oil spill emergency. It is assumed that readers of this document are familiar with oil spill control procedures. In general, and only need specific details in order to control a spill. It is recommended that the whole manual be read before a spill occurs. The first part of this handbook ... deals with the company policy with regards to all spills. The second part ... describes the basic oil spill response organization, details oil spill reporting procedures, and contains environmental maps. The third part ... contains an outline of specific details involved in an operational oil spill situation. The general approach is given in the section Countermeasures and Strategies, and serves as a basis for discussions on Equipment and Action plans. The Action plan is the heart of the handbook. ... (Au)

Q-107891
Chemicals for oil spill control / Exxon Corporation.
[5.1.]: Exxon Corporation, 1980. 6 microfiches: figures, tables; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWCO4) ACU

The purpose of this information package ... is to familiarize industry, governmental and academic groups with the importance of oil spill chemicals in contingency planning and the actual treatment of oil spills. This package is aimed at an audience of engineers, scientists and other individuals who are responsible for developing oil spill contingency plans and managing or dealing with oil spill situations. The major areas to be covered are: (1) what oil spill chemicals are, how they work, (2) the toxicity and effectiveness of the chemicals, especially dispersants, (3) how chemicals are best applied, and (4) the economics and logistics of using chemical dispersant products. The rules of oil spill collecting agents, shoreline protection chemicals, post-spill cleanup compounds are included. The package consists of 2 parts, an executive summary and a detailed technical discussion. Key published reports...
relating to the oil spill chemical topics discussed in the package are attached to the end of the information package. (Au)

Q-107905
Aerial application of chemical dispersants - field demonstrations / Exxon Research and Engineering Company. [S.I.: s.n., 1980?].
3 microfiches: figures, tables; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWC05)
Appendices.
Several unpublished field reports by Exxon Research and Engineering Company and Pacific Environmental Laboratory accompany the main report entitled Overland Aerial Application Tests of Oil Spill Dispersants at Abbotsford, B.C., March 15-14, 1979 written by R.W. Dennis and B.L. Steelman of Exxon Research and Engineering Company.

... the main report describes the results of a field test designed to evaluate the aerial application of a low toxicity, concentrated chemical dispersant. The specific goals of this test were to: (1) examine the feasibility of applying technical or commercial dispersants to aerial aircraft, (2) evaluate the dispersant delivery system, and (3) test the relative effectiveness of the chemical on different crude oils in water having different salinity levels. The results of this field test demonstrate that aerial application of oil spill dispersants from large aircraft is a feasible and effective delivery method. (Subsequent to this over land field test, in September and October, 1979, offshore oil spill tests were conducted in the U.S. The results of these offshore oil spill tests further demonstrate the capability of aircraft to effectively apply dispersants.)

Pacific Environmental Laboratory tested nine oil dispersant products; test results and a summary of the analytical procedure are also included.] (Au)

Q-107913
Computer-based training for oil spill on-scene commanders / Control Data Canada, Ltd. [S.I.: s.n., 1981].
2 microfiches: figures; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWC06)
Appendices.
ACU

The Computer-based Training Product resulting from the interaction of Subject Matter Experts, Instructional Designers and Developers would be a life-like simulation of water-based oil spills. The trainee would interact with a computer-driven simulation through a graphics terminal. A map-like graphic would illustrate the position and movement of the oil slick as it interacts with such forces as wind, current and its own composition characteristics (evaporation rate, viscosity, etc.). The trainee would choose containers and clean-up options as he attempts to implement and revise his strategies. Time compression would be used to provide a trainer with an experience equal to several days of on-scene activity in a matter of hours. ... The instructional goal can be stated as follows: To provide on-going opportunities for On-scene Commanders and Response Team Members to practice their problem solving skills related to oil spill response. (Au)

Q-107921
1 microfiche: table; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWC07)
Appendices.
References.
ACU

... limited experimental evidence suggests that waterfowl would avoid dyed areas under some circumstances; orange and possibly red appear to be the most promising deterrent colours. In order to fully assess the usefulness of dyes as a deterrent in the Beaufort Sea area information is required on species-specific responses of the most common bird species to various colours, and on the effects of habituation, availability of alternate habitat, motivation to land and social facilitation on these responses. Much of this information could be obtained in a laboratory setting, but field testing would eventually be required. Several oil-soluble dyes are commercially available, but data on solubility, required concentrations, rates of weathering and fading, and toxicity under various environmental conditions would be needed to evaluate their usefulness. Because experimental evaluation of the use of coloured objects as dispersant would be more complicated than the evaluation of dyes, ... and because application ... to oil spill areas also poses a number of technical feasibility problems, further consideration of this method is not recommended. (Au)

Q-107930
COST - Canmar oilspill tracking model users documentation / FLATER, W.A. [S.I.: s.n., 1978].
2 microfiches: figures; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWC08)
Appendices.
References.
ACU

The object of this programme is two-fold: firstly to track and predict the motion of a hypothetical oil spill and secondly to determine the concentration of oil after a certain amount of time. The objective of the project was to incorporate the programme in the Arctic Weather Center ... to allow for both tracking (up-dating) the oil trajectory every hour using the observed wind data and predicting the future trajectory (every six hours) using the predicted wind data. AWC are working directly with Canmar to provide up-to-date information on weather conditions during Canmar's drilling operations in the Beaufort Sea using a computer; the oil spill programme runs on this computer. It is hoped to verify the programme using Orinon oil tracking buoys. If this is carried out, it is recommended that a record of the wind data for grid points covering the Beaufort Sea (obtained from AWC computer), along with the buoy positions are retained. Using these data, a programme could then be written which would allow optimization of the model which indicates the movement of oil in the Beaufort Sea. The model considered in this programme determines oil motion from wind effects only and does not include permanent currents. ... (Au)

Q-107848
1 microfiche: figures, tables; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RWC09)
Appendices.
References.
ACU
... Apollonia (1965) stressed the importance of ice algae as a potential food source for grazing invertebrates such as amphipods ... which are in turn important food sources for polar cod. ... In view of this grazing activity at the bottom of the ice, the early ice algal production could be very significant. Clasby et al. (1982) calculated the annual carbon input by ice algae off Pt. Barrow was about 5 gC/square m which would amount to a very significant fraction of the total primary production for Arctic cod, estimated by various authors. The fact that oil floats will mean that it will accumulate in pools under the ice. ... There are several possible effects of oil that accumulate at the under-ice surface. A physical coating would lead to isolation of the algae from their nutrient and light source and also from the grazers. More important is probably the effect that the more volatile components of the oil will have on the organisms present. ... In the Arctic, Alexander et al. (1972) found that primary production was significantly depressed and seasonal succession of algal species was reduced in an oil-polluted small pond in Alaska. ... Halav (1976). ... predicted a large spill would result in a change of species composition of the phytoplankton community from diatoms to flagellates because of this differential sensitivity. ... With this background, we wanted to take advantage of the opportunity to collect some preliminary information on this subject in the Beaufort Sea in an area subjected to two experimental oil spills. (Au)

Q-107956
Appendices: volume 2.
References.
ACU

... The objectives of this study were to: Estimate the limiting factors for pumping oil/water mixtures in the Arctic. Develop guidelines for the use of appropriate equipment and recommended operational techniques to prevent freeze-ups. Develop test parameters to conduct a full-scale field exercise. This report summarizes the market survey of the availability of hoses, pumps, and insulating and heating systems, and details the heat transfer analysis for the hose system and experimental program for the pumping systems in the cold room for Arctic operations. This study investigated two distinct pumping systems, namely the "bare" and "insulated" systems. The former system implies neither the pump nor the hose is insulated or heated, while the latter is a general term for the pumping systems with insulation and/or heat tracing. (Au)

Q-107964
Appendices.
References.
Estimates have been made concerning the amount of oil, originating from a subsea blowout in the Beaufort Sea, which could be removed from the ice surface in the spring through an extensive igniter deployment operation via helicopters. ... The investigation firstly analysed the burning of all surface oil pools of area one metre square or greater, which would result in an ignition of approximately 95 percent of the surfaced oil, or 70 percent of the released oil. It was found that this would require the use of millions of igniters and dozens of helicopters for most of the blowout conditions under study. An operation of this magnitude was deemed unfeasible. ... Possible ways of enhancing the igniter operation's efficiency are discussed. The most promising method would be to induce an earlier formation of the oil on the surface. This would provide more time for the deployment of igniters and supply a higher percentage of the oil spilled on the surface for burning. ... In summary, the general effectiveness of igniters in removing oil from ice has been estimated. The decision to deploy igniters must now be based on a careful analysis of the costs involved and the benefits gained through such an operation. (Au)

Q-107972
Appendices.
References.
ACU

In a controlled test using 173 litres of Beaufort Sea crude oil, a series of prototype oil spill igniters were dropped from a helicopter, into an oiled pool on the ice surface of Crater Lake, near Yellowknife, N.W.T. Over 80% of the oil was successfully burned, but air deployment is not considered reliable using the igniters in their current form. Improvements are necessary to: eliminate the possibility of the igniter landing inverted - enhance the success rate of hitting the target pool - minimize the herding effect of helicopter downwash - reduce the igniter bulk, and simplify the fuse lighting procedure. (Au)

Q-107980
Appendix.
References.
ACU

Seven air-deployable igniters were constructed, tested and evaluated. The best design ... was then selected as the most suitable for air-deployment and subsequent ignition of the oil. The critical factors in its selection were the relatively low costs of construction and the superior performance of its design. When tested ... both of the objectives set out at the beginning of this project were fulfilled. The first objective was to reduce the size and weight of the igniter, and the second to improve its floatation and stability characteristics in water after air-deployment. All seven designs were tested for their floatation and stability ... only two, Igniter #6 ... and Igniter #7 were tested in the static combustion test ... and only the most suitable Igniter (#6) was tested in the ... In the end, during the air-deployment test runs, the selected Igniter #6 was dropped from an 11.5 m high tower and its performance was evaluated. Use only fuse wire as a starter. Four out of the five test runs ... were successful in achieving ignition.
Oil and gas under ice laboratory study / Acres Consulting Services Limited. Canadian Marine Drilling Limited [Sponsor]. Canada. EPS [Sponsor].

1 microfiche: 111., figures, table: 11 x 15 cm.

(Beaufort E.I.S. reference work, no. RWC17)

ACU

A laboratory study of the behavior of oil and gas under ice has been conducted by Acres Consulting Services. The prime objectives of the study were defined as follows. - To determine the influence of currents on oil hardening within depressions and under broken sea ice. - To determine the influence of currents on oil migration between depressions and under broken sea ice. The tests were conducted in Acres' ice flume at the Niagara Falls laboratories. Two different ice covers were used with undulated and broken cover sections. This report contains a description of the test facilities, test procedures, and detailed observations. A number of photographs have been attached and a videotape recording has also been prepared. (Au)

Q-108030

Development and testing of a 'quickie' fire resistant oil containment boom / Mcallister Engineering Ltd. Canadian Marine Drilling Limited [Sponsor].

1 microfiche: figures: 11 x 15 cm.

(Beaufort E.I.S. reference work, no. RWC18)

ACU

It has been found that one of the most acceptable forms of handling spilled oil appears to be in-situ burning. Before oil can be burned, it is necessary that it be collected to sufficient depth to burn. While current oil containment booms can collect oil, none have been built that are sufficiently fire resistant and yet sufficiently portable to allow for ready transport of a spill to a location where it can be burned. Consequently, McAllister Engineering Ltd. was asked to construct a test section of boom utilizing readily available materials. The boom suggested was to be constructed of oil drums interconnected by a flexible skirt utilizing chain as a ballast/tension member. The material to be used for a flexible interconnection was to be investigated and selected for appropriateness to the operation. Such a boom was designed, built and tested. Subsequently, tests were made of the oil drum materials to determine their rate of oxidation and probable life expectancy when used as a floatation unit. (Au)

Q-108057

Production islands / Exxon Corporation. Jeane, H.D.

1 microfiche: 111., 11 x 15 cm.

(Beaufort E.I.S. reference work, no. RWDO1)

References.


ACU, NFSMO

In this paper Exxon Corporation describes the way in which it would design and build an exploration gravel island in a thirty foot water depth in the Alaskan Beaufort Sea. (ASTIS)

Q-108065

1 microfiche: figures: 11 x 15 cm.

(Beaufort E.I.S. reference work, no. RWDO2)

References.

ACU

The purpose of this document is to outline Dome's 1981 plans for work at McKinley Bay in support of the continuing exploratory drllling program and specifically, to restate Dome's interests in the area as a winter mooring basin for the Cannar fleet and as a forward supply base for late season drilling and early season breakout. What follows is the background documentation, project description, environmental assessment and relevant permit/approval requirements as we understand them. ... (Au)

Q-108070

Isarrek artificial island environmental baseline and monitoring study 1977 / Environco Limited. Imperial Oil Limited [Sponsor].

1 microfiche: 111., figures, tables: 11 x 15 cm.

(Environco Limited [Sponsor].)

Appendices.

References.

ACU

The construction activities associated with Isarrek F-27 caused substantial turbidity both around and downstream of the island. However, a dyke built around the island perimeter substantially reduced the dredged material spilling into the adjacent waters. The phytoplankton population was either stimulated or entrained by the turbidity plume due to nutrient enrichment from the disturbance of underlying sediments. Neither the zooplankton nor benthos within the plume were significantly affected by the construction activities. However, an estimated 6000 kg of benthos were either destroyed or displaced from habitat at the borrow site or under the island base. Still, the underwater surfaces of Isarrek F-27 provide a potential habitat for benthos colonization. In addition, the presence of new shoreline may attract other biological communities including crabs. Any noxious environmental effects that may have gone undetected were likely to have only a short-term impact since the construction schedule lasted only about three months. Furthermore, such impacts would be restricted to the immediate Isarrek F-27 area. (Au)

Q-108120


1 microfiche: figures, tables: 11 x 15 cm.

(Seakem Oceanography Ltd., Thomas, D.J.: Canadian Marine Drilling Limited [Sponsor].)

Appendices.

References.

ACU

Water and sediment sampling was carried out at Kagulilik A-75 during shallow water flow. No temperature or conductivity anomalies could be detected. Dissolved oxygen concentrations indicated no critical oxygen deficiency and pH profiles were within normal range. Values for dissolved Fe, Cu, Zn, Cr, Cd, Ni, Pb, and Hg indicated concentrations at least several times above the baseline established by the 1977 Site Survey. The source of the trace metals was the
flow water itself and not likely the sediments which contained very low concentrations of all elements. (Au)

Q-108227
5 microfiches : figures, tables ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWE33)
Appendices.
References.
ACU

An investigation directed at the development and application of methodology for identification, quantification, and assessment of environmental impacts associated with the construction and operation of Dome's Beaufort Sea hydrocarbon production and transportation system was carried out. The primary quantification methodology developed and utilized is a computerized environmental matrix method capable of objectively identifying and quantifying first order impacts: that is, discharges, disturbances, and other direct effects of the system on the physical environment. ... the system was decomposed into approximately 400 potentially impacting activities, each associated with any of up to 100 impacts. Examples of activities include: dredging, ice breaking operations, drilling, and habitation; of impactors, sediment dispersion, ice breaking, exhaust emission, and sewage discharge. ... Further detailed investigations were carried out on higher order impactors, including permafrost, sea bottom reconfiguration, and drilling discharges. On a more vigorous level, the beginnings of an investigation into the effects of channel and ice free area maintenance and atmospheric dispersion were established.

Quantitative and qualitative significant issues were identified and discussed for all aspects of the work. Conclusions and recommendations were submitted. (Au)

ACU

Q-108383
Developing a safe arctic oil tanker / Dome Petroleum Limited.
1 microfiche : figures, maps, tables ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWO10)
Appendix.
References.
ACU, NPSMD

This report describes the distinctive features of a new concept for the transportation of crude oil from arctic regions via oil tanker. The ship which Dome has designed is a double-hull, 125,000 ton crude carrier of all-welded construction, consisting of forecastle and forward accommodation deckhouse, midbody oil cargo, segregated ballast tanks and with all machinery mounted aft. A conceptual drawing is provided along with a list of distinctive design features. Appendix I consists of the recommendations made by Det Norske Veritas to Dome Petroleum for arctic tanker design. These recommendations are separated into three categories: operational procedures; facility requirements, and construction features, and highlight the differences between conventional tanker design and operation and the proposed arctic tanker. (ASTIS)

Q-108405
1 microfiche : figures ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWO3)
ACU, NPSMD

The problem of ice scouring on the sea floor in ice infested water is an important problem now that development schemes for these waters are seriously being considered. This paper describes the origin and subsequent disappearance of sea floor ice scour, then presents a discussion of the various methods that can be used to calculate the return period for ice scores and TOP (top of pipe) depth for sea bed installations; namely, TOP below the saturated score zone or deepest score, score dating, repetitive mapping, score equilibrium analysis, ice keel/score statistics, and TOP depth optimization method. Of the methods, the last two are felt to be most useful for the Beaufort Sea, and results indicating TOP at 5 m in 25 m water depths and no trenching in 55 m of water are presented. Many of the other methods are thought to be useful for comparative purposes only. ... The purpose of this work is to examine the likelihood of disruption of a pipeline by an ice feature as a function of TOP depth, and thus rationally choose a TOP depth for the pipeline. Here we review all the methods known to the authors for determining TOP depth in the Beaufort Sea and present a new method of calculating TOP depth based on observed ice keel/ice score statistics. (Au)

Q-108421
1 microfiche : figures ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWO8)
ACU

The objective of this study is to describe the potential of King Point as a deep draft (17 m) harbour and a year-round facilities for Dome Petroleum's future activities in the Beaufort Sea. This study also addresses the use of the adjacent area as a marine terminal for oil and LNG. (Au)

Q-108430
2 microfiches : figures, maps ; 11 X 15 cm.
(Beaufort E.I.S. reference work, no. RWO6)
ACU

The objective of this report is to identify potential harbour sites along the Beaufort coast, and to evaluate the feasibility of the sites for anticipated Dome/Canmar needs. The potential harbour sites identified include: - all known anchorages and fixed structure sites that have been used, or evaluated for use, over the last 20 years. - additional sites which have been identified herein as potential harbour sites. The choice of potential sites for consideration and the more detailed evaluation of sites was conducted on the basis of: - the anticipated functional requirements for harbour sites and related shore facilities. - physical/environmental characteristics of the
sites, biological, cultural and socio-economic considerations. In the medium term (1982-85) drilling will expand to include year-round operations. In the long term (1985 to 1995) production activities are expected to develop and will involve initial production from floating platforms as well as transportation by tankers and/or pipelines. Year-round drilling will also continue. The short, medium and long term development projections are discussed in more detail. There are a number of physical, environmental, and socioeconomic criteria that must be considered in evaluating potential harbour sites. These criteria include: marine conditions, shore configurations, maps and profiles, environmental conditions, research requirements and present legal status of the land. The 20 sites analyzed were grouped on the basis of their locations along the Beaufort coast. (Au)

Q-108472

The Beaufort Sea operations evaluation is presented in four sections: 1. Drilling performance, 2. Offshore construction, 3. Environmental Affairs, research and development, and 4. Socio-economic considerations. 1981 investigations indicate that the discoveries at Kopanoar and Kakoak have the potential to be hydrogen accumulations with oil in place between 1.8 to 4.5 billion barrels in the Kopanoar structure and 2 to 5 billion barrels in the Kakoak structure. As a result Dome intends to conduct further appraisal drilling at both sites to further evaluate the potential of these discoveries. 1981 also saw construction of the world's first caisson retained island in arctic waters. The design and construction of the caisson retained island is described. During the past year Dome and Canmar's Environmental Group have conducted work in the areas of oil spill countermeasures, oil spill research and development, environmental monitoring and prediction, and biological - chemical research. The major accomplishments in these various areas are outlined. "Based on several years of accumulated northern experience, Dome Petroleum has been able to develop principles and implement strategies for local participation and benefits to provide visible advantages to local residents without adversely affecting social and environmental conditions. These policies and programs are described in an Action Plan entitled '1981 Social Economic, Cultural Agreement, Beaufort Sea Project'." Within the text is a summary of these programs in the areas of: northern employment and training, economic development, social and cultural programs, information and communications, and future development in the Beaufort Sea. (ASTIS)

Q-108480
The Special Committee of the Senate on the Northern Pipeline: a submission by Dome Petroleum Limited / Dome Petroleum Limited. [Calgary, Alta.]: Dome Petroleum Ltd., 1982. 3 microfiches: iil. figures, tables; 11 X 15 cm. (Beaufort E.I.S. reference work, no. RW203) ACU, DONE

Dome Petroleum was invited by the Senate Committee on the Northern Pipeline to participate in the hearing on the subject of "transportation of petroleum and natural gas to North of 60 degrees and any matter related thereto." ... this presentation addresses the Senate questions [which are outlined in the introduction] under the following headings: - general background, - future development, - research in support of development, - arctic marine transportation, - industrial and economic benefits of Beaufort development, - decision making process. [The report also includes a review of northern benefits in the area of employment and training, and manpower planning.] (Au)

Q-108499

The revenue generated by Dome Petroleum in the communities of Tuktoyaktuk, Inuvik, Coppermine, Aklavik, and Yellowknife is presented in summary form by vendor. (ASTIS)

Q-108502

Mr. Gallagher recently gave this report as an address to a group of investment institutions in six European financial centres in reference to Dome's fifty million Euro-dollar financing. The report includes information on Dome's assets, investments and role in the resource development of Canada. (ASTIS)

Q-108510

... Dome maintains that if appropriate new oil pricing policies are instituted which will allow currently relatively economically unattractive enhancement schemes to proceed, not only will large new reserves become available to allow Canada to achieve and maintain self-sufficiency, but also that crude oil self-sufficiency can be achieved very much sooner than has hitherto been assumed possible. This report outlines a crude oil incentive pricing system that will allow Canada to achieve oil self-sufficiency in a very few years. Dome's assessment is presented on what Canada's crude oil supply could be if this incentive pricing regime were adopted. (Au)

Q-108529

Dome Petroleum is currently conducting oil and gas exploration in the Beaufort Sea and has a social and environmental responsibility to the residents, communities, and local governments of the North. Through its 'Memorandum of Understanding' which incorporates affirmative action programs to involve the Northern people in the socio-economics of oil and gas
development, the Company states its commitment for local participation in six main areas: 1) Community Consultation, 2) Northern Employment, 3) Northern Employee Training and Development, 4) Economic Development, 5) Social, Ethical, and Cultural Support, 6) Future Beaufort Sea Development - Northern Participation. This document is a statement of Dome's corporate policies, followed by a statement of its programs and practices with regard to Northern involvement in Beaufort Sea oil and gas exploration, production, and development. (Au)

Q-108537
References.

ACU

A sample of Dome's Nektorilik K-59 crude oil was supplied for testing, and this report will summarize our experience with that oil to date. This report is a preliminary presentation only; it does not contain all data gathered and it contains little reference to existing literature. Studies included: (a) chromatographic analysis of oil, (b) preparation of a 'water soluble fraction', (c) uptake and clearance of oil components, (d) volatilization of oil components from water, (e) toxicity of water soluble fraction to larval fish, (f) toxicity of oil to aquatic plants, (g) anatomical effect of oil on larval fish, (h) induction of fish enzymes by oil. [Results for each study are presented]. (Au)

Q-108548

ACU

This directory consists of five parts: 1) northern business listing by area, 2) northern business listing by service group, 3) northern business listing by contact name, 4) northern business company data, 5) blank company data sheets, enclosed for additions, revisions, and corrections to the company data in the Northern Business Directory. Each northern business listed in this directory is assigned a six digit identification code identifying the region, subregion, community, service group, service subgroup and northern ownership. (ASTIS)

Q-108553

ACU

... The review contained in this report is designed to assist the Panel in reviewing the risk and risk analysis aspects of the EIS, and determine the degree of compliance of the EIS with the Guidelines issued by the Panel. ... The report is arranged into six sections.

Section 2: [Presents] A summary ... and discussion of issues and the reviewer's opinion of the EIS compliance with the Guidelines. Section 3: ... A general outline of risk analysis methodology is provided with reference to its application to the EIS. The risks are divided into two types for purposes of the review: intentional and accidental. Section 4: Discusses the intentional risk and reviews how they are assessed in Volume 4 of the EIS. Comments are made about the adequacy of the assessments. Section 5: Reviews the accidental risks which are assessed in Volume 6 of the EIS. Additional information pertaining to accidental oil spill risks is presented as derived from the data in the EIS. Comments are made about whether the risk analysis of accidental accidents in the EIS is adequate. Section 6: Compares the risks of the two oil transportation options described in the EIS: arctic marine and overland pipeline. The comparison is intended to provide an appreciation of the differences in risk between the two options, particularly at the current conceptual stage of development. (Au)

Q-108568

ACU

The proponents ... were directed, as part of the Beaufort Sea Environmental Assessment Review, to prepare an environmental impact statement ... to include a description of the existing socio-economic environment, an analysis of the socio-economic impact of the Proposal and the subsequent identification of essential impact management and monitoring measures. The following review was designed to assist the ... Panel in determining whether those requirements had been met. ... The review is a critical one and is, therefore, limited primarily to a discussion of deficiencies. Section 2.0 identifies two problems with the general methods employed by the proponents in conducting the assessment. Section 3.0 reviews the efforts of the proponents to fulfill particular guideline requirements. Some general conclusions about the adequacy of the socio-economic impact assessment are presented in Section 4.0. (Au)

Q-108618

ACU

The author of this submission directs his critique of the Beaufort E.I.S. toward the following concerns: long term or chronic impacts of oil release, oil spill frequency and volume, absolute effect of countermeasures, Mackenzie Valley pipeline spills, other hazardous materials, oil spill scenarios, identification of times and places of unusual vulnerability, impact safety, etc. / for training, and monitoring and research. (ASTIS)
Q-108634


This submission reviews the general description and characteristics of proposed tankers designed to transport oil from the Beaufort Sea to eastern Canadian markets. The summary of significant issues outlines for the Panel, seven points within the E.I.S. which the author finds require clarification and elaboration by the proponents. (ASTIS)

Q-108642


This compendium includes all submissions received by the Beaufort Sea Environmental Assessment Panel as of February 9, 1983. The reports included in the compendium are those submitted by the following groups or government bodies: Fisheries & Oceans (Preliminary comments), Labrador Institute of Northern Studies, Environment Canada (Preliminary comments). Mr. Wayne Lindau, Beaufort Sea Alliance, Inuvialuit, Dene Nation, Canadian Wildlife Federation, Canadian Nature Federation, Mrs. Rita Pasiciel, Metis Association of the Northwest Territories, Arctic Bay Development Review Committee, Northern Inuit Association, Inuit Tapirisat of Canada, Fisheries and Oceans Canada, and Department of Indian Affairs and Northern Development (Vol. 1). (ASTIS)

Q-108669


This compendium includes all submissions received by the Beaufort Sea Environmental Assessment Panel between February 9 & February 15, 1983. The reports included in the second compendium are those submitted by the following groups and government bodies: Settlement and Band Councils of Fort Norman, Yukon Conservation Society, Mackenzie Dene Regional Council, Dene Community Council - Fort Good Hope, Government of the Northwest Territories, North Slope Borough, Archaeological Survey of Canada, Canadian Wildlife Service, Mines and Resources Canada, Beaufort Sea Alliance (amendments to earlier submissions), Morton Lindhard, Government of Yukon, Baffin Regional Inuit Association, Dept. of Indian Affairs & Northern Development (Vol. 2), Hamlet of Pond Inlet, Town of Inuvik, and Employment and Immigration Canada. Copies of two late submissions of the Arctic Transportation Limited and the Hamlet Council of Norman Wells are also enclosed. (ASTIS)

Q-108715


The ultimate purpose of this report is to help develop a research program that will assess the socio-economic impact of the construction and operation of an Arctic Island Gas Pipeline. The purpose of this report is ... two fold: first and foremost, this is a study of the transcripts from the Berger Inquiry Hearings, and second, an examination of the socio-economic impact studies carried out in the Mackenzie Valley region by the Federal Government and by Canadian Arctic Gas Pipeline Limited. It should be pointed out here that we shall be dealing only with employment: other aspects of the Berger Inquiry will be dealt with in a later report. En derniere instance, cet essai se veut une contribution a l'elaboration d'un programme de recherche relatif aux impacts socio-economiques de la construction et des operations du gazoduc des Iles de l'Arctique. L'objet de cet essai est ... premierement et prioritairement, une etude des transcriptions des audiences de la Commission d'enquete Berger; et deuxiement, un examen des etudes d'impact socio-economiques menees dans la region de la vallee du Mackenzie par le gouvernement federal et Canadian Arctic Gas Pipeline Limited. Nous tenons a preciser que nous ne traiterons ici specifiquement de l'emploi: les autres aspects de l'enquete Berger seront traites dans un rapport ultérieur. (Au)

Q-108794


References. ACU

During July 1979 geomorphological investigations were undertaken at five abandoned oil and gas wellsites in Eagle Plain and Peel Plateau regions of northern Yukon Territory (NTS 106L, 116L, 116M). The following wellsites were visited: Aquitaine Alder C-33, Chevrion SOBC WM N. Parkin D-61, SOBC Blackstone D-77, Mobil Gulf Pfeil H-71, and Gulf Mobil Caribou N-25. The results selected ex being either representative of general conditions in the area or were known to have experienced...
Fluorescence and the search for petroleum / Bujak, J.P. Davies, E.H. (Bio review: 82, p. 54-57, figures) ACU

"Fluorescence" involves the examination of microfossils that have organic walls, including marine dinoflagellate cysts and the spores and pollen of land plants. These microfossils are excited with ultraviolet light and examined under the microscope. Using various optical filters it is possible to observe the fluorescence in selected parts of the spectrum; the most useful ones are a narrow band filter to observe the blue-green fluorescence and a broad band filter to observe the fluorescence in the yellow to red end of the spectrum. Polybiologists at the Atlantic Geoscience Centre have examined sediments from a major oil discovery well, Kopanoar M-13, from the Beaufort Sea. Although the use of fluorescence techniques to examine fossil organic material is a relatively recent innovation, it has already proved valuable in dating sediments with extensive reworking, as in the Beaufort Sea, and in the recognition of the mature petroleum zone, as discussed for the Hibbertia P-18 well. In this way the sites and targets of exploration wells can be selected with greater precision through an increased understanding of the formation of petroleum and the accompanying changes in fluorescence of organic material. (Au)


The purpose of the Beaufort Sea Alliance position paper on Social Impact Assessment is to discuss the requisites of an adequate Impact Statement and of a good Social Impact Assessment. The paper reviews the social impact literature and then focuses on seven essential socio-economic impact issues. These issues are:

devlopment and on-going change, land claims, role of government, public participation, alternative patterns of development, local business and the boom, rural communities, and alleviation/mitigation strategies. It is hoped that the social impact discussion of these seven impact issues will centre the debate and thus prove to be a useful tool to the Panel in its assessment and evaluation of the proponent's Impact Statement and other evidence presented at the EARP hearings. (Au)


The EARP Panel is scheduled to complete its assessment and terminate its activities by the summer of 1983, eliminating any continuing assessment capability, and leaving no adequate forum within which to discuss and resolve the issues for, and full social, environmental and economic impacts of northern development. The Canada Oil and Gas Lands Administration (COOLA) has recently been jointly created by Energy, Mines and Resources and Indian and Northern Affairs, to consolidate the administration of northern hydrocarbon exploration and development. Still outstanding however, are the needs for a description of COOLA's operations, a clarification of COOLA's jurisdiction, and a framework for COOLA's management of offshore hydrocarbon development north of 60 degrees. The recommendations [in this report] specify additional changes necessary to complete the transition to a better management capability [both evaluation and regulation] for the Beaufort Sea - Mackenzie Delta region. (Au)

Canol, the first northern pipeline / Browning, P. (North/Nord, v. 29, no. 4, Jan. 1983, p. 2-8, map, col. 111.) ACU, NFSMO

During the Second World War the first great oil pipeline in the north was built, the Canadian American Norman Oil Line. It was destined to bring raw petroleum from Nornan Wells oilfield expansion and pipeline and report on construction progress, social and environmental issues and community affairs. (Au)


Between the CANOL pipeline of the 1940's and that of the Norman Wells Oilfield Expansion and Pipeline Project there has been a world of evolution in thinking. The 16 years to date has been a two-year moratorium before the start-up of construction. This interim would permit all participants to express their
points of view, particularly the native peoples who inhabit the immediate area of the project along the Mackenzie River. An innovation has been the appointment of fulltime interim project coordinator, John Scullion of DIAND, in preference to the creation of a costly agency as in the past. (ASTIS)

Q-113107
The Beaufort Sea hydrocarbon production proposal: guidelines for the preparation of an environmental impact statement Canada.
42 p. ; 28 cm.
Appendices.
ACU, NFSMO
The Environmental Assessment and Review Process (EARP) of the Government of Canada requires that proposed federal programs and activities that are likely to have significant environmental or socio-economic effects be submitted to an Environmental Assessment Panel for review before any decision is made to proceed. ... these Guidelines are being issued by the Panel to DIAND as a basis for the preparation of an Environmental Impact Statement (EIS) by the proponents [Dome Petroleum Limited, Gulf Canada Resources Inc. and Esso Resources Canada Limited] on their Beaufort Sea Hydrocarbon Production Proposal. Changes in these Guidelines can only be made by the Panel. ... The EIS, therefore, should address present and potential environmental issues associated with a proposal for offshore production in the Beaufort Sea-Mackenzie Delta area and alternate modes of transportation to southern pipelines or both Project site specific details, as they are developed, will be reviewed and assessed by other mechanisms at appropriate times. (Au)

Q-113395
(Occasional publication - Arctic Science and Technology Information System, no. 9) (APSA project no. 98 : Arctic Science and Technology Information System.)
ACU, NFSMO
... this bibliography contains all publications concerning the Beaufort Sea Environmental Assessment Review received on or before Feb. 28, 1983, a total of 198 documents. The following reports are included: Environmental Impact Statement, Support Documents, Reference Works, Other Company Publications, Government Position Statements, Technical Specialist Reports, [and] Other Panel Publications. (Au)

Q-114650
ISBN 0-660-11343-0
Appendices.
ACU, NFSMO
... in 1989 ... meetings were arranged between industry and government under the auspices of the Surveyor General in EMR. The meetings were held to discuss the technical and administrative difficulties of surveying in the offshore, and to make arrangements whereby they might best be overcome. The arrangements included ... the formation of a six-week workshop, the Workshop on Offshore Surveys, composed of 20 members from various agencies in industry and government. This first workshop was convened from January 12 to February 20, 1970, under the sponsorship of the Surveys and Mapping Branch. Its objectives were to study surveying systems, procedures and amendments to the regulations appropriate to the development of offshore mineral resources. The Workshop decided to confine its terms of reference to three aspects: first, a study of present and potential capability of offshore surveying systems suitable for the Canadian continental margins; second, a consideration of the problem of monumentation or marking of offshore surveys; third, a review of existing survey regulations in light of these findings. The Workshop dealt with surveying as it pertained to oil and gas. ... Since then there have been significant discoveries in the Arctic and on the east coast. ... To review these developments and make further recommendations, a one-week workshop of 20 delegates from government and industry was held March 15-19, 1982 under the auspices of the Interdepartmental Coordinating Committee on Offshore Surveys. The Workshop recommended the production of this third edition of Surveying Offshore Canada Lands for Mineral Resource Development. It brings the second edition up to date with more emphasis on the sequence of events leading to drilling for hydrocarbons in the offshore and there are additional chapters which emphasize positioning aspects of hydrographic surveying, geophysical surveying and sea ice. (Au)

Q-114782
Marching to the beat of the same drum : transportation of petroleum and natural gas north of 60 degrees latitude. Senate. Special Committee on a Northern Gas Pipeline. [Ottawa] : Queen's Printer, 1983.
84, 81 p.: figures, tables; 28 cm.
Appendices.
Text in English and French.
ACU, NFSMO
... Frontier petroleum resources have been accorded a central role in securing domestic oil self-sufficiency by 1980. Over the next 10 years, [within] industry, ... much valuable operating experience has been gained and technological advances made in the construction and innovative use of artificial islands, subsea and surface drilling systems and alternate transportation systems. The technical advances achieved to date have, however, been somewhat overshadowed by uncertainties for industry resulting largely from a policy vacuum and unresolved government priorities. Industry has yet to earn its first dollar of revenue from Canadian frontier oil and gas. The point has been reached where clear federal policy is imperative since economic petroleum resources in the High Arctic, the Beaufort Sea-Mackenzie Delta Region and offshore East Coast have now become a reality. The concern of this study is developments occurring in the Arctic Region ... the first part of this report concentrates on the plans of the companies active in the Beaufort Sea-Mackenzie Delta Region and in the Arctic Islands area. ... Industry is gearing up to move from the exploration and development phases to the production stage in frontier regions. Yet the priorities for frontier hydrocarbon development remain unclear and ground rules for bringing arctic petroleum resources to market are only just being established. Until this government clarifies its position relative to petroleum resource development by providing
For approximately 17 years now oil and gas exploration activities have been carried out in the Beaufort Sea - Mackenzie Delta region. However, discovering oil and gas in the Arctic is only the first step. After being found, the hydrocarbon reserves must be delineated by further drilling in order to prove that commercial reserves exist. Estimated oil reserves at several of these locations are nearing the threshold quantities needed to proceed with production. No matter which field is produced first... oil production will begin at a slower pace than in the next decade as a result of offshore development. The Environmental Impact Statement prepared by the proponents of Beaufort Sea development examines the technical, environmental and socio-economic implications associated with a range of production rates. But the rate itself will be influenced by a number of factors including government policies, industry's drilling success rates, and social, economic and environmental considerations. This article examines the basic requirements for production, climate and geography, wildlife in the region, oil spills and countermeasures, environmental effects of normal activities, and development and the people. (Au)

This article addresses key considerations in the construction of an overland pipeline from the Beaufort Sea - Mackenzie Delta hydrocarbon reserves to Edmonton, Alberta. The factors discussed are: the effect of climate and geography on pipeline construction, the environmental aspects of pipeline construction, the effects the pipeline will have on wildlife, safety considerations, and the socio-economic impacts of pipeline construction on the people of this area. (Au)

The purpose of this review is to provide an assessment for the Beaufort Sea Environmental Panel of the adequacy and completeness of the Environmental Impact Statement (EIS) prepared for the Beaufort Sea Hydrocarbon Production Proposal. The primary standard against which the EIS will be evaluated is the Guidelines for the Preparation of an Environmental Impact Statement issued by the Federal Government. However, the purpose of the review is not only to provide an assessment of degree of adherence to the guidelines but also of the adequacy of the document as the Panel Review process. Therefore, the author's opinion as to the EIS prerequisites for an effective public review process will also be utilized where appropriate. (Au)

The Beaufort Sea Environmental Assessment Panel has reviewed the Environmental Impact Statement (EIS) for Hydrocarbon Development in the Beaufort Sea - Mackenzie Delta Region prepared by Dome Petroleum Limited, Beaufort Sea Canada Limited and Gulf Canada Resources Inc. and transmitted to the Panel by the Department of Indian Affairs and Northern Development in November 1982. The Panel has identified major deficiencies in the EIS in each of the following categories: assessment of socio-economic effects, assessment of environmental effects, oil spills and zone summaries. In addition, the Panel has identified a number of concerns about which it wishes the Proponents to respond. Further information may be discussed in papers to be submitted at the same time as the response to the Deficiency Statement. (Au)

Q-115746
Subsea containment study: phase 3, environmental loads / CanOcean Resources Ltd. [Sponsor]. New Westminster, B.C.: CanOcean Resources Ltd., 1981. 2 microfiches: figures, tables; 11 x 15 cm. (COOSRA project report, no. CS08V3) Appendices. References. ACU, NFSMO

The present study is to evaluate the environmental loads acting upon the oil spill containment structure consisting of an incinerator, risers, collector and the mooring system. It has been found that very high ice forces are involved. Consequently a new power mooring system is required. Besides the ice strength and thickness, the magnitude of the ice forces depends largely upon the performance of the structure during ice breaking, and the configuration of the ice ridge. The incinerator should be designed to have a slightly inclined surface to enhance the bending failure of the ice, and at the same time to reduce the rotation at the riser connection(s). (Au)

Q-115748
Subsea containment study: phase 4, preliminary system design / CanOcean Resources Ltd. Dome Petroleum Limited [Sponsor]. Calgary, Alta.: CanOcean Resources Ltd., 1982. 1 microfiche: figures, tables; 11 x 15 cm. (COOSRA project report, no. CS08V4) The fourth phase has been referenced as task 2 in succeeding reports. Appendices. References. ACU, NFSMO

A preliminary design of the proposed type of subsea oil spill containment system is presented. Further work involving computer simulation and model tests are necessary to ensure the survival of the system in the presence of ice ridges. The system is expensive. Its deployment within a matter of three weeks is difficult even if it is pre fabricated and assembled. Furthermore, no practical solution has yet been found for the pretensioning of the mooring lines. [The first part of the study is] ... a preliminary design of the subsea containment system. The second part of the study examines the deployment and operational aspects of the system. ... The two major areas where the system is to be used are the Beaufort Sea and the East Coast. Water depths range from 20 m to 80 m in the Beaufort Sea. In the East Coast, water depths up to 200 m are considered. The
system has to break through 2 m thick ice sheets during normal operations. Under the influence of large ice features, the incinerator submerges. It has sufficient buoyancy to pierce through the ice sheets again after the passage of the ridges. This study can only attempt to highlight the requirements and the problems associated with the system.

(Au)

Q-116581
Oil and gas activities 1981: report on the activities in 1981 of the oil and gas industry in the Yukon, Northwest Territories and Nunavut.

Ottawa: DIAND and COBLA, 1982.

87 p.: ill., figs., map, table; 28 cm.


Appendices:

ACU

The Northern Oil and Gas Liaison and Co-ordination Directorate is a liaison between DIAND and COBLA and serves to ensure that northern policy and northern concerns are reflected in the administration of northern oil and gas rights and associated oil and gas activities. This report for the Yukon and Northwest Territories summarizes new discoveries of oil and gas, new legislation relevant to the oil and gas industry, recent exploration agreements reached, revenues for the calendar year, drilling activity, production figures for oil and gas, and ongoing research in oil spill countermeasures and regional environmental studies.

(ASTIS)

Q-116084
The construction of an artificial drilling island in intermediate water depths in the Beaufort Sea / Boone, U.D.


(OTC paper, 3873

References: ACU, NSM

In October of 1979, Esso Resources Canada Limited, a wholly-owned subsidiary of Imperial Oil Limited, completed its 15th artificial drilling island in the Beaufort Sea, 26 km north of the Mackenzie River Delta in the western Canadian Arctic. Issungnak, as the island is known, is unique in size and construction. The success of the project hinged on finding sufficient granular borrow material within the range of the suction dredges and their pipelines. An on-site mini-computer controlled system ensured the accurate placement of fill to optimize the use of construction time. The system was also used to collect hydrographic survey data and generate fill volumes, contour maps, and slope profiles for use in planning construction and dredging strategies. Details of the island construction are presented in this paper with special attention given to site conditions, design criteria, and construction techniques and control. The techniques used include innovative approaches to surveying, dredging, and the use of floating pipelines in hostile marine conditions.

(Au)

Q-116180
Dredging and construction techniques for steep slopes on artificial drilling islands in the Canadian Arctic / Dikken, J.J., Brakel, J.


(OTC paper, 4225)

References: ACU, NSM

A method is described, that has been developed for the construction of sand berms for artificial islands in the Canadian Beaufort Sea. The method leads to steeper slopes of the submerged sand. Side slopes of 1:5 have been obtained resulting in diminished material requirement with consequent reduction in time and expenditure. This paper describes a system of controlled placing of dredged material under water enabling the economical construction of artificial islands. The system has been used successfully at various projects such as the covering of pipelines and the construction of the Tarsut Island in the Canadian Beaufort Sea for Dome Petroleum.
The potential of ice ride-up on a man made island in the Beaufort Sea, and the associated ice forces were investigated through a series of model scale experiments in ARCTEC CANADA'S synthetic ice basin. The study was carried out in April 1978 for ESSO RESOURCES on behalf of the Arctic Petroleum Operator Association, project number 109. In this paper, the test procedure, the results and their analysis are presented. In this study, the influence of ice thickness, ice properties and the scale factor on the ice ride-up extent over the island slope and ice forces on the island were investigated. A simple analytical model was also used to correlate the experimental results and evaluate the ice ride-up likelihood for a wide range of ice conditions. (Au)

The prediction of return periods of extremely deep pressure ridge keels is discussed, using as data a 1400 km summer profile obtained by U.S.S. "Gurnard" in the Beaufort Sea. Three techniques of predicting return periods at a point are examined: the use of the negative exponential distribution, a depth crossing technique, and a probability plotting technique. The problem of predicting return periods along a line is then examined with reference to ice scouring across seabed pipeline routes. A technique which combines keel statistics and scour depth statistics is used to compute the pipeline burial depth necessary to avoid disturbance by ice for a specified period. (Au)

A seven-volume Environmental Impact Statement was published by the three companies in 1982. ... To ensure that everyone can participate successfully in the community discussions, a summary for each region or zone studied in the statement has been prepared in clear, non-technical language .... This report is the summary for the Northwest Passage region or zone. Two other summaries cover the Beaufort Sea-Mackenzie Delta zone and the Mackenzie Valley. (Au)

Ice rubble fields, extensive accumulations of fractured ice broken out of moving ice sheet, form around most Arctic offshore structures located in a dynamic ice environment. The extent and influence of such a rubble field are principally governed by the water depth, ice movements, properties of the ice and geometry of the structure. The authors have developed a computer simulation program which calculates the rubble field extent and properties that will accumulate around various offshore structures located in the path of moving ice. ... This tool provides the basis for a more rational calculation of force and ice scour reductions, compared to traditional calculations, as well as the basis for an assessment of the operational problems of product export and resupply over and through free floating or grounded rubble. Pre- and post-processors are used to develop statistics on the ice movement data, and to plot the results of rubble extent, rubble cross-sections, and pressure transmission calculations. The model has been applied to numerous artificial offshore structures, and for verification purposes, to several naturally occurring features. (Au)

The prediction of extreme keel depths from sea ice profiles / Wadham, P. (Cold regions science and technology, v. 6, no. 3, Feb. 1993, p. 257-266, figures, tables) References. ACU, CNSMD.


A seven-volume Environmental Impact Statement was published by the three companies in 1982. ... To ensure that everyone can participate successfully in the community discussions, a summary for each region or zone studied in the statement has been prepared in clear, non-technical language .... This report is the summary for the Mackenzie Valley region or zone. Two other summaries cover the Beaufort Sea-Mackenzie Delta zone and the Mackenzie Valley. (Au)


A seven-volume Environmental Impact Statement was published by the three companies in 1982. ... To ensure that everyone can participate successfully in the community discussions, a summary for each region or zone studied in the statement has been prepared, in clear, non-technical language .... This report is the summary for the Mackenzie Valley region or zone. Two other summaries cover the Beaufort Sea Mackenzie Delta zone and the Northwest Passage. (Au)
O-116795
ACU
A seven-volume Environmental Impact Statement was published by the three companies in 1982. To ensure that everyone can participate successfully in the community discussions, a summary for each region or zone studied in the statement has been prepared. In clear, non-technical language, this report is the summary for the Beaufort Sea-Mackenzie Delta region or zone. Two other summaries cover the Northwest passage zone and the Mackenzie Valley. (AU)

O-116793
ACU, NFSMO
The Beaufort Sea Environmental Assessment Panel has reviewed the Environmental Impact Statement (EIS) for hydrocarbon development in the Beaufort Sea-Mackenzie Delta Region and has identified major deficiencies in the EIS in each of the following categories: 1. Assessment of Socio-Economic Effects, 2. Assessment of Environmental Effects, 3. Oil Spills, 4. Zone summaries, 5. Further information requirements (Discussion Papers). This document responds to items 2, 3, and 5. Item 1 is dealt with in a document entitled Socio-Economic Effects, and individual Zone Summary reports have been prepared for each of the three geographic zones where development activities may take place. Namely the Beaufort Sea-Mackenzie Delta, the Northwest Passage, and the Mackenzie Valley. ... (AU)

O-116807
Contents: Dome/Esso/Gulf EIS Information/Consultation Summary ; Post Deficiency Letter - new consultation material Dome/Esso/Gulf : Dome, Esso, Gulf Information/Consultation summaries: Beaufort Exploration, Norman Wells Expansion Project. Section 1.6 lackinng: Fort Good Hope meetings re oil spill investigation.
ACU
Appendix I is a compilation of Summary sheets and other material documenting the following Beaufort Sea-Mackenzie Delta environmental impact statement, supplementary information 1983. Contents: Dome/Esso/Gulf EIS Information/Consultation Summary; Post Deficiency Letter - new consultation material Dome/Esso/Gulf: Dome, Esso, Gulf Information/Consultation summaries: Beaufort Exploration, Norman Wells Expansion Project. Section 1.6 lacking: Fort Good Hope meetings re oil spill investigation.
ACU
This publication provides news of Esso's activities in northern Canada, especially the Norman Wells Expansion Project and the Beaufort exploration agreement operations. Business and employment opportunities are included. (ASTIS)
Q-117919

Islands in the sea ... built by Esso / Forrest, D. (Review - Imperial Oil Limited, v. 67, no. 2, 1983, p. 6-11, 111.)
ACU, NSMDO

The author discusses Esso's Beaufort Sea operations which have been ongoing since 1965. Esso developed the concept of the temporary exploration island and went on to build more than any other company, 18 have already been completed and a nineteenth is under construction. Some of the more outstanding artificial islands are described here. (ASTIS)

Q-118117

ACU

An aerial survey of facilities sites along the IPL pipeline route from Norman Wells, NWT, to Zama Terminal, Alberta, was conducted between 20 and 25 June 1983. Facilities sites included in the survey were those proposed for construction camps, stockpile sites, staging areas, pump stations, remote maintenance bases, and metering stations. Of these, only the pump stations, the remote maintenance bases, and the metering stations are considered to be permanent structures. In some cases, site locations were altered from the original drawings, after consultation in the field ... The objectives of the study were twofold: ... to present general recommendations for the location and operation of facilities sites; and ... to assess the location and activity of each site to determine the possible impact on aquatic resources. [Site-specific recommendations are included.] (Au)

Q-118125

ACU

Interprovincial Pipe Line (N.W.) Ltd. proposes to cross the two largest streams on its pipeline route, the Great Bear River and the Mackenzie River, in the late summer and early fall. The major objectives of this study were to: 1. Describe the fish populations ... with particular emphasis on migrating or spawning fish that may be in the vicinity of the crossings during the construction period; 2. Assess the potential impact of pipeline construction on fish populations in the two rivers; and 3. Provide suggestions for mitigative measures in the design, construction, and timing of the crossing so that, if permitted, impacts on local fish populations are avoided. ... (Au)

Q-118133


v. 50, 6 leaves : figures, tables ; 29 cm. Appendices.
ACU

This document provides environmental protection measures specific to winter clearing activities planned for the period December 1982 to April 1983. It is designed to be used in conjunction with coded alignment sheets which contain clearly marked locations and areas designated for clearing and burning activities. The protection plan summarizes project activities, schedules and required approvals ... and presents the general and specific project procedures designed for protection of terrain, wildlife habitat, aquatic habitat, and historical resources. ... (Au)

Q-118141

ACU

This addendum to I.P.L's environmental protection plan for winter clearing and site development activities describes the planned activities to follow completion of 1983 winter clearing at off-right-of-way sites. Activities include the following: development of borrow pits, construction of gravel pads at camp sites, fuel storage sites, pipe storage sites and access roads. A list of the more outstanding project locations is provided. The environmental inspection program for preconstruction activities is outlined. (ASTIS)

Q-118168

Late winter surveys of aquatic resources along the IPL pipeline route Norman Wells, NWT to Zama Terminal, Alta. / Aquatic Environments Limited. McCarr, D. McCarr, P. Interprovincial Pipe Line (NW) Ltd. [Sponsor]. [Edmonton, Alta.] : Interprovincial Pipe Line (NW) Ltd., 1982. 1, 26 leaves : maps (folding), tables ; 29 cm. References.
ACU

Winter construction of the Interprovincial Pipeline from Norman Wells, NWT, to Zama City, Alberta, will result in some disturbance to streambeds crossed by the pipeline route. The objectives of the study reported here were to: 1. Assess the potential for fish overwintering in the vicinity of stream crossings; and 2. Suggest mitigation measures to reduce the impact of winter construction where overwintering fish are likely to occur. Discussion in this report is limited to streams with some fish overwintering potential. ... (Au)

Q-118176

ACU

... This report is a description of the environmental education program to be conducted...
by Interprovincial Pipe Line (NW) Ltd. for all inspection and construction staff. Emphasis in this report is placed on the program for clearing and pre-construction activities; construction activities will be addressed in a report scheduled for submission in January 1983. Course objectives, schedule and duration are included. ... (Au)

Q-118184
iv, 36 leaves : figure, table ; 29 cm.
ACU

... This report provides a review of predevelopment environmental conditions, an assessment of potential impacts resulting from development, and appropriate preliminary reclamation procedures for borrow pits scheduled for development along the Mackenzie Valley Pipeline route in winter 1981. ... (Au)

Q-118192
18 leaves : figures (some folded), map, table ; 29 cm.
Appendices.
ACU

... The proposed IPL line will cross several dozen rivers and streams. Hardy Associates (1978) Ltd. have been retained to provide the geometrical and river engineering input to final design of the stream crossings along the proposed system. ... The scope of the present report is limited to the segment of each proposed crossing which lies beneath the stream channel and associated flood plain. Further, this report addresses only the geometrical/river engineering factors affecting stream crossings and in general provides information on the extent of vertical and lateral cover required to maintain pipeline integrity. (Au)

Q-118206
iii, 25 leaves ; 29 cm.
References.
ACU

... This reassessment, which is in response to requirements set forth by the National Energy Board, takes the form of a review of the existing literature, supplementary field and office studies and the development of an outline of standard construction procedures to maintain terrain stability. ... Study programs have been carried out by Interprovincial Pipe Line to gather information applicable to the mitigation of terrain damage. These can be divided into geotechnical studies, geophysical studies and environmental studies. ... The overall conclusion based on the additional studies and literature review is that Interprovincial Pipe Line's plans to minimize terrain damage, as presented to the National Energy Board, were adequate and sufficient to ensure minimal disruption to the terrain along the pipeline route. (Au)

Q-118222
v. 19 leaves : 29 cm.
ACU

This volume describes the organization into five volumes of the environmental protection plan of Interprovincial Pipe Line (NW) Ltd. A detailed description of the format of each volume is given, but actual plan content is not included. (ASTI)

Q-118796
v. 30 leaves : figures, maps (folded), tables ; 29 cm.
Appendix.
References.
ACU

This report evaluates the impact of pipeline construction on fish populations at stream and river crossings along the proposed pipeline route. Streams and rivers which could be affected by construction are discussed along with measures to mitigate these impacts. This assessment of impacts and mitigative measures is based on fisheries studies by McCart and McCart (1982) and McCart (1982). (Au)

Q-118800
Inspection of wildlife habitat at facility sites along the Norman Wells Pipeline / McCourt Management Ltd. Ealey, D.M. Interrprovincial Pipe Line (NW) Ltd. [Sponsor]. [Edmonton, Alta.]: Interprovincial Pipe Line (NW) Ltd., 1982.
v. 53 leaves : figures, maps (folded) ; 29 cm.
ACU

An aerial and ground inspection of pumping station sites, stockpile sites, construction camp sites, river crossing sites, and access roads associated with the Norman Wells pipeline was conducted between 19 June - 1 July 1981. ... The purpose of the study was to detect any critical wildlife habitat which might be affected by activities associated with the facility sites. ... Critical habitat ... included: data for over-wintering bears and for other carnivores; mineral licks and winter range for ungulates, primarily moose; nest sites for raptors; and any habitat which may have a diversity of species or a large number of any single species on a regular basis. (Au)

Q-118921
v. (various pagings) : figures, tables ; 29 cm.
References. Appendices.
Corridor on the Mackenzie Delta.

ACU

This report deals with the impacts on the biological, physical and human environments which we think will result from the construction and operation of the proposed Dempster Highway gas pipeline. Even more important, it deals with other developments that are, or will probably be, associated with the pipeline, including the highway itself... (Au)


... This report summarizes the Alaska Highway Pipeline Panel's assessment of the physical, biological and socio-economic impacts of the Dempster pipeline and associated activities. In making this assessment it has been necessary to evaluate the impacts of the recently completed Dempster Highway as well as gas plants, gas gathering systems and other consequent support activities that will inevitably follow if a gas pipeline is built. The panel feels that an impact assessment which considers the pipeline in isolation will be incomplete and misleading. ... (Au)


The Issungnak Oceanographic Survey was conducted near Issungnak, an artificial island site in the Canadian Beaufort Sea. Sampling occurred during two winter seasons and one summer season in 1981-1982. (Au)

Q-118955 Modularizing the Norman Wells processing facility. (Canadian petroleum, v. 24, no. 6, July 1983, p. 27-28) ACU, NFSMO

This article describes the history, design criteria and construction of the Norman Wells Central Processing Facility, the first of its kind to be fully modularized for the Canadian Arctic. (ASTIS)

Q-120316 Esso CRI drilling system now complete. (Oilweek, v. 34, no. 28, Aug. 22, 1983, p. 29-30) ACU, NFSMO

This article describes the design, construction and testing of Esso Resources Canada's new $20 million Caisson Rig 7, the largest rig owned by Esso and specifically designed for use on the initial caisson retained island exploratory drilling program to begin this fall. (ASTIS)


The Ottawa Field-Naturalists Club presents its comments on the Environmental Impact Statement concerning the hydrocarbon development in the Beaufort Sea-Mackenzie Delta region for consideration by the Beaufort Sea Environmental Assessment Panel. (ASTIS)


In 1982, in McKinley Bay, N.W.T., an experimental spill was conducted to investigate the cleanup of water-in-oil emulsions spilled under first year sea ice. The experiment involved the discharge of 192 litres of a 60% water-in-oil emulsion beneath the ice at each of two test sites and the discharge of 192 litres of straight crude oil at a third site for comparison. The ice was 165 cm thick at the time of the discharge. ... During the time that the oil and emulsion were frozen in the ice no significant changes in the physical or chemical properties of the oil were noted. In particular the emulsion did not separate back into its components of oil and water. By mid-June, when the ice sheet was melting, the crude oil began to appear on melt pools on the ice surface. The oil was migrating up through open brine channels in the ice. This process continued and by July 8, one day prior to the breakup of the ice sheet, only some 5% of the original oil was left trapped in the ice. In comparison, significant quantities of emulsion did not appear on the ice surface until about July 5. This was because the high viscosity of the emulsion prevented it from flowing up the open brine channels. ... By July 8 the same small percentages of emulsion as oil was left trapped in the ice. In-situ burning of the emulsion floating on melt pools proved to be an
effective technique for cleaning up the spills. About half the emulsion was removed by burning compared to that of 57% for the crude oil. The remainder of the surface oil and emulsion was either cleaned up using sorbent pads or evaporated or dissolved. The implications of the findings of this experiment for offshore oil spill countermeasures are [reported] .... (Au)

Q-121746

References.
ACU

The evidence for the existence of in situ hydrates within the Beaufort Sea shelf is reviewed and the associated implications for hydrocarbon development are briefly discussed. (Au)

Q-122167
Black gold redrilled : are the economics of Beaufort Sea oil getting better or worse? / Brooks, D.B. (Northern perspectives, v. 11, no. 3, 1983, p. 1-4)

ACU, NFSMO

Five economic factors will play strong roles in determining whether Beaufort Sea oil is produced. More or less in order of increasing uncertainty, these are: on the demand side, questions of markets for oil and of the price of oil; on the supply side, questions of the volume of oil reserves in the Beaufort and of costs of production; and, finally, the policy regime within which production will take place. This review will cover only the first four factors. (Au)

Q-122165
Development in the Beaufort Sea region from EARP to regional planning / Fenge, T. (Northern perspectives, v. 11, no. 3, 1983, p. 5-8)

ACU, NFSMO

... Ambitious development scenarios would industrialize the region in the 1980s and 90s. If the region's renewable resource and conservation values are to be maintained, broad land-use planning and management must be instituted well before production and transportation of hydrocarbons. The federal and territorial governments appear to be adopting policies favoring planning and management for development, but the implementation of such processes must be based within the region. ... Regionally based planning and management should become accountable to local residents through local and regional governments. Similarly, land claims by COPE, the Dene Nation, and the Council for Yukon Indians, all of which will have an impact on the region, have to be resolved. ... It is to be hoped that the Beaufort Sea EARP panel will seek this context during forthcoming public hearings and subsequently press for regionally based planning and management processes that serve local, regional, and national interests. (Au)

Q-122203
The planner's shortcut to Beaufort Sea answers / Beynas, R. (Canadian petroleum, v. 24, no. 7, Aug. 1983, p. 12)

Review of document number 113069.
ACU, NFSMO

This article describes the scope of the publication "Arctic Development: Compilation and Appraisal, Volume one" by the Institute of Ocean Sciences of the federal Department of Fisheries and Oceans. It is a compilation of 127 oceanographic studies of the Beaufort Sea and Amundsen Gulf. The IDS is making the 279-page catalogue available in a series of published reports and through its computerized data storage and retrieval system. (ASTIS)

Q-123510

Cover title. ACU

This compendium includes all submissions received as of August 15, 1983 from review participants and the Panel's technical specialists. Responses are by consultants, government departments and individuals. (ASTIS)

Q-123609
Assessing environmentally acceptable levels of metals in drilling fluids: the Beaufort Sea as a case study / Macdonald, R.W. Thomas, D.J. (Issues of the 80's: Twelfth Annual Arctic Environmental Workshop held at Fairmont, British Columbia, May 8th-11th, 1983, p. 137-156, figures, tables)

References.
ACU, NFSMO

We have attempted to predict the probable effect resulting from the disposal of used drilling fluids which contain heavy metals from impure barite and chrome lignosulphonates. We have restricted ourselves to the Beaufort Sea and have approached the problem by trying to establish natural scales of time and space appropriate to the region. We have suggested how the initial guidelines might be set with due consideration of the general aims of regulations, (i) to prevent immediate toxicity; (ii) to prevent long-term irreversible damage; and (iii) to prevent exposure of humans to pollutants. Monitoring is required to enable revision of regulations should they fail in one of their objectives. (Au)

Q-123641

ACU

The following report should be viewed as a working document which provides a brief overview of hydrocarbon exploration undertaken in the Beaufort region, describes the environmental and socio-economic milieu, and cites federal accomplishments in introducing and administering environmental legislation and monitoring oil and gas activities. In addition, it sets forth some broad objectives and guidelines intended to facilitate hydrocarbon exploration, and to ensure that it can proceed in a socially and environmentally responsible
manner. It should be noted that the guidelines are not intended to be binding: they simply suggest good practices that should be followed by anyone exploring for oil and natural gas in the Beaufort region and other parts of northern Canada. They are, in large measure, based on current industrial practices. ... (Au)


ACU

These pages contain general comments and observations prepared by departmental staff on the Beaufort Sea EIS deficiency materials. (ASTIS)


References.

ACU

Five Tertiary deltaic cycles are identified in the Mackenzie Basin. These cycles are composed of approximately 35,000 sq. mi. of sediment. The five deltaic cycles followed a distinctive counter-clockwise progradational pattern into the Mackenzie Basin with sedimentation beginning in the southwestern part of the basin and shifting northeast. The area distribution of the three major depositional facies for each of the five deltaic cycles, namely the delta plain, the delta front, and the prodelta facies, is outlined. The recognition of a turbiditic surface with the prodelta sediments is of major importance and provides new and deeper prospects for petroleum exploration in the Mackenzie Basin. (Au)


ACU

In particular I will discuss the Beaufort Sea's potential to become a source of crude oil for Canada by 1986. Then to demonstrate briefly to you that through its development, significant industrial, arctic technology, and employment benefits may be derived for all of Canada. (The Kopenoar, Kooakok and Tarsut discoveries are described, production drilling technology, production feasibility and industrial benefits). (Au)


References.

ACU, NFSMO

... The paper includes a review of the different ice hazards and where they are found: the different radar technologies under active use, including SLAR, SAR and scatterometers; the associated technologies of real time processors, downlinks, and image display systems, currently or soon to be available. As well, examples of the use of radar imagery for direct ship support and for ice dynamics modeling are included. For the restrictions of this paper, the scope will be limited to a discussion of the activities associated with DOME/CANMAR's (Canadian Marine Drilling Limited) operation in the Beaufort. In practice this is not a limit, as the activity in the Beaufort has promoted radar remote sensing in terms of both technology and technique. ... (Au)


(Cold regions science and technology, v. 7, 1983, p. 217-226, figures)

ACU, NFSMO

The Polar Gas Project was established in 1972 to determine the best means of moving frontier natural gas reserves from Canada's High Arctic to southern markets. In order to connect the natural gas reserves in the Canadian Arctic Islands, Polar Gas will have to install pipelines in two major marine crossings in the Arctic waters in the initial construction phase of the project. The two marine crossings are located at either end of Victoria Island - at Dolphin and Union Strait and at McClure Strait. Dolphin and Union Strait lie between Victoria Island and the Canadian mainland is about 19 miles wide and has a maximum depth of 400 feet. McClure Strait is between Victoria Island and Melville Island and is 76 miles wide with a maximum depth of 1650 feet. Different methods of construction are proposed for the two channels and these methods are described in the paper as well as outlining the technique for protecting the pipelines from potential ice scour. Polar Gas and its consultants have designed a full scale demonstration of the one-atmosphere welding technique closely paralleling the underwater environment faced at McClure Strait to decrease the tie-ins which would be necessary for the actual construction of the marine crossings could be satisfactorily undertaken. The equipment required for the demonstration is outlined in the paper and the general procedures are described. ... (Au)

Q-126241 Beaufort Sea energy production and environmental protection / Hoss, R.A.W. (Arctic energy resources: proceedings of the Comité Arctique International Conference on Arctic Energy Resources, held at the Veritas Centre, Oslo, Norway, September 22-24, 1982 /

References.

NFSMO

In the search for hydrocarbons in the offshore arctic areas, use has been made of a variety of artificial islands. A number of islands have been built in shallow water (~10 m) with a variety of construction materials and techniques. As exploration proceeds into deeper water, new dredging equipment and techniques have been developed. This paper reviews the dredging techniques and their capabilities in the Canadian and Alaskan Beaufort Sea. (NFSMO)

0-126438

Improving offshore structures promote arctic development / Bruce, J.C. (Petroleum engineer, v. 55, no. 6, 1983, p. 44, 46, 48, 52, 54 : ill., figures)

ACU, NFSMO

... Five structures will have been deployed in the Beaufort Sea by 1984, and much has been learned from these on design methods for arctic structures. The most intangible factor still is the ability to obtain satisfactory ice loading criteria for the new structures. The paper provides a way to providing this information. It is hoped that this will lead to rationalization and structural savings in the next generation of arctic platforms. Attention is turning to production platforms which will have to be designed for longer return-period ice loads. It is here that submerged berms may be important in ground out major ice features, otherwise the structure would have to be capable, on its own, of dissipating the entire kinetic energy from major floes. Artificial sand or gravel islands have been used for hydrocarbon exploration in the Canadian Beaufort Sea since 1972 and, more recently, in the nearshore areas of the Alaskan Beaufort. (Au)

0-126853


References.

NFSMO

The development of arctic offshore structures has progressed gradually as hydrocarbon exploration has moved into deeper waters where artificial sand or gravel exploration islands no longer are economical. In the deeper waters, the ice loading becomes more severe and, with little available prototype data, the methods of estimating the loading involved considerable subjective judgment. This paper discusses the ice features which dominate the North American arctic, the effects of the ice loading on the structures, the available methods of estimating this loading, and the structural solutions which have evolved to cope with the severe environmental conditions. In particular, the paper highlights a new series of computer programs which has been developed by the authors' group which enables the designer to better understand the impact of ice forces on any particular structure. With this understanding, the engineer can tailor the design early in the concept stage to minimize the incident loading. (Au)

0-127140

A caisson to tap the riches of Kadjuk. (The engineering times, v. 17, no. 2, Feb. 21, 1983, p. 5, ill.)

NFSMO

... The caisson was built in a Japanese shipyard using Canadian design and Canadian-made materials. The size of the structure is awesome. Each section of the ring is 39 feet high, 157 feet long, and 43 feet thick at the base. Angled deflectors rise another 15 feet from the crown to fend off the ice and waves of the Beaufort Sea. When filled with dredged sand, the hole in the doughnut - 328 feet in diameter - will support a 930-ft rig and a three-storey, crew camp. Its sophisticated instrumentation is as impressive as its size. The caisson was tested in Tuk harbor in November last year, then split into two half-sections and anchored for the winter. This spring crews will attach wave deflectors and add finishing touches to the instrumentation package. In July, the two sections will be moved to Toft Point, just outside Tuk harbor, where they will be assembled and hauled to the Kadjuk location. A new compact drill rig will be moved to the caisson island, and next November, another milestone hole in Beaufort history will be spudded. (Au)

0-127256

This paper describes the design and construction phase of BeaufDrill Limited's Arctic Drilling Unit, Kulluk (Inuit name for 'Thunder'). This floating unit is designed to operate in water depths from 24 to 55 meters and incorporates a 24-faced conical hull which has been ice strengthened to the American Bureau of Shipping IIA Requirements and the Canadian Arctic Shipping Pollution Prevention Act, Arctic Class IV classification. The double hull has an outer diameter of 81 meters at the main deck and is in the form of an inverted cone which causes the ice to break downward and away from the vessel, protecting its drilling riser system and the mooring lines. The unit is not self-propelled but will be towed to each drill site and is moored on-location by twelve radially deployed anchor lines, each having a diameter of 3 1/2 inches. With this unit, Gulf eventually anticipates operation in the Beaufort Sea to be extended significantly. The Kulluk is presently under construction in Japan with a scheduled delivery date of April 1, 1983. (Au)

Q-127279
The Tarsiut monitoring program / Weaver, J.S.
References.
NFSMO
This paper presents a description of the monitoring programs used during construction of Tarsiut Island and during the drilling of the Tarsiut N-44 exploration well. The objectives of this program were threefold: 1. To ensure that the Island was constructed according to acceptable design standards. 2. To ensure that the Island performed satisfactorily under the imposed environment and loads throughout the drilling of the Tarsiut N-44 exploration well.
3. To collect data that could be used to streamline the design of future islands. A description of the monitoring strategy and instrumentation is presented. Typical results are reviewed and recommendations for future programs are given. (Au)

Q-127302
Experience with alert and evacuation, Tarsiut Island, summer 1982 / Townsend, D.L.
Stewart, H.R.
References.
NFSMO, ACU
The original concept for Tarsiut Island considered that drilling operations in the Beaufort Sea would be done under ice-covered conditions. Extension of drilling to summer open water conditions necessitated two major changes. Upgrading construction would be required to reduce the potential for scour at the base of the concrete caissons, and to increase freeboard protection from waves and spray. The Island Alert and Evacuation Manual also had to be changed. Depending upon the position of the permanent ice pack, the fetch for waves can change drastically. Weather changes are sudden. The principle changes in the alert system had to recognize that local direct decisions as well as short term forecasts would be needed. Warning was needed which recognized the influences of high winds upon helicopter operations. During the summer of 1982, two successful total evacuations of the Island were necessary due to the forecasted and observed weather conditions. There was minimal damage and no personal injury. The paper indicates the role of the Island Design Engineer in the co-ordination of monitoring activities, the various alert levels which were established for summer conditions, and summarizes the procedures carried out for the two successful operations. (Au)

Q-127337
Strength of offshore gravel islands to resist ice loads / Kotras, T.V.
Arnold, C.L.
References.
NFSMO
One of the prime concerns in designing offshore gravel islands in ice-covered waters such as in
the U.S. and Canadian Beaufort seas is the ability of the island to resist the imposed design ice load. In presenting this paper, the goal is to describe a methodology to aid in the preliminary assessment of the overall strength of a gravel island to resist a design ice load for a set of prescribed design and environmental parameters. Conversely, the described methodology can be used to aid in developing a preliminary island design in terms of its size, height and geometry to ensure the island has sufficient strength to resist the design ice loads. More specifically, the purpose of this paper is twofold: (1) to describe a methodology for establishing the strength of offshore gravel islands to resist imposed design ice loads; and (2) to use this methodology to illustrate how the performance of gravel islands to resist the imposed ice loads varies with the major design and environmental parameters. In summary the results of the analysis presented in this paper indicate that, from the standpoint of resisting ice loads, gravel islands will continue to be technically feasible offshore drilling platforms for both exploration and production in the U.S. and Canadian Beaufort Seas as the oil industry moves into deeper and more harsh areas. (Au)

Q-127388

This paper reviews the development of the caisson retained island (CRI) concept for exploratory drilling in the Canadian Beaufort Sea and outlines the geotechnical design considerations for CRI construction. During the first years of exploration, the caisson was fabricated in Japan and transported to Tuktoyaktuk in the Beaufort Sea where it currently awaits deployment in 1983. As the caisson arrived in the Beaufort, construction of the CRI berm was nearing completion at the Kudluk location. In geotechnical terms, the CRI design must ensure adequacy of the berm and the total structure. The major considerations for design include: the evaluation of stability under gravity and ice loads; estimates of deformation due to seabed and berm settlement; and the effect of filling rate for the CRI core on the differential head relative to sea level. (Au)

Q-127396

Waves, erosion, spray, and storm surge were recorded at Tarsiut Island during the open water season of 1982. This paper analyzes data collected, presents findings, and the program to assumptions made during the design of Tarsiut Island. Waves experienced at Tarsiut in 1982 were more severe than normal and more severe than had been expected in design of the berm. Wave interaction with the berm and caisson was confirmed to agree well with theory and design except for elevation +10 m where horizontal forces were greater than theory would indicate. Tarsiut berm was identified as being stable and subject to considerably less erosion than was assumed in design. Wave spray data was collected by monitoring infilling of 45 gallon drums during wave spray events. Intensity of spray on the island surface was found to be as high as 102 cm/hr but this rate was not typical. Spray intensity was found to reduce with distance in from the caisson wall by a negative exponential relationship. Storm surge was identified to exist at Tarsiut and a maximum of 0.2 m positive and 0.2 m negative surge were measured. Indications are that surge is related to storm direction as well as wind speed. (Au)

Q-127400

This paper describes the design and development of a motion-compensated geotechnical drill rig that was tailored specifically for arctic site investigation work in the Canadian Beaufort Sea. Fieldwork was undertaken during the summers of 1981 and 1982 at potential sites for caisson-retained exploration islands (drilling platforms). The approach to site investigation is described, together with the results of laboratory and in situ testing. The drill rig proved to be reliable and the unique motion compensation system permitted down-hole work to be done in a manner that is comparable to onshore methods. The value of using a variety of in situ tools is apparent when on-site decision making is necessary and the test results prove the inadequacy, in certain circumstances, of reliance on laboratory test data. The flat-dilatometer is a relatively new in situ instrument and the results of its first-time application in the Beaufort are encouraging. (Au)

Q-127779
Hydrocarbon extraction in arctic frontiers / Watt, B.U. (Behaviour of off-shore structures. proceedings of the third International Conference / Edited by C. Chryssostomidis and J.J. Connor. v. 1, p. 71-91, figures, tables) References. NF5MO

This paper provides a broad overview of offshore operations in ice-infested waters. The focus is on the Beaufort Sea with lesser emphasis on the Bering Sea and Davis Strait regions. Most of the expenditure to date has been on exploration programs. The complicated nature of sea ice is discussed, and the methodologies for predicting ice loads on fixed structures are reviewed. The design of a variety of exploration and production platforms is then discussed, including assessments of the development status. Systems considered range from ice platforms through gravel islands, caisson islands, gravity cones and steel towers to moored semisubmersibles. The importance of factors such as wave runup and overtopping and ice buildup is stressed, in addition to the question of ice loads. The environmental constraints on tanker or pipeline transportation of crude are briefly reviewed in the context of Alaskan and Canadian development programs. It is concluded that arctic offshore engineering is rapidly advancing and capable of meeting the challenges of the region. The
The CANOL Project. With this objective as a goal, the following four purposes were outlined: 1. Describe the circumstances and nature of the disturbances at their initiation in 1942-1945. 2. Determine the current ecological characteristics of CANOL disturbances after 32-37 years. 3. Compare the disturbed areas to control or reference areas that were undisturbed in order to determine the long-term ecological consequences of the initial disturbances. 4. Discuss the implications that the results of this study will have for future northern developments. (Au)


Studies conducted as part of the Beaufort Sea Project (NORCOC, 1976) have demonstrated that oil deposited under ice would become encapsulated in the ice for significant periods of time, moving with the surface of spring melt pools. Experiments have shown that it was only necessary to monitor the ice in order to track the oil. A system of micro and macro buoys recommended by an early AMDP program, has been developed (McNagglas and Wright, 1977; Roddis, 1980) and is routinely used for ice motion monitoring. However, oiled ice could become separated from the buoys if the ice floes should break or diverge, as might occur in the shear zone. Its relocation would require the capability to detect the presence of oil in or under the ice. Such a system would also enable the routine monitoring of subsea under-ice pipelines and the detection of pollution near northern loading terminals and production platforms. The difficulties of detecting pipeline leaks under ice were identified as a concern of the Norman Wells Environmental Assessment Review Panel. This paper presents a background and overview of the limitations of under-ice detection systems and indicates possible improvements. (Au)


This paper describes the Canadian High Arctic in terms of regions, frontier basins. It outlines the growth of legislation and regulatory agencies for hydrocarbon exploration. Diagrams are included which indicate the environmental assessment process for major development projects. (ASTIS)


The paper describes the Arctic Marine Oilspill Program and the extensive scientific work that has taken place in three areas related to the fate and behaviour of oil spills in Arctic waters: oil on open water, oil-ice interactions, and deep water blowouts. The
countermeasures discussed include in-situ burning, incinerators, dispersants, skimmers and booms. The development of a remote sensing package as an AMP project is described. A shoreline cleanup and protection plan for the Beaufort Sea is described. The status of experimental oil spill studies is given. (ASTIS)

O-132675
NFSMO

In the Beaufort Area, Issungnak Island is located just north of the 70 degrees latitude. Issungnak was the fifteenth and largest artificial drilling island built by Esso Resources to date (Sept. 1981). This paper will focus on three main topics. First of all, we will look at the feasibility of artificial islands for drilling. Secondly, we will discuss Issungnak O-61, the first well drilled. We are going to look at the Downhole Technology (CODD), September 14-16, 1981, Hotel MacDonald, Edmonton, Alberta. - Calgary, Alta. : CODD, 1981, [p. 14-17])
NFSMO

... Dome Petroleum, in the conceptual stages of its Beaufort production design, planned an artificial island which is dredged to six metres below the water line and brought to surface using steel reinforced concrete caissons. The caissons are then filled with dredged material. The first of such islands is under construction near the Tarsult A-2S discovery well. Dome contracted Centmor to design and construct the drilling system for this island. Based on six years operational experience in the Beaufort, design parameters for the drilling unit were established. This paper describes the design and construction of the rig. ... (Au)

Q-132780
NFSMO

This paper discusses methods of determining pipeline trench depths for the South Eastern Beaufort Sea. For shallow water (less than 20 m) interpretation of shallow seismic records is recommended as these can indicate the deepest score that has occurred over the past few thousand years. In deeper water, a method of combining ice keel and core statistics is used. Pipeline depths of about 2 m in shallow water, 4 to 6 m in 10 m, and no burial beyond 50 m depths are indicated by preliminary studies using these techniques. (Au)

Q-132845
NFSMO

... Several of the major oil companies have investigated various types of mobile drilling platforms. The Mobile Arctic Caisson (MAC) system now under construction by Gulf Canada Resources consists of a steel annular box containing flotation ballast tanks and with a simply supported steel deck. This paper describes the geotechnical design considerations for the mobile arctic caisson. ... (Au)

Q-132691
NFSMO

This paper briefly discusses the need and the methodology of drill site survey, the general
New drilling island concepts for Beaufort Sea.  
(Ocean industry, v. 17, no. 6, June 1983, p. 32-33, 111.)  
NFSMO

[This article describes caisson-retained artificial islands, including Tarsut N-44.]  
Dome is using caisson-retained units for water depths beyond 20 m; Gulf is building mobile islands for use beginning next year.  
(Au)

Constructing artificial islands in Canada's Beaufort Sea.  
(Ocean industry, v. 17, no. 6, June 1983, p. 28-31, 111.)  
NFSMO

Since 1972, ESSO Resources Canada has constructed 17 artificial exploration islands in the Beaufort Sea. The article taken from an ESSO Resources Canada internal report describes the exploration activity and the engineering problems encountered in building artificial islands.  
(NFSMO)

Canadian Arctic energy resources - a development and transportation strategy / Lee, J.E.  
ACU

The author discusses ESSO's western Arctic resource development and transportation strategy by first examining the current Canadian energy supply and demand outlook and resource base.  
(ASIT)

Beaufort Sea transportation : tankers and pipelines / Churcher, A., Pardy, B.  
ACU

... This paper reviews the status of performance, safety and cost predictions for the primary transportation options and how the differences apparent in applying the transportation options to offshore field development have caused Dome, Canada's foremost explorer for hydrocarbons in the Arctic, to intensify R&D programmes on the movement of oil by icebreaking tankers. The paper concludes that both pipelines and tankers will serve important roles in the exploitation of Canada's rich oil and gas resources in the Arctic. Demonstration projects for both these transportation modes are essential now to verify cost and performance predictions and thereby improve confidence in the proper selection and use of pipelines and tankers for the many oil and gas projects in the future in Canada's Arctic.  
(Au)

Drilling the Beaufort.  
NFSMO

This article describes Gulf Canada Resources drilling system for the Beaufort Sea.  
(NFSMO)
The Beaufort Sea drilling system / Zvarun, S.  
NFSMO

Arctic technology continues to develop.  
(Offshore, v. 42, no. 8, July 1982, p. 68, 70, 72, 111.)  
NFSMO

The article describes Esso Resources Canada exploratory drilling program in the Beaufort Sea.  
(NFSMO)

In March 1983, Gulf Canada Resources Inc. applied to the Department of Indian and Northern Affairs for permission to build a marine support base at Stokes Point on the north slope of the Yukon. Gulf wanted the base to supply its Beaufort Sea drilling operations, especially its huge new conical drilling unit which arrived in the Beaufort this summer from Japan. The application touched off a bitter public controversy that echoed the famous Mackenzie Valley Pipeline Inquiry of Mr. Justice Thomas Berger.... (Au)


Partial contents: Ch. 9. Beaufort: in fact or fantasy? Ch. 10. The fearful enemy. - Ch. 12. Tuktoyaktuk: the two solitudes. ACU

... Making newspaper headlines for over a year, the company's achievements and problems have captured the attention of the Canadian public and made Dome the business story of the decade. Now the absorbing tale of a company teetering on the brink of either glory or bankruptcy is revealed in fascinating detail.... Lyon has seen the enormous and mixed effect Dome has had upon the native people and the ecology of the north, and describes the confluence of cultures with insight and humor. (Au)

Preliminary Investigation of potential concepts for a gas production platform for the Timirkirk well location in the Beaufort Sea / Crest Engineering Inc. Dome Petroleum Limited [Sponsor]. [Calgary, Alta.: Distributed by APOA], 1976. 2 microfiches: figures, tables; 11 X 16 cm. (APOA project no. 130: Preliminary design studies for production structures for the Beaufort Sea. Report, no. 1) Appendices. References. ACU

A previous study by Crest Engineering Inc. investigated all possible structure concepts and determined the structure types that are suitable for use as an oil production platform in 55 m (180 ft) of water. This study determines structural systems that are suitable for use as a gas production platform in 29.0 m (95 ft) of water. The results of the previous study were used to limit this investigation to those structures previously found to be suitable for use in the southeast Beaufort Sea. This study is specifically oriented to the conditions found at the Timirkirk drilling site where a gas discovery was made in September 1976. (Au)


The Phase I study defines the scope of investigation for a more detailed investigation of means to develop and produce potential major oil fields in 180-ft water depths of the Beaufort Sea. The present study does not analyze any of the various alternative systems mentioned herein nor does it develop estimates of the investments that will be required. This information will be developed by the detailed study. (Au)


The Phase I study defined the scope of the investigation of means to develop and produce 95 m (310 ft) water depths of the Beaufort Sea. As a result of discussions and review of the Phase I report, this Phase II study concentrates on the determination of viable structural systems and an analysis of cost and time requirements for installation. The study also looks at what is required in the way of on-platform producing and ancillary facilities.... Dome Petroleum has made great progress in mastering this environment by developing the means to perform exploratory drilling. This study shows that the installation of drilling/production structures in this area is possible. Indeed, there may be a choice of structural systems that can be used. The choice of structures of course, depends on costs, foundation condition requirements. (Au)

Well spacing design criterion for permafrost, Beaufort Sea well completions / Enertech Engineering and Research Co. Goodman, M. A. Gulf Oil Canada Limited [Sponsor]. [Calgary, Alta.: Distributed by APOA], 1978. 1 microfiche: figures; 11 X 15 cm. (APOA project no. 152: Beaufort Sea well completions and permafrost. Report, no. 2) Appendices. ACU

This report presents a well spacing design criterion for multiple wells through Beaufort Sea permafrost. Effects of thaw-subidence and freezeback are considered as the basis for the spacing criterion. Pressure drawdown and decomposition of hydrated formations is not considered, although it is recognized that such
pressure may be significant if hydrates are present. Values of Beaufort Sea permafrost properties used in this study were selected from information supplied to Enertech by Gulf Canada. Although these property values are reasonable for the type of soils encountered during shallow coring in the Beaufort Sea, sensitivity studies have been performed over a wide range of values in order to bound the effects of property variations. With the exception of ice rich soils, the results presented herein are applicable to the types of frozen soils expected beneath the Beaufort Sea, including mudstones, days, silts, coarse sands and gravels. The results do not apply to hard formations such as calcified sandstone, limestone, and shale. (Au)

G-139669
Fast progress on historic Norman Wells pipeline / Rowland, L. (Oilweek, v. 35, no. 9, Apr. 2, 1984, p. 10-13, 111.)

ACU

Pipeline construction projects of last fall and winter have featured significant achievements in dealing with logistics and climate. In conjunction with the 30th annual conference of Pipeline Contractors Association of Canada, this annual winter season report reveals how owners and contractors carried out the jobs with exceptional success. (Au)

G-139698

ACU

These abstracts cover papers on the following topics: Ice-breaker design, ice cover in Tuktoyaktuk Harbour, Esso's island construction program, permafrost investigations in the Mackenzie Delta and Beaufort Sea, the Navy Oceanographic Data Distribution System, seabed geology of the Canadian Beaufort continental shelf, Mackenzie River water levels at breakup, Dome's oil spill program, MIZEX West 1983, and arctic data compilation. (ASTIS)


R-89340

ACU

... The purpose of the study is to assist the community of Tuktoyaktuk in achieving a sociably and environmentally acceptable interface between the community and industry. To achieve this purpose we have the following objectives: a) to identify the affects which the residents of the community feel that industry is having on their community b) to provide alternatives for dealing with these effects which reflect the views of people in the community. ... The study deals with such matters as community growth, housing, education, alcohol, water and waste and communications. (Au)

R-11215

ACU

Statistical information on the number of northern residents employed by the industry and their contractors. Tabular data is presented under the geographical area surveyed. Each table is divided into 4 columns: job classification, number of man, weeks employed, remarks. (ASTIS)

R-11623

ACU

Describes how fur costs are made and how the industry is progressing in Aklavik, N.W.T. The costs are shown at New York and Montreal fur fashion shows. (ASTIS)

This paper, presented by the Director of the Department of Planning and Program Evaluation, Government of N.W.T., gives an administrator’s view of the role of the Committee. Circumstances leading to establishment of the Committee, participation by all riparian jurisdictions in the Mackenzie basin, and priorities of the Committee are described. (ASTIS)

R-52580

The study covers almost one-fifth of Canada, the largest area ever studied in a river basin planning study under the Canada Water Act. The program, its limitations and experiences during the first two years are described. ... (Au)

R-75910

The primary objective of the Canadian Government in the North is to assist the residents to achieve a higher standard of living, quality of life and equality of opportunity through methods which are compatible with their preferences and aspirations. Development projects should be based on the economic and social needs of a community interwoven into the cultural fabric of the people. ... As a result of the Berger Inquiry, emphasis has been placed on renewable resource development North of 60. The Inquiry offered the residents the opportunity to voice their opinions concerning development. ... One of the resulting recommendations was that while some larger scale non-renewable resource development was viable, this activity should exist ‘side-by-side’ with traditional renewable resource activities. ... three renewable resource projects in the Mackenzie Delta [were] studied. The purpose of this case study is to review and analyse perceptions concerning the success of these projects. ... In the first case information will be gathered concerning whether the projects are in fact considered a success and the reason for this decision. ... In the second case, there may be several characteristics that have contributed to the success of the project or that have created problems. ... To achieve these ends a longitudinal study was conducted with particular emphasis placed on workers’ attitudes, satisfaction and the degree of integration of work activities with participation in traditional home, community and economic activities. The three projects considered are the Aklavik Fur Cooperative, the Inuvik Serving Centre and the Nanook Fur Cooperative in Tuktoyaktuk. The aim of the investigator was to interview as many individuals along the lines of production to elicit views concerning this issue. The result of the study is a list of perceptual principles of success that the respondents felt were important factor to be considered in these and other renewable resource development projects. ... (Au)

R-76853

Statistics are provided for Yellowknife covering demographic, social, and economic indicators such as income, retail trade, and construction. Also contains capital forecasts, and an outline of community services available. (NPS)

R-76861
Yellowknife community audit 1981 / N.W.T. [Yellowknife : s.n., 1981]. 8p. ; 19cm. ACU

Summarizes wide variety of social, and demographic indicators and provides lists of government and community services available. (NPS)

R-77224

This publication provides price comparisons between Yellowknife and Edmonton compiled during the month of June 1981. Incorporated in this survey are nearly 6000 price quotes for over 650 consumer goods and services chosen from the seven components of Statistics Canada’s Consumer Price Index. These components are: food; housing; clothing; transportation; health and personal care; recreation, reading and education; and tobacco and alcohol. Included in this comprehensive price survey is a summary of results, an outline of methodology used and detailed statistical tables. (Au)

R-77585

Description of the small mining community of Tungsten, on the border of the Yukon and Northwest Territories, in the heart of the Selwyn Mountains. (NPS)
changing perceptions of industrial development in the north / Cox, B. (Human Organization, v. 34, no. 2, Spring 1975, p. 27-33)

References, Document not seen by ASTIS. ACU

brief discussion of the issues at stake in the industrial development of the Mackenzie river region, particularly concerning the proposed gas pipeline from Alaska, across northern Yukon and via the Mackenzie. (NPE)

R-77925

the study is undertaken to investigate factors which influence members of the labour force in the Mackenzie District to migrate. . . . the main source of data for the study is the Mackenzie Manpower study conducted by the Department of Indian Affairs and Northern Development during the period between September to December of 1970. A multiple linear regression equation is used to estimate the probability of migration of members of the labour force. The personal characteristics and the socio-economic development of an individual are included in explanatory variables which are considered to be major influences on his or her attitude towards migration. . . . (Au)

R-77968

R-89273

... Sovereignty over the territorial sea has long been established, but since the end of the second world war, coastal states have sought to exercise jurisdiction over a variety of offshore activities beyond this limit. In the present context, two particular claims are of primary importance: first, exclusive jurisdiction over the natural resources of the seabed and subsoil of the continental shelf for the purposes of regulation and control of exploration and development; and second, the right to take measures to protect the marine environment and the coastline from oil pollution damage. . . . Canada is currently implementing the new regime for the control of offshore exploration and development outlined in the National Energy Program. This regime will apply to the Canadian Arctic, islands and offshore alike. The need to exercise proper control over aspects of offshore operations, especially in the environmentally sensitive northern waters, will compel Canada to define her offshore jurisdictional claims with greater precision than has hitherto been required. Similarly, the rules of international law against which the validity of these claims must be tested will hopefully be determined following the successful conclusion of the Law of the Sea Conference. (Au)

R-88599
Mackenzie Valley Pipeline Inquiry : response to Commission Counsel submissions / Parker, J.H. Yellowknife : [s.n.], 1976. 74 leaves : 28 cm. Document not seen by ASTIS. QMUNS

this paper is a critique of some of the socio-economic submissions made to the inquiry. . . . (Lef)

R-98834

the Planning Report and Development Plan for Norman Wells was commissioned by the Government of Northwest Territories. . . . As the community is supported by an adequate economic base, and the population consists mainly of well-salaried employees of the refinery and government, the main emphasis was placed on the physical form of the community; the greatest need lies in this particular area. [Population and employment are discussed with an emphasis on seasonal fluctuation.] . . . (Au)

R-91332

... The primary purpose of this paper is to investigate if education plays a significant role on ethnic earnings in the Mackenzie District. . . . multiple linear regression has been adopted to analyze major determinants of ethnic earnings in the District of Mackenzie. Formal education in elementary and secondary schools for Indians has significant influences on earnings. This effect would not be realized in the cases of Eskimos and Whites until they reached secondary school. In addition, the statistical evidence casts doubts on the effect of education on Métis earnings. However, university education and vocational training have much stronger impacts on earnings than formal education, since they lead directly to employment. . . . the higher the proportion of Whites to total population in a settlement, the higher are the annual earnings of all workers, and particularly those of the Indigenous workers. This indicates the significance of southern influences on the earnings of northern Indigenous . . . the substantial gaps in earnings between Whites and natives have been shown to be attributable to education, "openness".
marital status and age structure of workers, as well as ethnic differences. (Au)

R-91405

[This brief] ... is a description of Continuing and Special Education opportunities and the people of the Region who have participated in these programs. (Au)

R-92185

This report contains the responses to a survey undertaken to determine kinds and sources of information available to participants in the Environmental Assessment and Review Process ... as applied to the Beaufort Sea Hydrocarbon Production and Transportation Proposal. The first section of the report deals with information sources in general and consists of 60 agency Information Sheets. Each Information sheet identifies a contact for the agency, as well as objectives, areas of expertise, relevant current projects, publications and information services of that agency. The second section contains more specific information on kinds of data available in the form of 162 Project Information Sheets. Information provided includes project objectives, approach and/or-proposal, anticipated time frame, reports or publications, agencies and researchers involved, and a contact for additional information. Relationship of Individual projects to the Environmental Assessment Review Process of the Beaufort Sea Hydrocarbon Production and Transportation Proposal is indicated with a subject by zone index. (Au)

R-93416

This report discusses the design and testing of a labour force and employment information system for ascertaining on a continuous basis the state of the labour force of the communities along the Mackenzie Valley pipeline route and the training capabilities of that labour force related to both pipeline construction and operation and Mackenzie Highway construction. Originally intended to apply only to the Mackenzie Valley, the scope of the project was expanded to cover the whole of the Northwest Territories. Its aim was the design and implementation of an information acquisition system on the potential labour force of the Northwest Territories which would provide both statistical data for manpower planning and research purposes and also a means for identifying individual job or training programs. Having been broadened in scope to cover the whole of the Northwest Territories, the project was named the Territorial Employment Record and Information System, TERIS. ... (Au)

R-93467

"The lower Mackenzie Region" Area Economic Survey is an attempt to examine the lower Mackenzie River area and its diversity of physical and human landscapes. ... the survey includes the settlements of Inuvik, Aklavik, Fort McPherson, Arctic Red River, Reindeer Station and Tuktoyaktuk and their general resource areas. ... The present status of the economy is unsatisfactory in terms of productivity, the input of monies for development and the outflow of products. Marketing systems are unsatisfactory or ill-defined. A program of integrated resource use and the establishment of marketing systems appear to be absolute requirements. Continuing advancements in education, and a replacement of non-residents with residents in positions of increasing responsibility will partly solve the problem of increasing population. For the interim period continuous efforts should be made to encourage out-migration of younger age groups. (Au)

R-93475

The objective of this study is to measure and define the economic and social impact of the proposed Mackenzie Valley natural gas pipeline and the associated hydrocarbon exploration and development activities, on the people and the communities that will be directly affected. ... It was concluded that, in economic terms -- jobs and income -- the impact of a decision to build the pipeline should be more favourable to the people in the study region than the impact of the decision not to build a pipeline. In terms of the social impact of the decision to build the conclusions are, of necessity, subjective. ... It is argued with some apparent relevance that increasing income will increase social dislocation ... reduce anti-social behaviour and so improve the social circumstances in the study area. ... The creation of jobs and income ... will increase the revenues of the communities and will contribute to financing the improvement of the communities. The implication of the decision not to build the pipeline and so to deny the associated hydrocarbon activities, will be to forego these improvements or to effect them at the cost of the general Canadian taxpayer. It is concluded that, in terms of the improvement of the communities, the further development of the hydro-carbon industry through the decision to build the pipeline should be positive in its effect. (Au)
This report is one of a series of Area Economic Surveys carried out... to determine the basic for local economic and social progress in the Northwest Territories. Basically the surveys are intended to: 1) Assess the renewable resources as to their ability to sustain the local population. 2) Determine the degree of exploitation of these resources and the efficiency of their use. 3) Investigate and explain the social and economic factors affecting resource utilization. 4) Recommend ways and means whereby the standard of living of the local people might be improved. The overriding fact that must govern every consideration of the future of the Dogrib settlements is that Yellowknife is the regional growth centre. Barren any major new mineral developments in the area, it does not appear that any secondary industry developments in any of the Dogrib settlements are likely to have any chance of success. As pointed out earlier, efforts to create wage employment opportunities for Dogrib Indians should be concentrated in Yellowknife, though of course a slight improvement in the ration of native to white employment at Fort Resolution is possible particularly if the suggested service functions there are enlarged. Lac La Martre should be viewed largely as a retreat for the traditionally inclined among the Dogrib after the over crowded settlements have been phased out. (Au)

R-94277
Ottawa : DIAND, 1968.
xii, 128 p. : ill., figures, maps (folded) ; 28 cm.
(A.E.S.R. report, no. 67/3)
ACU

This report is one of a series of Area Economic Surveys carried out... to determine the basic for local economic and social progress in the Northwest Territories. Basically the surveys are intended to: 1) Assess the renewable resources as to their ability to sustain the local population. 2) Determine the degree of exploitation of these resources and the efficiency of their use. 3) Investigate and explain the social and economic factors affecting resource utilization. 4) Recommend ways and means whereby the standard of living of the local people might be improved. The area... of this survey is without doubt the most highly developed already, as well as the one most amenable to further economic development. ... difficulties still exist... The most important factor for future regional development will be the extension of the road and highway network, the present tourist potential of the region is not exploited to its full capacity. ... The market for local farm and garden products can be expanded There still seem to be areas of employment opportunity, particularly in the semi-skilled and semi-skilled. The available native labour pool is not fully utilized, ... The feasibility of a smelter for Pine Point ores and those of possible additional production in the area at Pine Point should be reassessed periodically. (Au)

R-94293
The lower Liard region : an area economic survey 1965 / Higgins, G.
xii, 275 p. : ill., figures, maps (folded) ; 28 cm.
(A.E.S.R. report, no. 65/3)
References.
ACU

R-94250
Rae - Lac La Martre : an area economic survey / Anders, G. Morissett, J.
xii, 113 p. : figures, maps, tables ; 28 cm.
(A.E.S.R. report, no. 66/2)
ACU

This report is one of a series of Area Economic Surveys carried out... to determine the basic for local economic and social progress in the Northwest Territories. Basically the surveys are intended to: 1) Assess the renewable resources as to their ability to sustain the local population. 2) Determine the degree of exploitation of these resources and the efficiency of their use. 3) Investigate and explain the social and economic factors affecting resource utilization. 4) Recommend ways and means whereby the standard of living of the local people might be improved. The following report is the result of that evaluation. ... Programs operated by the Continuing and Special Education Division range from excellent to good. The few that are weak are salvageable. The most noticeable weaknesses include... (Au)

R-84234
Tuktoyaktuk - Cape Parry : area economic survey 1962 / Abrahamson, G.
Ottawa : DIAND, 1968.
x, 83 p. : figures, maps (some folded), tables ; 28 cm.
(A.E.S.R. report, no. 62/2)
Appendices. References. Bibliography:
ACU

This report is one of a series of Area Economic Surveys carried out... to determine the basic for local economic and social progress in the Northwest Territories. Basically the surveys are intended to: 1) Assess the renewable resources as to their ability to sustain the local population. 2) Determine the degree of exploitation of these resources and the efficiency of their use. 3) Investigate and explain the social and economic factors affecting resource utilization. 4) Recommend ways and means whereby the standard of living of the local people might be improved. The following report is the result of that evaluation. ... Programs operated by the Continuing and Special Education Division range from excellent to good. The few that are weak are salvageable. The most noticeable weaknesses lie within the organization itself. In its... (Au)

R-93521
xii, 151 p. : ill., maps, tables ; 28 cm.
(Report - Canada. Task Force on Northern Oil Development, no. 74-41)
Appendices. Bibliography.
This report is one of a series of Area Surveys carried out to determine the basis for local economic and social progress in the Northwest Territories. Basically the surveys are intended to: 1) Assess the renewable resources as to their ability to sustain the local population. 2) Determine the degree of exploitation of these resources and the efficiency of their use. 3) Investigate and explain the social and economic factors affecting resource utilization. 4) Recommend ways and means whereby the standard of living of the local people might be improved. ... the study region is rather unique in N.W.T. in that it possesses a broad spectrum of natural resources ... that allow an order to be established for their timely development as optimum economic conditions present themselves. ... an unparalleled opportunity exists at present, and in advance of an impending acceleration in economic activity, to prepare a large number of Indians in the potential labour-force for up-coming opportunities requiring a wide and interesting range of skills. If a plan is not devised to achieve that objective then the prospects for the Indian population will quickly revert to the familiar one of crisis in the midst of opportunity. Lastly, a costly arrangement of population centres is present in the region ... (Au)

R-95540

The book is a collection of appendices dealing with aspects of employment, labour and training. (LET)

R-95613
The Mackenzie Delta logging project. (North, v. 9, no. 1, Jan./Feb. 1982, p. 39) ACU

A summary of how the logging project commenced, the associated vocational training, the area logged, and its success in the first year. (LET)

R-95664
Northern employment and training for northerners. [Calgary?: s.n.], 1977. 11 leaves: 111.; 29 cm.

... The main objective of the training program is to provide a skilled, trained labour force from the N.W.T. and Yukon to operate and maintain proposed northern gas transmission and processing facilities. Northern residents interested in careers with the petroleum industry are encouraged to apply for training positions provided by the participating companies at various sites throughout Alberta, Saskatchewan, Manitoba and the N.W.T. NORTTRAN assists in relocation, and provides accommodation and relocation subsidies. A counselling service is also available to assist trainees in the process of adapting to a new social and job environment. In addition, training is monitored and education assistance provided where possible. This booklet describes some of the positions which become available through NORTTRAN from time to time. (Au)

R-95818

Yellowknife: s.n., 1971. 1 l., 76 p., tables; 28 cm. ACU

R-90546

Draft report prepared as part of the Mackenzie Delta Regional Planning Project. Projections based on existing population structure and current demographic trends as well as a number of alternative scenarios for oil and gas development. (NPB)

R-905929
Occupational preferences of northern students / Smith, D.G. [Ottawa : DIAND], 1972. 23 p. (Social science notes, 5) Document not seen by ASTIS. Citation from NPB-V1. ACU

This is a report on the initial findings of a questionnaire study conducted among over one thousand high school post students of all ethnic groups in the Mackenzie River delta, Yellowknife, Churchill and Frobisher Bay. The questionnaires explored the occupation aspirations, prestige values and occupational aspirations of the students, and found a strong correlation between all ethnic groups. It was further apparent that the school students attended, rather than their ethnic affiliation, was a principal factor in this similarity. (NPB)

R-108644

This report on Beaufort Sea Development has been prepared jointly by the Government of the Northwest Territories and Dome Petroleum. Its purpose is to begin the assembly of data in order that each party may have a working familiarity with the potential needs of the other. No attempt has been made to draw conclusions or to make recommendations. ... The report focuses on the production of oil from geological structures beneath the deeper waters of the Beaufort Sea, specifically the exploration permits in which Dome Petroleum has
an interest. ... The report does not address considerations of environmental, social or economic impacts in any depth. These important subjects are being dealt with in other studies and it is believed that this report will be useful in these wider contexts. A hypothetical projection of oil development and production has been made in order to illustrate the scale of activities which could occur during the next fifteen years. Information on government organization and communities in the Northwest Territories has been compiled. The infrastructure requirements associated with the production of oil and gas from the Beaufort Sea are described. A correlation can be made between the existing facilities and those which will be required. It will then be possible to coordinate resident interests, government policies and company practices most effectively. (Au)

R-115614

ACU

The Beaufort Sea Assessment Panel has prepared procedures for the purpose of providing guidelines to ensure that the delivery of presentations will be executed in an efficient and fair manner, with sufficient structure to provide useful results to participants and to the Panel; and in a manner that will foster constructive discussion among participants. These guidelines include procedures for community sessions. These procedures are for general sessions. (ASTIS)

R-115622

7 p. ; 28 cm.

ACU

The Beaufort Sea Assessment Panel has prepared procedures for the purpose of providing guidelines to ensure that the delivery of presentations will be executed in an efficient and fair manner, with sufficient structure to provide useful results to participants and to the Panel; and in a manner that will foster constructive discussion among participants. These guidelines include procedures for community sessions. (ASTIS)

R-115660

ACU, NFSMO

This article reports on the CARC's Third National Workshop on People, Resources and the Environment North of 60 Degrees held at Yellowknife June 1-3, 1983. The theme was resource management in the Canadian North. Responses to DIAND's granting permission to Gulf Canada's Stakes Point project are included, as well as discussion of Inuit sea claims. (ASTIS)

R-130526

ACU

The attached draft schedule and draft agenda were prepared by the Beaufort Sea Environmental Assessment Panel Secretariat and approved by the Panel to assist participants to prepare for their attendance and participation at the
A comparison of the government of the Northwest Territories and the Denendeh government proposal / N.W.T. Legislative Assembly, Special Committee on Constitutional Development. [Yellowknife, N.W.T. : Special Committee on Constitutional Development, 1982.]

This booklet was prepared by a Working Group to make sure the communities and members of the public were informed, consulted and involved in political and constitutional reforms for the western part of the Northwest Territories. It presents a brief review of similarities and differences between the government as it now exists, and the reforms presented by the Dene Nation and Metis Association of the N.W.T. (ASTIS)

R-136277


ACU

Increased exploration for non-renewable resources in the Canadian High Arctic, poses unresolved problems for government, business, and lawyers with respect to the jurisdiction of the waters and land north of 60 degrees latitude. Since the voyage of the *S.S.*...
The aims of the Dempster Highway Management  Plan are: 1. To allow year-round use of the highway with minimal adverse impact of the highway and its users on the environment. Conservation and management are to be regarded as interdependent; 2. To introduce a method of control that is technically and economically feasible as well as being socially and environmentally acceptable. It is recognized that certain aspects that are environmentally or socially acceptable to one sector of our society are often unacceptable to another. Conflict of this nature would possibly occur among the following highway users: native people, tourists, hunters, hikers, campers, canoeists, photographers, artists, miners, petroleum and mineral exploration crews. It is hoped, however, that the plan will be able to accommodate the needs and interests of the majority of people; 3. To ensure a comprehensive programme is implemented before the highway is completed; 4. To make management sufficiently flexible so that modifications can easily be made to accommodate the conditions of the settlement of native land claims; and 5. To be responsive to the findings of research activity pertaining to the northern environment. (Au)

S-10887
(dls 1113177)
ACU

On July 16, 1978 the initial step towards the creation of Canada's first national wilderness park was taken with the withdrawal of some 15,000 square miles of the northern portion of the Yukon from new development. The region encompasses critical wildlife habitat and is perhaps the only area where Arctic tundra, alpine tundra and boreal forest can be observed in their natural condition in the same location. (ASTIS)

S-14078
Appendixes: - Prepared for the Dept. of Indian Affairs and Northern Development in cooperation with the Government of the Northwest Territories and the city of Yellowknife.  ACU

The goal was to determine the outdoor recreational activity patterns of Yellowknife residents in this unique northern community. The city was divided into twenty-four separate areas and a systematic sample from a random start, taking each fourth dwelling unit was drawn. Of the 735 units in the sample, approximately 4% were vacant at the time of the survey and 9% of the occupants in the remaining units refused to participate. Information was obtained on 644 of the units providing a 22% sample of Yellowknife households. ... (Au)

S-21108
Title series: Major findings comprehensive study proposed Tuktoyaktuk land freeze.  Prepared for Dept. of Indian Affairs and Northern Development.
Bibliography: p.38-49.
ACU

This report identifies eight areas regarded as critical in maintaining present use of Arctic fish and wildlife resources and an additional seven areas regarded as critical in maintaining potential resource harvest opportunities in Area "A". Many potential for adverse impact from oil and gas exploration and development activities within these areas are identified. For the most part, these impacts are regarded as mitigable through existing land-use regulations if appropriate operating conditions are applied to land-use permits and if enforcement of operating conditions is adequate. ... (Au)

S-37656
References.  ACU

This paper explains the principles of a balanced land management system suitable for use in northern environments. It is demonstrated in three case studies - Bear Rock-Brackett Lake, N.W.T., Lake-Chesterfield Inlet, N.W.T., and Polley-Macmillan Rivers, Y.T. - involving different types of northern environments and several competing resource development proposals for each area. (ASTIS)

S-42250
A study of wildlife, land-use, and social interests in the Bathurst Peninsula region, Northwest Territories / Canada. DIAND. Spaller, S.W. Barry, T.W. Jacobson, B. ... [Canadian Wildlife Service], 1975.  96 leaves : 14 maps each 70x105cm fold. to 29x22cm : 28cm.
Appendices: - The cultural and economic value to the residents of Tuktoyaktuk of wildlife of the Bathurst Peninsula region / by Thomas W. Barry and Billy Jacobson. - Elf oil geophysical survey land use applications to DIAND. - Canadian Wildlife Service guidelines for aircraft activity in the vicinity of rare and endangered avian species.  ACOD

... The report describes the wildlife resources of the area and the possible consequences of oil exploration activities. It also recommends supplementary operating conditions to be attached to land use permits governing human activity in arbitrarily defined "critical" and "sensitive" wildlife zones in the region. These zones are outlined on the accompanying maps and their wildlife values described in the text. (Au)

S-43268
Appendices.  References.  ACOD

... this report provides a ... basis for
regulating industrial land use in area "A" ..... The objective of this study was simply to identify the potential for conflict in area "A" should exploration and development activity be permitted, and suggest means whereby adverse impact on traditional aboriginal interests might be alleviated or averted. The appendix contains much of the background information on biological characteristics and traditional land use needed in developing the main study report. (Au)

S-54577
175 p. : ill., maps, photos. (part. col.) : 24x30cm.
References: p.163-165. 
ACU

It has been recognized that the approach to town planning and community building in the northern part of Canada requires unique approaches: (a) to meet the severe winter climatic conditions that are prevalent in the N.W.T. (b) to allow a high level of community input to planning and building. This report provides some understanding of the vast area and people being served, and outlines the current practices and approaches to community building in the N.W.T. It is not intended to be a comprehensive, technical review of northern planning, but rather an overview of existing efforts, both successful and experimental to provide better communities in the N.W.T. (Au)

S-55278
An Arctic challenge: America and Canada can make conservation history. Will they? / Deane, J.G. (Living wilderness, v. 41, no.140, Jan./Mar. 1979, p. 15-17, map) 
ACU

This editorial describes proposals to create an international wildlife refuge in northeastern Alaska and the Yukon to protect the supporting range of the Porcupine caribou herd. (ASTI5) --

S-55481
Destruction by insignificant increments / Canadian Arctic Resources Committee. [Ottawa]: Canadian Arctic Resources Committee, 1979.
12p. : maps, photos. : 28cm. (Northern perspectives, v. 7, no. 6, 1979)
ACU, NFSMO

These articles comment on the federal government's uncoordinated reaction to the proliferation of industrial proposals for Arctic waters. (ASTI5)

S-55447
ACU

This article describes briefly each of six sites proposed by Parks Canada for designation as national parks in the Canadian Arctic. Wager Bay, areas on Axel Heiberg and Ellesmere Islands, Bathurst Inlet, parts of Banks Island, the northern coastal area of the Yukon Territory including Herschel Island, and the Tuktoyaktuk pingo. (ASTI5)

S-69485
23p. : ill., maps ; 23x36cm.
Cover title: SSU

Objective: To conduct a preliminary resource analysis within a natural area of Canadian significance in the northwestern Yukon. In order to assess its potential as a National Park. Conclusion: The area extending from the Díd Crow Flats to the Arctic Coast offers outstanding representation of the natural heritage values of the Northern Yukon and would qualify for inclusion in the National Parks System. (Au)

S-69882
References.
ACU, GN

The object of this study is to identify and describe all important land use areas on Victoria Island, including adjacent marine areas. The study concentrates on land use for current resource harvesting activities, but also includes a perspective on historical land use patterns and possible future patterns. The study is designed to answer questions concerning where, when, and what Victoria Island residents hunt, trap and fish. [and] the relative importance of specific areas and activities to each community. The study was designed to collect data both from public sources and from representative resource harvesters in each settlement. (Au)

S-73024
ACU

... The objective of this study is to review existing legislation in Canada under which lands in the northern Yukon might be protected for conservation or related purposes. Specific problems of concern in the northern Yukon, such as native rights and mineral potential, receive attention in the legislative review. It begins with a brief background statement, which reviews the natural resources found in the study area, and the recent history of proposals made in relation to the area. A discussion of the notion of "wilderness" follows, drawing upon legislative and administrative experience from jurisdictions in Canada and the United States. Legislative mechanisms for the establishment of conservation areas in northern Canada are critically evaluated. Existing and potential mineral claims in the study area,
and their ramifications for a wilderness area, are discussed. Recent developments in the United States with regard to the Arctic Wildlife Range are analyzed, and potential problems associated with an international caribou treaty or other treaties are touched upon. The report concludes with recommendations. 

S-76379


Describes historical, geographic, social and economic aspects of Yellowknife. Provides general information and lists of government and private services available in the community. (NPH)

S-88570

Recreational activity preferences of resident and tourist campers in the Yellowknife region / Jackson, E.L. Schinkel, D.R. (Canadian geographer, v. 25, no. 4, winter 1981, p. 360-364, 111.) References. ACU

Tourism may represent an important component of regional economic development strategies, and geographic research on recreation behaviour can provide data, or potential planning utility, about recreational activity preferences. The results of a campground survey in the Yellowknife region showed that residents and tourists differed in recreational activity preferences but not in recreational satisfaction. The resident variable has implications beyond the superficial spatial separation of residential origin and recreational destination and can guide choices between natural environmental protection and facility development in recreational resource management. (Au)

S-106596


The Environmental Impact Statement ... Guidelines require the proponent to deal with a number of matters relating to the use of land, such as the effects of possible developments on housing and community services, transportation facilities, community land needs, and current or projected local land use plans ... The Guidelines do not however require the proponent to examine the question of land use planning or regional planning as such, and the EIS confines itself to a general statement of support for government planning initiatives .... The purpose of this paper is to outline briefly the more important of these issues in the context of a similar brief sketch of the background of past and current planning initiatives in the north. It is merely a preliminary review intended to draw the attention of planners and others who may wish to examine in greater detail. (Au)

S-118389


Larsen Canada is beginning a program to develop a Management Plan for Nahanni National Park Reserve. When completed, the Management Plan will guide the development, management and operation of Nahanni for a period of ten to fifteen years. This newsletter has been prepared to provide you with information about: (1) Parks Canada's planning process for national parks and how you can participate in this process; (2) the Park Purpose and Objectives Statement which has been prepared for Nahanni National Park Reserve; (3) the National Parks Zoning System and its present application in Nahanni; (4) Parks Canada's legislation and policies of direct applicability to Nahanni, summarized as proposed Planning Principles which will guide the Planning Team in preparing the Plan; (5) a brief description of Nahanni's regional setting, natural resources, history, existing park development and use, and (6) the issues identified by the Planning Team to date which will be addressed in Nahanni's Management Plan. (Au)

S-135518


Natural Sites of Canadian Significance are sites which have been identified for preservation in a natural state and are considered to be outstanding, exceptional, unique or rare. Parks Canada has been working to identify sites containing these natural features. One of the sites identified in the Arctic is the pingos of Tuktoyaktuk. It could be protected as a National Landmark. In addition to this small site, Parks Canada has identified five large Natural Areas of Canadian Significance, considered to be representative of different Arctic landscapes. These areas are also worthy of consideration for new parks. They are: 1. Bathurst Inlet, 2. Wager Bay, 3. Northern Yukon, 4. Banks Island, 5. Ellesmere and Axel Heiberg Islands. (Au)

S-135534


Natural Areas of Canadian Significance are areas which have been identified for preservation in a natural state and are representative of the major natural environments of Canada. To identify the variety of Canada's landscapes, Parks Canada has divided the country into 48 natural regions. It is the aim of Parks Canada to set aside, in each of the 48 regions, an area of outstanding scenery or distinct features, that best portrays the region. So far only 18 of the natural regions have representative parks. Of the 30 regions without parks 18 are at least partly in the Yukon and the Northwest Territories. Parks Canada, in its effort to further the completion of the national system of parks, has recently identified 6 of the more impressive natural heritage areas worthy of consideration for new parks. They are: 1.
S-135569

Archives of tho City
See
S-139543
Inuvik
5-
Bank8 Island - a natural area of Canadian significance
13 p. : 111., figures ; 28 cm.
ACU

Natural Areas of Canadian Significance are areas which have been identified for preservation in a natural state and are representative of the major natural environments of Canada. ... To identify the variety of Canada's landscapes, Parks Canada has divided the country into 48 natural regions. It is the aim of Parks Canada to set aside, in each of the 48 regions, an area of outstanding scenery or distinct features, that best portrays the region. So far only 18 of the natural regions have representative parks. Of the 30 regions without parks, 15 are at least partly in the Yukon and the Northwest Territories. Parks Canada, in its effort to further the completion of the national system of parks, has recently identified 6 of the more impressive natural heritage areas worthy of consideration for new parks. They are: 1. Banks Island, 2. Bathurst Inlet, 3. Northern Yukon, 4. Ellesmere and Axel Heiberg Islands, 5. Wager Bay, 6. Pingos of Tuktoyaktuk. [This pamphlet describes the significant natural features of Banks Island.] (Au)

S-137743
[1], 85 p. ; 28 cm.
(Sources for N.W.T. history, no. 3)
Cover title: City of Yellowknife records, Northwest Territories Archives.
ACU

This publication is a catalogue of the early records of the city of Yellowknife beginning with Settlement Minute Copies 1940. Also included are lists of photographs and housing surveys, ordinances, business licences and miscellaneous papers. (ASTIS)

S-139513

ACU

... From July 11-18, 1983, Inuvik celebrated its 25th birthday, the town's coming of age. Today Inuvik is not only a centre of administration, it is also a centre of administration, it is also a centre of commerce serving the western Arctic and the needs of the oil and gas industry. ... (Au)

See Also: C-14540, C-14559, L-27448, Q-63762, Q-116807, Q-1161832, Q-116142, Q-118176, Q-121165, R-88834, T-2399, T-8400, T-9903, T-9811, T-10456, T-11193, T-11658, T-13232, T-19227, T-3223, T-63073, T-72079, T-77836, T-77879, T-77897, W-46230, W-79774

T-2399
175 p. ; 22cm.
Fascimile of Treaty 11 and pertinent parts of Treaty 8.
ACU

Presents the personal views of the author on the Berger hearings, native land claims, the proposed construction of the pipeline and its environmental effects, and the dissent among the Indians themselves as to what they really want from the government. The author also suggests measures that the federal departments could use to deal with the problems of the native peoples in the District of Mackenzie. (ASTIS)

T-6050
References
ACU

The impact of oil exploration work by Gulf Oil Canada in the Mackenzie Delta on the Inuit people of Coppermine is analysed. Various segments of the community (i.e., the male workers, wives and children) and non-Inuit members of the community were interviewed in order to assess the effect of the work on the economy, social and family life and health of the community. (Au)

T-7951
References
Review of document number 64025.
ACU

Judge Berger uses the term "self-determination" in the sense that as descendants of the original inhabitants of Canada, the Inuit and Metis people enjoy the right to decide upon their future governmental structures themselves in conformity with their traditional cultures. ... The educational values emphasized in the Report might relegate natives to certain occupations, unfitting them for others, and thereby deprive them of freedom of choice. This and certain other aspects of the Report, including a long residency requirement for voting, might detract unacceptably from the mobility and political rights inherent in broader Canadian citizenship. (Au)

T-7960
Review of document number 64025.
ACU

In his Report of the Mackenzie Valley Pipeline Inquiry, Volume Two, Mr. Justice Berger criticizes the present Territorial Government as a "white-dominated" structure. ... In some cases, the implications of his argument are not sufficiently brought out and all of the difficulties are not confronted. ... (Au)

Cover title : Our land, our culture, our future.

The Matís Association presents recommendations for a new arrangement between the Government of Canada and the native peoples of the Mackenzie Corridor concerning native land claims. (ASTIS)


This paper presents: the principles of environmental and wildlife protection, the harvesting rights of the Inuit, the management of wildlife, and the establishment of planning agencies to implement the goals outlined in the position paper. (ASTIS)


The joint position paper recently announced by the Committee for Original Peoples' Entitlement (COPE) and the Government of Canada marks a significant point in the resolution of native land claims in northern Canada. This paper analyzes what effect the position paper, if legislated, may have on policies, practices, and developments in the Northwest Territories. Primary focus is upon elements of the position paper which are particularly critical to future land use and management. (Au)


ACU

After COPE's proposal for the land rights claim, Inuvialuit Nunangat, was presented to the Government on May 13, 1977, there was a breakdown in discussions between the two parties. Representatives of each formed the Working Group, took a common position. This paper is the result of the Working Group's efforts, and forms the basis for a submission to cabinet for an Agreement in Principle. (ASTIS)


References. ACU

Reviews the background of the proposed Mackenzie Valley Pipeline, and the Berger hearings with particular emphasis on the native land claims of the Dene. The author traces the Dene's relations with the government, the impact of the pipeline on their social and economic conditions, and the support the Dene received from concerned non-native organizations. (ASTIS)


The Northern Native Fashions is a project headed by Tim Skye who incorporates native craft work into high fashion garments and market them on a national, perhaps even international scale. (ASTIS)


ACU


Cover title. ACU

... This report analyses the diversity of language use by the native population surveyed in the 1970 Northern Manpower Survey Program. Through an examination of multilingualism and language use, this report investigates the pattern of native language retention in this multilingual environment. ... (Au)


Agreement between the Committee for Original Peoples' Entitlement representing the Inuvialuit of the Western Arctic region, and the Government of Canada represented by the Minister of Indian Affairs and Northern

This study considers the socio-economic importance of fishes, beluga or white whales, seals, white fox and polar bears to Inuit, Metis and Indians living adjacent to the Beaufort Sea. Factors considered as 'socio-economically important' include the level and distribution of local and export sales, domestic uses of wildlife harvests, employment and income. ... (Au)

T-23647

At head of table: For discussion. ACU

Discusses the basis for Dene self-government, areas of jurisdiction, traditional federal government responsibilities and special aboriginal powers. (ASTIS)

T-24171
Vitamin C in the diet of Inuit hunters from Holman, N.W.T. / Geraci, J.R.; Smith, T.G. (Arctic, v. 32, no. 2, June 1979, p. 135-139, table) References. ACU, NFSMO

During the spring and summer months the diet of three Inuit families living in a seal hunting camp south of Holman, N.W.T., was studied. A total of 13 food items including the most commonly eaten mammal, bird and plant species were analysed for Vitamin C in both the raw and cooked state. We document a daily intake of ascorbic acid of between 11 and 118 mg and estimate a mean dose of at least 30 mg. ... (Au)

T-28223


T-35062

Summer and winter, the Inuit of Holman in western Victoria Island still depend on the natural bounty of their harsh land. Arctic char caribou and seal provide food, while the pelts of foxes and seals provide good cash income. ... (Au)

T-42528

This work is an examination of the operation of the kinship system of the Mission Chipewyan. It examines the utilization of kinship terms by this group of Caribou-Eater Chipewyan and the conflict inherent within their system. The sources of conflict are derived from the Chipewyan utilization of both relative age and genealogical position as a means of categorizing kin as well as the overlap in functions of the kindred and the hunting unit. Analysis of marriage and the role of affines is included and the non-age-ranked ties between
siblings-in-law are shown to be crucial to group formation in this society. (AU)

T-43974
The Hare Indians and their world / Hare, H.S.
xvi, 314p. : ill., figures, plates, tables ; 28cm.
(Mercury series)
"A Diamond Jenness memorial volume."
Bibliography: p.295-301.
ACU, SSU

This ethnographic report ... describes the life of the Hare Indians, a group of Northern Athapaskan-speaking hunting and gathering in the Fort Good Hope game area in the Mackenzie River basin of northern Canada. The data were collected during fieldwork carried out between June and September, 1961, and between June, 1962 and January, 1963, and also through library research of the documented literature. It is my intention to convey to the Hare Indians themselves their view of their world and what it is to be a Hare person. This report was written in the years of 1963 and 1964. Since then, ethnographic and linguistic researches on the Hare Indians have been undertaken by Joel S. Savichinsky and others. Since the findings are not incorporated in this monograph, it should be read as one of the historical documents depicting the people in the early 1960's. (AU)

T-46101
Inuit employment by Gulf Oil Canada : assessment and impact on Coppermine, 1972-73 / Kupfer, G.
Edmonton : Westreda Institute, [1973].
134p. : 28cm.
Appendices.
ACCO, ACU

This report presents the results of an impact study assessing the consequences of the employment of Inuit men from Coppermine, N.W.T. by Gulf Oil Canada and its contractors in the Mackenzie River Delta during the period from November 1, 1972 until May 1, 1973. ... This report assesses the effects of the Inuit employment program on the Gulf Oil operation, and the social and economic impact of the work and wages on the settlement, and the lives of the Inuit workers and their families. ... because of the number of man employed in the program, and the substantial financial input into the community, the potential for impact on the community was very great. ... This was also a unique project in that a considerable number of men from a small Inuit settlement in the Fort Smith Region moved to a distant work site in the Inuvik Region without going through or dealing with other N.W.T. settlements. ... this project may provide guidelines for the continued employment of the Northern native peoples. ... (AU)

T-47201
Dene Nation newsletter.
v.1., no.1 (June, 1980).
ACU

... This newsletter is the first of a regular series which will be sent from the national office in Yellowknife to inform the chiefs, councils and people in every community in the Dene Nation of what your elected leaders and staff are doing. ... (AU)

T-62286
Kupfer-Eskimo-Siedlungen auf der Banks-Insel, Nordwest-Territorien, Kanada = [Copper Eskimo settlements on Banks Island, N.W.T., Canada] / Hahn, J.
ACU

During the research ... on Banks Island new campsites of Copper Eskimo were discovered. Besides tent rings, stone deposits or caches and graves, bones of muskoxen were mainly found. We have found a source of raw materials from the research ship abandoned in 1851 by McClure on the northern part of the island. The archaeological investigations enhance the known ethnological data pertaining to technology and settlement pattern of the Copper Eskimo. (AU)

T-63687
The individual in northern Dene thought and communication : a study in sharing and diversity / Christian, J. gardner, P.M.
v.1, 419p. : ill., figures, photos., tables ; 28cm.
(Mercury series)
References.
ACU, SSU

... Peoples of the Subarctic, particularly the so-called 'Slavey', have long been noted for their quiet self-reliance, their emphasis on the value of maintaining individual autonomy. We have reason to suppose that their individualism is expressed in the conceptual realms as well as the social, making their case of considerable theoretical importance. What is more, their characteristic behavior would be expected to make factors bearing on the development of shared concepts and beliefs relatively visible and isolable. This volume reports some of the preliminary findings of a collaborative study of thought and communication among the Dene of the Mackenzie drainage Dene community. Subprojects, on aspects of communication and learning and on shared and diverse classifications and processes having to do with trapping, fishing, and exploitation of moose, are reported. ... Several sociolinguistic, ethnographic, and general linguistic and ethnographic field methods were employed and various sampling procedures. (AU)

T-69703
Dene Nation - the colony within / Watkins, R. [Editor]. University League for Social Reform.
Toronto : University of Toronto Press, [1977].
xii, 189p. : figures, maps, tables ; 23cm.
References.
ACU, SSU

The Indian people of the Mackenzie district ... today face the final onslaught of 'progress' in the form of applications to build a natural gas pipeline down the Mackenzie Valley through their homeland. The Dene are struggling mightily against these proposals. In the process, they are greatly strengthening their identity as a people and are once again...
asserting their rights as a nation. ... The government of Canada established the Mackenzie Valley Pipeline Inquiry under Justice Thomas R. Berger ... to consider the separate proposals of the applicants. Canadian Arctic gas Pipeline Ltd ... and Foothills Pipe Lines Ltd, to build pipelines up the Mackenzie Valley. ... Either pipeline would pass through lands they have occupied and used since time immemorial. The land claim of the Dene is for these lands. ... This book is based in large part on presentations made to the Berger Inquiry by the Dene themselves and by others on their behalf. ... (Au)

T-66087


References.
ACU

The author comments on the development of the subarctic sociocultural research during the past 15 or 20 years. Many of the notable researchers in this field are discussed. (ASTIS)

T-69817


ISBN 0-920908-03-9

References.
ACU

... We shall ... review ... not only facts known in regard to the nutritional base of native people in the N.W.T. in aboriginal and changes experienced in transitional times, and effects observed on their health, but also discuss availability and nutritional value of traditional local food resources as well as accessibility and cost of imported alternatives and recommend actions to improve optimal nutrition at reasonable cost from use of local and/or imported sources. All native population groups in the Mackenzie District were part of the Penetration of English into the Aboriginal tongue as the language most often used in the home. These findings were examined for variations by region of residence, age and education of the respondents. A final section presents data on the loss of native languages resulting from the penetration of English into the language groups. (Au)

T-72079

Native settlements and native rights: a comparison of the Alaska Native Settlement, the James Bay Indian/Inuit Settlement, and the western Canadian Inuit settlement / Frideres, R.S. (Canadian journal of native studies, v. 1, no. 1, 1981, p. 59-88, maps)

References.
ACU

The author describes each of three recent agreements between governments and northern native peoples, the Alaska Native Claims Settlement Act of 1971, the James Bay Inuit Settlement, the COPE Agreement still in limbo. The agreements are compared in several areas, and against some potential demands from other groups researching land rights in preparation for the negotiation of claims. (Au)

T-72286


ACU

This publication is the COPE monthly newsletter and contains up-to-date information concerning matters of interest to residents in the District of Mackenzie, and on-going reports of COPE's projects. (ASTIS)

T-77380


ACU

The Mackenzie District is a multilingual area. There are six major language groups - Dogrib, Slave, Chipewyan, Loucheux, Esquimaux, and English. ... Language is a significant component of culture. The number of languages spoken and the pattern of language use provides an important indication of an individual's contact and familiarity with different cultures. The ability to speak another language, however, does not imply assimilation or identification with that language's cultural group. In a multilingual area the acquisition of the dominant language is only a prerequisite for assimilation and not necessarily part of that process. In this way a study of multilingualism and language use provides the groundwork for studies of indigenous culture and language loss. ... This report presents the analysis of language use in four parts. The first ... presents an overview of multilingualism for the entire N.W.T. It analyses data presented in the published summary tables from the Northern Manpower Survey Program. The second section examines in greater detail the language diversity of different linguistic groups in the Mackenzie District. The third ... analyses the proportion of each language group retaining its mother tongue as the language most often used in the home. These findings were examined for variations by region of residence, age and education of the respondents. A final section presents data on the loss of native languages resulting from the penetration of English into the language groups. (Au)

T-77836


Document not seen by ASTIS.
ACU

Describes the Dene people and their land claims. Includes the agreement-in-principle. (NPB)

T-77879

Dene Rights : supporting research and documents. [s.l. : s.n.], 1976-. 2v. : illus., maps.

Collected research papers and documentation in support of Dene Rights position. Vol. 2 not yet completed. Document not seen by ASTIS.
T-79588

ACU

Detailed nutritional health and occupational histories, clinical and laboratory examinations were obtained on 644 persons, mostly Eskimos (SOD). From Arctic Bay, a small Eastern Arctic settlement still heavily dependent on traditional food resources and hunting activities, and Inuvik, an urbanized center in the Western Arctic with little access to traditional food and lifestyles during the last generation. (Au)

References.

T-80403
The dying art of the Slaveys / Bohne, R.B. (Synergy, v. 1, no. 2, winter 1982, p. 20-22, col. photos.)

ACU

This short article describes the embroidery, using moose-hair and porcupine quills, done by the Slaveys of the Mackenzie valley region. (ASTIS)

Also available in French under title: L'emploi par roullement chez les travailleurs Inuit de Coppermine: ses effets et ses perspectives pour la communauté. (Cultural contact - the trading company and mission churches - focused the activities of native Eskimo and Indian peoples upon the Mackenzie Delta. In 1950, trapping camps were evenly distributed throughout the Mackenzie Delta. After the building of the new planned settlement of Inuvik the numbers of trapping camps diminished. For the mid-sixties, a grouping procedure used to dichotomize "serious" and "part-time" trappers shows that a large proportion of the latter maintained trapping camps. Analysis of employment in Inuvik also shows a divided commitment to land and town. High income and high status jobs were occupied predominantly by white transient workers since they required skills and levels of educational achievement possessed by few native people. Though native people of Metis origin showed some success in employment, most Eskimos and Indians occupied more menial jobs. A comparison of employment in government and non-government sectors indicates that native involvement in the latter was growing, many native people in both sectors shifted jobs frequently. Trapping camps and land-based activities. The town economy like the land economy showed signs of adaptation to the dual allegiance felt by native people to land and town. (Au)

T-88903

ACU

The situation in the western Arctic in the mid-sixties, if allowed to continue unabated, would transform the Eskimo into an Arctic variety of the "hill-billy." Sporadic and minimal opportunities for wage labour have partially integrated the Eskimo into a cash economy. The traditional living-off-the-land lifestyle is no longer feasible, but a modern alternative has not been satisfactorily developed. (Au)

T-8907


ACU

The Mackenzie Delta Research Project is an attempt to describe and analyse the social and economic factors related to development in the Mackenzie Delta. Particular emphasis is being directed toward the participation of the native people of the area, and the extent to which they are making effective adjustments to changes brought about by government and commercial expansion in the North. The individual studies within the project and the conclusions arising from them will be published in a series of reports. This study, MDBR 1.2, was undertaken to provide background data and analysis necessary for a general understanding of the economic realities of life in the Mackenzie Delta. (Au)

T-8975

ACU

Also available in French under title: L'évolution et l'économie de la communauté du Delta. (Au)

... historical analysis shows that agents of cultural contact - the trading company and mission churches - focused the activities of native Eskimo and Indian peoples upon the Mackenzie Delta. In 1950, trapping camps were evenly distributed throughout the Mackenzie Delta. After the building of the new planned settlement of Inuvik, the numbers of trapping camps diminished. For the mid-sixties, a grouping procedure used to dichotomize "serious" and "part-time" trappers shows that a large proportion of the latter maintained trapping camps. Analysis of employment in Inuvik also shows a divided commitment to land and town. High income and high status jobs were occupied predominantly by white transient workers since they required skills and levels of educational achievement possessed by few native people. Though native people of Metis origin showed some success in employment, most Eskimos and Indians occupied more menial jobs. A comparison of employment in government and non-government sectors indicates that native involvement in the latter was growing, many native people in both sectors shifted jobs frequently. Trapping camps and land-based activities. The town economy like the land economy showed signs of adaptation to the dual allegiance felt by native people to land and town. (Au)

... Eighteen communities were chosen to be included within the study area .... Twenty-three studies or surveys were selected ... In order to determine the nature of available research, the degree to which it related to current development, and the extent to which gaps in this research might be identified. ... [There is a focus on ... Continuing and Special Education ... Recreation ... Child Welfare ... and Industry and Commerce ... In general these programs could be described as development-oriented and quite flexible, adapting to local conditions such as community size and the desires of residents..... the relative growth rates of the Indian, Eskimo and Other population are shown. ... Grouping of the responses to the attitude questions showed that for the Inuit, education, welfare programs, and employment are considered the most important areas of concern. ... The Fort Smith [Adult Vocational Training Centre] ... is described including a breakdown of current courses now offered. ... [The Hire-North] employment program related to construction of the Mackenzie Highway is examined .... There are really two major aspects ... on-the-job-training of equipment operators and the hand clearing of the highway right-of-way. The development of Labour Pools at Fort McPherson, Aklavik, and Cambridge Bay is described. Basically the Labour Pool concept provides for an employment officer to be hired by and to report to the Settlement Council. ... Where possible we have organized the report with material that is really of a reference nature included in ... [one of the seven appendices]. (Au)
opinions about the role and effects of education in the North and compare them with some detailed research findings from the Mackenzie River Delta. At least three factors are necessary for social development of Northern Native people - namely aspiration, motivation, and ability. Our Mackenzie Delta studies show two of our three factors (aspirations and motivations) to be very similar between Native and white students, and Professor MacArthur's intelligence testing programme in the Mackenzie Valley shows our third factor (general ability) to be very similar between Native and white students. Perhaps one of the chief impediments in this social system is a lack of realistic knowledge of Native people and their aspirations on the part of many White Outsiders. (Au)

T-95624
The human ecology and social and economic change in the community of Tuktoyaktuk, N.W.T. / Ferguson, J.D.

Ottawa : Dept. of Northern Affairs and National Resources, 1961. [8], 80. 1x p. ; ill., figures, maps ; 28 cm. (Report - Canada. Northern Coordination and Research Centre, 61-2)
ACU, DORD

This study examines the social organization of the Tuktoyaktuk Eskimos in relation to the resources of the area, using data gathered in the field in 1957. Population characteristics and health conditions are described, and the history of culture contact and change outlined. The author predicts little increase in the number of permanent jobs available to Eskimos in the area, and a decrease in part-time summer employment as freight-handling becomes more mechanized. At the same time, the number of employable males would increase by about five percent yearly. The fur market was unlikely to rise because many synthetic materials were replacing natural fur. Furthermore, Tuktoyaktuk was not a good trapping area. (NPB)

T-95729
Canada's unemployable northerners : square pegs in round holes in the system to be created for the international transfer of energy by pipeline from northern Canada to the United States / Stucki, L.D.

[S.l. : s.n.], 1972. vi, 187 leaves ; 30 cm.

Appendices.

References.
A paper to be presented at the 71st annual meeting of the American Anthropological Association, December 1, 1972.
ACU

This paper is concerned with how native northerners will fare if the Mackenzie Valley Gas Pipeline is built. It is recommended that rather than a pipeline, that an integrated oil and liquified gas railway from Prudhoe Bay, Alaska to the least Trout River, N.W.T. be constructed. This is seen as a far superior solution to the ecological, social, and chronic native unemployment problems that are so severe in Northern Canada. (LET)

T-95842

1 v. (various pags) : tables ; 28 cm. (Report - Canada. Task Force on Northern Oil Development, no. 73-33)

Appendices.

References.
ACU

...[This volume (6)] of the study [Regional Impact of a Northern Gas Pipeline] contains information on the population with emphasis on the native population, of the Mackenzie Impact Corridor. This volume provides sufficient information on the local population to enable both policy makers and program managers (responsible for assisting local residents considering taking pipeline and related work) to have as much information as possible before making definite decisions concerning involvement of the local, and total northern native population. The information has been arranged to give, first, a basic background picture of the population, then to project to what extent the local population can and will participate directly or indirectly in pipeline projects. (Au)

T-95874
Appendices.
ACU

...The objectives of ... [this three volume study were: -- To determine the feasibility of mobilizing the employable male labour force in specified Mackenzie Valley settlements through an organized labour pool at the settlement council level. -- To motivate more northerners to become members of the labor force at least on a part-time basis, while retaining an opportunity to continue hunting and trapping. -- To suggest the agency or administrative structure which might best serve these aims and those of potential employers and possible methods of financing. ... [The first volume in an overview of the data, settlement, employers and the organization of pilot pools. Volume II and III are appendices, continuing the reports, questions, and descriptive statistics which are considered]. (Au)

T-98884
The names of economically important or conspicuous mammals and birds in the Indian languages of the District of Mackenzie, N.W.T. and in Sarce / Hoh, E.D. (Arctic, v. 15, no. 4, Dec. 1962, p. 299-306, tables)

ACU

T-98058
ACU

T-100641
ACU

T-104388

This paper contains an assessment of the northern native male labour potential in 1981 in that area of the Mackenzie District outside the Mackenzie Valley Pipeline Corridor. Designated as the Rest of the Mackenzie, the study area excludes all those communities contained within the Pipeline Corridor and the Arctic Coast communities of Holman Island, Coppermine, Cambridge Bay, Gjoa Haven, Spence Bay and Pelly Bay. (LET)


This paper contains an assessment of the northern native male labour potential in 1981 in that area of the Mackenzie District outside the Mackenzie Valley Pipeline Corridor. Designated as the Rest of the Mackenzie, the study area excludes all those communities contained within the Pipeline Corridor and the Arctic Coast communities of Holman Island, Coppermine, Cambridge Bay, Gjoa Haven, Spence Bay and Pelly Bay. (NPB)

T-105643

This paper considers the northern native people and their characteristics as they apply to the development of training programs designed to meet occupational skills. Since the primary purpose of training is to achieve satisfactory occupational performance, work characteristics are examined as well as learning characteristics. (NPB)


This paper attempts to relate background, lifestyle and interests of the native people of the Delta to the guidelines on employment, education and training of the Northern Development Policy 1971-81. The material is drawn from a research study by Dr. D.G. Smith, carried out in the Mackenzie Delta during the period 1963 to 1970. Since that period, economic activity has increased considerably but the changes in the situation portrayed are in degree only. (NPB)

T-105830

Appendix. References.

A richly detailed account of the demise and death of a Kutchin leader in the early 19th century, preserved in Hudson’s Bay Company journals, is presented and analyzed for what it reveals of Northern Athapaskan adaptations in the early fur trade era. (AU)
Study of the social aspects found in the Berger hearings transcripts : native employment and the Mackenzie Valley gas pipeline / Larnari, R. Ottawa : [DIAOC], 1976.
82 p.
Document not seen by ASTIS. Citation from NPB-VI.

Contains background information on the Mackenzie Valley gas pipeline and an analysis of the Berger inquiry proceedings related to native employment, and socio-economic impact studies carried out on the proposed project. Lists socio-economic research undertaken by Government and industry under various themes. (NPB)

1 v. (various pagings) : ill., tables ; 28 cm.
Appendices.
Bibliography: p. 100-102.

Ce rapport presente une etude socio-economique
This paper deals with the means whereby native peoples in Yellowknife manage their ethnic identities within constraints imposed by their biographies and Euro-Canadian power, and explicates the political consequences of this management. It is informed by the ethnographic and historical context that we continually uncover as we work to discover these stories.

T-122046
Seasonal photoperiodism, activity rhythms, and disease susceptibility in the central Canadian Arctic / Condon, R.G.
(Arctic anthropology, v. 20, no. 1, 1983, p. 33-48, figures, table)

References.
ACU

The arctic region is characterized by pronounced seasonal variation in environmental conditions, most notably in light intensity and duration (photoperiod). This paper examines the relationship between photoperiodicity, activity rhythms, and disease susceptibility in a small Inuit settlement located in the Central Canadian Arctic. Data indicate that marked alteration of sleep/activity rhythms occurs during the winter and summer solstices, and that children are the most responsive behaviorally to these photoperiod fluctuations. During the mid-winter period of constant darkness, such desynchronization results in loss of sleep, physiological fatigue, and improved school attendance, all of which contribute to the mid-winter spread of infectious disease. Disease susceptibility is documented as resulting from the interplay of environmental and cultural variables, both of which are affected by the unique lifestyle regimens of the arctic ecosystem. (Au)

T-125032
Inuit behavior and seasonal change : a study of behavioral ecology in the central Canadian Arctic / Condon, R.G.
(Pittsburgh, Penn. : University of Pittsburgh, 1981)
ACU

This dissertation examines the effects of extreme seasonal change upon chronicusceptibility, birth seasonality, activity rhythms, and interpersonal stress in a small Inuit settlement in the Central Canadian Arctic. In addition to gathering complete ethnographic data on contemporary settlement life, the research concentrates upon the interaction between environmental change and social adaptation, and the manner in which this interaction affects the behavioral and physiological responses of local residents to the arctic environment. A distinct pattern of disease susceptibility is documented and found to be the result of temperature and photoperiod changes as well as socially induced modifications in activity rhythms. The research also investigates and documents seasonal variation in birth rate, alcohol consumption, and alcohol consumption. In each case, these seasonal patterns are found to be the result of the unique rhythm inducing character of the arctic ecosystem. (Au)

T-12882
Inuit in the manner of the Eskimo / Inuitak living on the land has been made by film makers Peter Haynes and Harold Tichenor. The 56-minute film focuses on a trapper and his wife in the Mackenzie Delta and Mackenzie Estuary. (ASTIS)

References.
ACU

The first documentary film of Mackenzie Delta Inuitak living on the land has been made by film makers Peter Haynes and Harold Tichenor. The 56-minute film focuses on a trapper and his wife in the Mackenzie Delta and Mackenzie Estuary. (ASTIS)
ix. 124 p. : figures, tables ; 26 cm.
(Technical paper - Arctic Institute of North America, no. 28)
ISBN 0-919004-87-8
Appendices.
References.
ACU

... What follows is a brief introduction to ethnoarchaeology and a summary of the methodology employed to collect the data on which this paper is based. After an ethnoarchaeological introduction to the Dene of Willow Lake, the informant group, the ethnoarchaeological data are described and evaluated. Various archaeological assumptions and techniques of reconstruction are examined in terms of ethnographic information. This paper concludes with a discussion of the relevance of ethnoarchaeological studies for the interpretation of Athapaskan prehistory.

Archaeological ethnography, also called living archaeology, is one aspect of ethnoarchaeology and refers to the study of living human societies from an archaeological perspective. More specifically, the concern is with the study of refuse and physical remains resulting from observable activity, with the aim of understanding how and why material remains come to occur where they finally do.

The emphasis throughout this study is on providing specific descriptions of behaviour. As far as I know, ethnoarchaeological descriptions of northern Athapaskan society in the Northwest Territories are rare, with some notable exceptions (Clark, 1982a; Noble, 1975). There is a very real need to begin documenting human behavioural variability in this region as the necessary first step. (Au)

---

T-131458

The purpose of this paper is therefore to apprise the Members of the current status of the talks, and to seek direction on certain issues which will be discussed at the First Ministers’ Conference. This paper consists of a short review of the agenda items and an indication of how some of the items will likely be dealt with by the First ministers. (Au)

---

T-130413

Translated from French and compared with versions in the original tongues. ACU

These books are the books of Dene. In them are the histories, tales and traditions of the Dene. In them is contained the wisdom of the Dene. Just as we will find the histories, tales and traditions of the people of Israel as told by Moses and other storytellers, so in this book you will find the histories, tales and traditions of the Dene as told by Dene a hundred years ago. They were spoken to a priest called Emile Patiot (1838-1916) who wrote the words down in the Dene language. (Au)

---

See Also: I-32115, I-43915, I-43923, I-44008, I-47210, I-107751, I-115168, I-116924, I-108413, L-102059, N-98885, P-91219, P-106488, Q-9873, Q-9881, Q-29904, Q-30309, Q-43990, Q-63765, Q-98201, Q-983048, Q-98996, Q-98977, Q-98995, Q-108719, Q-112712, Q-113395, Q-116823, Q-138207, R-76910, R-77960, R-91332, R-91405, R-93416, R-93521, R-94234, R-94250, R-94277, R-94283, R-119560, R-135953, S-42269, S-69892, U-65374, U-89078, U-103110, U-125954, V-20095, V-33618, V-37931, V-43613, V-55375, V-63399, V-65528, V-66079, V-81764, V-115860, W-128177

---

U - ARCHAEOLOGY

U-7011


Bibliography: leaves 189-203.

ACU

Excavations at the Lagoon site (OJRi-3) on the southern coast of Banks Island, N.W.T., have provided a data base with which to formulate hypotheses concerning the Paleoeskimo culture.

The purpose of this paper is therefore to apprise the Members of the current status of the talks, and to seek direction on certain issues which will be discussed at the First Ministers’ Conference. This paper consists of a short review of the agenda items and an indication of how some of the items will likely be dealt with by the First ministers. (Au)

---

U-12033

English summary.

References.
Text in German.

ACU

The Pre-Dorset Umingmak site is a camp settled by musk-ox hunters 3,400 radiocarbon years ago: ... The site is considered to be an inland hunting camp occupied during and at the end of the warmer season; during the colder season these Paleoeskimos probably lived on the coast. (Au)

---

U-12041

English summary.

---

ACU

The Pre-Dorset Umingmak site is a camp settled by musk-ox hunters 3,400 radiocarbon years ago: ... The site is considered to be an inland hunting camp occupied during and at the end of the warmer season; during the colder season these Paleoeskimos probably lived on the coast. (Au)
U-22187
Describes the various types of faunal bones found in the Old Crow Basin, Y.T. Bones of extinct mammal species as mammoths, horses, and bison have been preserved in the area. (ASTIS)

U-22519
In this paper we present the results of preliminary Neutron Activation analyses of fossil bone samples from the Old Crow River region of the Northern Yukon Territory, Canada. ... measurements of elemental concentrations in these fossils would provide a quantitative figure for the extent and nature of the mineralization. It might also be possible to discern multiple mineralization events, and to determine when ... mineralization took place. ... (Au)

U-22756
... in some respects this has been one of the most productive field seasons. Inasmuch as one of the objectives of highest priority was attained not once but five times: this is the excavation of artefacts from deposits of unquestionable Pleistocene age ... we found and were able to excavate fluvial deposits containing bone artefacts that lie well below layers dated by carbon 14 to >50,000 years at Old Crow Locality 1. ... (Au)

U-22764
The main purpose of this paper is twofold: 1. to discuss evidence for human activity in the Yukon Territory of Canada at a time before the Classical Wisconsinan glacial stage, and 2. to suggest, very tentatively, how this evidence can be understood in relation to the Paleolithic of Siberia. (Au)

---

References.
Text in German.
ACU

Head Hill Flat is a Copper Eskimo autumn camp site, located on the northern end of the Thomten River on Banks Island, N.W.T. 34 taut pits could be identified, some were outlined with stones and almost all of the entrances faced southwest to south-east. Several occupation phases could be established from the tent pit features, about 12 visits from probably 3-4 families each time. ... A direct relationship can be seen between Head Hill Flat and Kunana site on Victoria Island. This supports STEFANSSONS (1944) theory that the Copper Eskimo from Victoria Island migrated to the north of Banks Island in search of the wreck "Investigator". ... (Au)

In 1976 a portion of mandible of a human child was found in probable association with bones of Pleistocene fauna in point bar deposits on the Old Crow River, northern Yukon Territory. The morphology and odontology of the mandible are described, and it is concluded that no specific or sub-specific taxonomic designation can be assigned. It is suggested that the mandible is of an age greater than 20,000 years, and may relate to a Pleistocene human occupation of eastern Beringia. (Au)

Data and inferences concerning the Late Pleistocene extinction of the Arctic-Steppe biome in eastern Beringia are summarized, and their implications for early man in the New World are examined. A possible link is noted between these extinction phenomena and the sudden widespread appearance of fluted points in interior North America. Various aspects of this problem, including the ecology of the Mackenzie Corridor, the various possible causes of extinction, and the question of archaeological visibility, are discussed .... (Au)

Briefly discusses the theory of early man's migration from the Far East to the Yukon and then on to highland Mexico approximately 30,000 years ago. Describes the tools which were brought with him. (ASTIS)
Bluefish Cave
U-46019
Bluefish Cave I : a late Pleistocene eastern
Beringian cave deposit in the northern Yukon / Cinq-Mars, J.
(Canadian journal of archaeology, no. 3, 1979, p. 1-32., map, photos.)
(NYRP contribution, no. 24)
References.
ACU
This paper describes some of the preliminary results of the last excavation carried out at the Bluefish Caves site (northern Yukon Territory) during the summer of 1978. The data at hand allow us to suggest that the site was utilized by human groups at the end of the Pleistocene, between 13,000 and 10,000 B.P. The deposit is viewed as important mainly because of the presence of thousands of Upper Pleistocene vertebrate fossils among which there are enough artificially modified specimens to increase the archaeological record by a hundred fold. These discoveries have prompted a series of field and laboratory studies specifically designed to improve our analogues for interpreting bone, antler, tusk, and tooth specimens which have been altered by both natural and artificial agencies. One purpose of this report is to review the current status of several aspects of our knowledge of bone alterations and to make recommendations as to how our analogues can be enlarged and improved. ... (Au)

Bluefish Cave
U-49875
New dates for early man / Morlan, R.E. Matthews, J.V.
(Contribution - Canada. Yukon Refugium Project, no. 32)
ACU, NPSMO
New finds that indicate man was in North America long before some archaeologists previously thought are being uncovered in the northern Yukon. Bone tools and other bone broken by man more than 30,000 years ago have been found in an area that escaped coverage by ice in the Pleistocene age. Previous estimates by some archaeologists had put the first human inhabitants at 14,000 years ago. The new finds mean that the earliest human history of this continent, and the nature of admissible evidence for that history, will demand rethinking. (Au)

The search for the first Americans / Canby, T.Y.
Smith, K. [Illustrator]. Andersen, R. [Illustrator].
ACU
Discusses prehistoric man's migration from Asia to the Americas across the Bering land bridge, the sealing off of Beringia from the Ice Age, and the recent archaeological finds in Yukon's Old Crow Basin. (ASTIS)

Early man in northern Yukon Territory : perspectives as of 1977 / Morlan, R.E.
(early man in America from a circumpacific perspective / edited by Alan Lyle Bryen.
(Contribution - Canada. Yukon Refugium Project, no. 30)
References.
ACU
... Archaeologists long have believed that Beringia played a key role in the initial colonization of the New World by human immigrants from northeast Asia, but this model long has been frustrated by the absence of evidence for late Pleistocene human occupations in Beringia. Northeastern Beringia finally has begun to yield such evidence in the form of a distinctive bone technology found primarily in northern Yukon Territory. In this paper we will outline the paleoenvironmental contexts of early human occupations in the Old Crow area of the Yukon. ... (Au)

A Paleoeskimo occupation on southern Banks Island, N.W.T. / Arnold, C.D.
References.
ACU, NPSMO
Significant changes occurred within Paleoeskimo cultures during the first millennium B.C. Archaeological remains from the Lagoon site, on Banks Island, N.W.T., provide a new perspective on the nature of those changes and insights into some of the processes involved. (Au)

Taphonomy and archaeology in the Upper Pleistocene of the northern Yukon Territory : a glimpse of the peopling of the New World / Morlan, R.E.
References.
ACU
... During the past 14 years, Old Crow Flats and several other areas of the Yukon Territory have gradually provided tens of thousands of Upper Pleistocene vertebrate fossils among which there are enough artificially modified specimens to increase the archaeological record by a hundred fold. These discoveries have prompted a series of field and laboratory studies specifically designed to improve our analogues for interpreting bone, antler, tusk, and tooth specimens which have been altered by both natural and artificial agencies. ... One purpose of this report is to review the current status of several aspects of our knowledge of bone alterations and to make recommendations as to how our analogues can be enlarged and improved. ... (Au)
North America, known as the Beringian Refugium, Pleistocene vertebrate remains are well preserved in permafrost deposits. Major paleontological collections have been gathered from primarily four areas: Old Crow Flats in the northern Yukon; the Dawson vicinity in south central Yukon; Lost Chicken Creek, west central Alaska; and from the Fairbanks region in central Alaska. Radiocarbon dates on these assemblages, which lack stratigraphic context, range in age between 10,000 and greater than 40,000 years before present. A control reference collection of bones modified by known processes was assembled and bone breaking experiments were conducted for the purpose of separating fossil bones altered by geological, biological and cultural agencies. Bone, antler, and ivory from the Arctic-Steppe tundra had herbivores have been modified by a variety of techniques. On the basis of the surviving tools, it is reasonable to assume that the early Beringian populations had a flexible repertoire of tool making techniques at their disposal. (.Au)

U-65021

References.
ACU, NFSMO

The stratigraphic position of artefacts of undoubted Pleistocene age found in the Old Crow Basin has long been in question. We report on geological, paleontological and archaeological excavations and studies there which show that artefacts made by humans occur in deposits of Glacial Lake Old Crow laid down before Sangamonian time, probably during a phase of the Illinoian (Mississippi) glacial. The geological events surrounding and following the deposition of Glacial Lake Old Crow were complicated by a changing lake level, localized soft-sediment flowage, pingo formation and dissolution, and by the colluvial transport of vertebrate fossils and artefacts. Following deglaciation stages of the Lake, an environment -- not greatly different from that of the present -- is suggested by the excavated vertebrate fauna and by permafrost features, although warming during the succeeding Sangamon can be considered likely. Sangamonian and later phenomena in the Old Crow Basin are referred to briefly; they show that humans persisted in the area for some time. (.Au)

U-65374

Text in French.
ACU, NFSMO

... Excavations at the Washout site (V^Ji-2), Herschel Island, Yukon Territory were conducted in order to obtain data on early Thule subsistence, and to determine the affinity of the site to later Mackenzie sites. Analysis of the data indicates that the Washout site was inhabited by Western Thule peoples from about 1000 - 1400 A.D. The inhabitants practiced a subsistence exploitation of seal, fish, caribou, whale and other species during the winter occupation of the site. The Washout site is interpreted as being one of a number of sites on the Beaufort Sea - Amundsen Gulf coast representing an early Western Thule expansion.

Mackenzie Eskimo culture is interpreted as a distinct regional variant, derived from this Western Thule base. (.Au)

U-73032

Suggested reading.
ACU

... By focusing our attention on two distinct geographic areas in the north - the High Arctic and the Yukon coast - we have selected two cultural periods that illustrate some of the unique and varied problems facing those concerned with the conservation and preservation of this rich cultural past. Much of the material from the two periods remains on or close to the surface and is presently threatened by a variety of agents; discussion of some of these examples will point to some of the more characteristic problems in the preservation of this invaluable data that face archaeologists, museum curators and conservators. First, we will consider the Thule culture period that dates from approximately 1000 to 1600 A.D. when an apparently homogenous Eskimo culture populated different areas throughout the entire Arctic and developed adaptations to various climatic zones. Secondly, we will consider the historic period of European exploration and whaling dating from 1820 to the present. (.Au)

U-74128

References.
ACU

A complete right dentary of a domestic dog, Canis familiaris L., recovered from Old Crow Basin, Yukon Territory, Canada, may represent one of the earliest known domestic dogs. The oldest known dog remains have been dated to approximately 12,000 B.P. Although the Old Crow specimen has not been radiocarbon-dated, it is inferred to be Pleistocene in age on the basis of its stratigraphic position and staining. (.Au)

U-84385

Les grottes du Poisson-Bléu [The Bluefish Caves] / Cinq-Mars, J. (Archaological Survey of Canada, no. 99, 1980). The Bluefish Caves site, located in the Porcupine basin of the northern Yukon interior has yielded a variety of in situ, late Pleistocene faunal and archaeological materials indicating that between 17,000 and 12,000 years ago human groups had developed means of adapting themselves to what must have been a fairly severe periglacial climate. This paper describes some of these finds and some of their implications for future research. (.Au)

U-87335

The Lagoon site (DJR-3) : implications for Paleo Eskimo interactions / Arnold, C.D. (Canadian journal of archaeology, no. 107, 1981, p. 47-53, tables, 1 fig.).
References.
ACU, NFSMO

... The Lagoon site (DJR-3) is located on the Beaufort Sea - Amundsen Gulf coast, representing an early Western Thule expansion.
Excavations at the Lagoon site (DR1-9) on the southern coast of Banks Island, N.W.T., have provided a data base with which to formulate hypotheses concerning the Palaeoeskimo culture history of the western periphery of the Canadian Arctic, ca. 1000 B.C. In the several centuries previous to that date, Dorset culture is believed to have evolved in the Foxe Basin - Hudson Strait region of the Eastern Arctic, and from there spread by immigration into areas formerly occupied by Pre-Dorset people. At about the same time, Choris and Norton complexes were expanding from Alaska into northwestern Canada. The artifact assemblage obtained from the Lagoon site incorporates traits which are characteristic of several of these Palaeoeskimo complexes. Since it appears that no more than one occupational episode is represented at the site, diffusion resulting from cross-cultural interactions is hypothesized to account for the nature of the data. In order to develop this postulate, aspects of models devised for historical, biological and anthropological explanations are drawn upon. (AU)

References:

This report is accompanied by 37 topographic maps accurately bound entitled: Archaeological sites: Arctic tanker route (BEISSD20A).

ACU

An archaeological study area of 18 Borden blocks is defined in the Arctic Archipelago between the Beaufort Sea and Baffin Bay. The study area contains likely alternatives of an Eastern Arctic Oil Tanker Route. From various file sources 747 [recorded] sites were found ... [to be] representative of an archaeological record spanning back 3,000 years. From base sample projections of two intensively resurveyed areas it was estimated that there may be 17,000 sites in the study area. Most of these sites will be found 2 km above sea level. (AU)

References:

This report is accompanied by 37 topographic maps accurately bound entitled: Archaeological sites: Arctic tanker route (BEISSD20A).

ACU

I have prepared a very brief summary of research on Palaeoeskimo cultures in the Old Crow Basin, as of September 1980. ... Of most general interest and significance is some findings that suggest very strongly that we have found in Beringia (the Palaeoeskimo subcontinent that subsumes the unglaciated westernmost North America and eastern Siberia) evidence of cultures of Riss/Illinoian age. Our excavations in the easternmost part of this province, at Old Crow River ... establish this ... beyond doubt ... (AU)

References:

The general objectives of this study are to assemble a current data base on the heritage resources in the study area which can serve as a framework for future assessment of the possible impact of development related to terrain disturbance. The specific terms of...
reference can be summarized as follows: 1. To conduct a literature review of historical, ethnohistorical, ethnological, archaeological and palaeontological work in the study area and to prepare a concise synthesis of the pertinent data. 2. Based on this review, to prepare a set of land use models that could be applied to the terrain and circumstances of the specific onshore developments. (Au)

U-92053
Survey of the Dismal Lake area, N.W.T., Canada (Newsletter: - Yukon Historical and Museums Association, no. 12, 1983, p. 36-99) ACU
This paper reports on the archaeological work conducted in the Rock River area along the Dempster Highway (ASTIS)

U-122190
A close association between human tribes and caribou populations (hunting bands and caribou herds) has existed in Canada's barrenlands since man's earliest occupation about 6000 B.C. Game populations and topography exerted direct influences on human cultures, while climate, game forage, forage distribution, and hunting pressure exerted secondary or indirect influences upon the caribou themselves. (Au)

U-124036
A close association between human tribes and caribou populations (hunting bands and caribou herds) has existed in Canada's barrenlands since man's earliest occupation about 6000 B.C. Game populations and topography exerted direct influences on human cultures, while climate, game forage, forage distribution, and hunting pressure exerted secondary or indirect influences upon the caribou themselves. (Au)

U-125954
To date, the nature and development of Thule Eskimo culture along the Canadian central Arctic coast has received comparatively little attention. Little has been known of the spread of Thule culture into this region, or of its relationship to Thule in other, better-understood areas to the east and west. In order to investigate Thule culture in this strategic but marginal region, excavations were undertaken between 1978 and 1981 at three house sites on the western coast of Coronation Gulf. Principal among these is the Clachan site, a three-house village which was almost entirely excavated. On the basis of stratigraphy and typological comparisons, this site appears to have been occupied over a period of several centuries between about A.D. 1150 and 1450. Together these sites, along with others already identified, appear to represent a fairly distinctive stylistic variant of Thule culture in the western central Arctic. This variant is primarily affiliated with western rather than eastern Thule, and appears to be of direct Alaskan origin. Subsistence strategies are also examined. Subsistence at the study sites was based overwhelmingly on ringed seal, but a number of lines of evidence indicate an economic orientation which was quite different from that of the historic Copper Eskimo of the area. In particular, it is suggested that the Thule inhabitants had not yet developed breathing-hole hunting techniques which were effective under the difficult ice conditions of the central Arctic. (Au)
Analysis of midden material from a Thule Eskimo dwelling site on the shore of Herschel Island showed it to contain a high proportion of fatty material. Chemical analysis shows this to consist of a mixture of fatty acids from the fats and oils of marine animals which has been partially, but far from completely, converted to adipocere. The lack of complete conversion is attributed to anaerobic conditions, low ambient temperature, and lack of bacterial action. The result are consistent with, but not a proof that the debris is from a mixture of harbour, ringed, and bearded seal, which is the conclusion from the bone fragments found. (Au)


This report constitutes a preliminary analysis of the results of a second season of archaeological investigations at the Lagoon Site (OJRI-3), a Palaeoeskimo campsite situated near the mouth of the Masik River on the southwest coast of Banks Island, N.W.T. Accordingly, a crew of five spent seven weeks at the site during the summer of 1977, testing new areas and extending the excavations of the previous year. The data thus obtained is seen to have a bearing upon our interpretation of the nature of the prehistoric cultural interactions between the western and eastern regions of the North American Arctic. (Au)


Analysis of midden material from a Thule Eskimo dwelling site on the shore of Herschel Island showed it to contain a high proportion of fatty material. Chemical analysis shows this to consist of a mixture of fatty acids from the fats and oils of marine animals which has been partially, but far from completely, converted to adipocere. The lack of complete conversion is attributed to anaerobic conditions, low ambient temperature, and lack of bacterial action. The result are consistent with, but not a proof that the debris is from a mixture of harbour, ringed, and bearded seal, which is the conclusion from the bone fragments found. (Au)

A field programme of archaeological research was conducted during the summer of 1976 for the purpose of investigating the nature and extent of Thule Eskimo occupations along the south coast of Banks Island, N.W.T., from the region of the Masik River in the east to Cape Kellet in the west. .... Accordingly, a crew of four was put down by helicopter near the mouth of the Masik River on June 20 with the intent of conducting a foot and boat survey northwest along the coast. Plans in this regard were frustrated, however, as the ice sea in the research area failed to go out until the second week in August. A thorough survey of the areas within hiking distance was conducted during this period; the major part of the time, however, was spent excavating a site showing Pre-Dorset cultural affinities which was located a short distance southeast of the Masik River .... This report reflects a preliminary assessment of the data obtained, and as such will hopefully contribute to a more comprehensive understanding of the history and prehistory of Banks Island. (Au)


The author describes his friendship with Stefansson. He concentrates on the period during WWII when both he and Stefansson were employed by the U.S. Office of Coordinator of Information which was engaged in the collection of information considered useful for the joint defence of the U.S. and Canada. Stefansson was the Arctic expert and the author was his representative in Ottawa. In particular, the author describes their involvement in the CANOL project, a pipeline built to carry crude oil from Norman Wells to a refinery in Whitehorse.
References.
ACU, NSM0

... Using unpublished whaling logbooks and journals, manuscript annual summaries of Dutch and British whaling, and other sources, the author assembles data annually for each of the whaling grounds of Davis Strait, Hudson Bay, and the Beaufort Sea, which indicate that more than 29,000 whales were killed. Considering gaps in the coverage and the mortality or wounded escaped whales, the total kill during the whaling period may have exceeded 38,000. This reconstruction is considered preliminary ... (Au)

V-32816
"Punch" Dickins and the origin of Canol's Mackenzie air fields / Barry, P.S.
(Arctic, v. 32, no. 4, Dec. 1979, p. 366-373, (map)
References.
ACU, NSM0

Correspondence between the Canadian flyer, C.H. "Punch" Dickins, and government officials in Ottawa during the early summer of 1942 reveals that the United States Army began building an "unauthorized" military air route to Norman Wells ... much earlier than the U.S. War Department's official histories admit, and that, a though Canada's Cabinet War Committee professedly knew nothing of it, certain Canadian government personnel were privy to the secret. ... (Au)

V-33618
The native response to the extension of the European traders into the Athabasca and Mackenzie Basin, 1770-1814 / Sloan, W.A.
(Canadian historical review, v. 60, no. 3, 1979, p. 29-28)
References.
ACU

The author relates the impact that the North West Company had on the Indian tribes in the Athabasca and Mackenzie river basins. Between their arrival in 1778 and their withdrawal in 1814, the Company brought disease, disrupted tribal relations and hunting patterns, and precipitated changes in the balance of power between the Indians which caused a deterioration of inter-tribal relations. The Indians consciously withdrew from the fur trade because of competition with each other, alcohol and gifts which lensted their desire to work, and, in the case of the Chipewyans, the severe and inhumans treatment accorded them by the Company. (ASTIS)

V-35998
Geological lectures by Dr. John Richardson, 1825-26 / Warkentin, J.
69p., 111., facsims. (part. col.), map ; 28cm. (Syllogaeus, no. 22, 1979)
References: p.34-38
ACU

Notes made by Lieutenant George Back during eleven lectures on geology given by Sir John Richardson at Fort Franklin during the winter of 1825-1826 are presented. Warkentin uses these notes to investigate the state of geological theory as expressed by a leading geologist at the time when the subject was being founded as an empirical science and long-held fundamental concepts were being questioned. Warkentin identifies titles and editions of a small geological reference library known to have been available to the officers on the expedition. Richardson's published geological reports of 1823 and 1828 on areas traversed by the two Franklin land expeditions are used to illustrate the type of field studies undertaken at that time. (ASTIS)

V-37931
The Nakotcho Kutchin: a tenth aboriginal Kutchin band? / Krech, S.
(Journal of anthropological research, v. 35, no. 1, Spring 1979, p. 109-121, (map)
References.
ACU

The examination of ethnohistorie data presents strong evidence for the disappearance of one North Athapaskan Kutchin regional band and it is suggested that epidemic diseases were responsible for this. The implications of acculturative changes for theories of social and band organization among Northern Athapaskans and other foragers are explored. (Au)

V-42612
British law and arctic men: the celebrated 1917 murder trials of Sinniisik and Ulukuk, first Inuit tried under white man's law / Moyles, P.G.
Saskatoon: Western Producer Prairie Books, [1979].
93p. : photos. ; 23cm.
ISBN 0-88853-021-8
References.
ACU

This is the story of the first trials, under white man's law, of members of the Inuit race: Rex v. Sinniisik and Ulukuk on charges of murder ... The first trial in Edmonton ended in a "not guilty" verdict; following charges of jury-tampering and a change of venue, Sinniisik and Ulukuk were eventually found guilty by a Calgary jury. The implication of the trials was not only (nor even primarily) to bring Sinniisik and Ulukuk to justice, but to impress upon the whole Inuit nation ... that the North was no longer theirs ... Canada was determined to establish control over the whole of its territory ... (Au)

V-44202
Vilhelmar Stefansson and the Karluk disaster / Hunt, W.R.
(Musk-ox, no. 25, 1979, p. 3-11, map, photos.)
References.
ACU

The careers of polar explorers should be periodically re-examined as a means of refreshing our memory of their achievements and also to review received interpretations of the facts in the light of new evidence. ... In his recently published book, William McKinlay, sole survivor of the Karluk (flagship of Stefansson's Canadian Arctic Expeditions of 1913-18) has charged Stefansson with responsibility for the Karluk disaster. Journalists reviewing the book tend to endorse uncritically McKinlay's unfair appraisal of Stefansson's role in the expedition. The ship was, in fact, doomed by both natural and human factors: a gale that forced her to drift helplessly westward into Siberian waters where she was eventually crushed by ice, and Captain Bob Bartlett's inexperience with Western Arctic navigation and his refusal to take advice. Stefansson was further hampered by efforts of scientists of the Geological Survey of Canada to subvert the expedition and discredit its commander. ... (Au)
V-55328
By canoe up the Yellowknife River in 1932 / Wray, D.R.
(Musk-ox, no. 26, 1980, p. 21-50, maps, photos.)
(Musk-ox, no. 27, 1980, p. 36-59, maps, photos.)
References. Published in 2 parts in consecutive issues.
ACU
... The present report deals with a traverse made by a geological survey party during the summer of 1932 which followed the course of the Yellowknife River on the route to Winter-Lake used by Franklin in 1820. It also explores the country between Winter and Point Lakes and touches on a portion of the barren land north of Point Lake ... Observations recorded in the journal published here might indicate why Indians avoided travelling this route during the summer, choosing instead to seek their hunting grounds on the Barren Lands by way of the Snare River in their canoes, and only using the Yellowknife route when ice and snow had taxed its rapids and portages. ... (Au)

V-56293
Portaging on the Slave River (Fort Smith) / Mackinnon, D.S.
(Musk-ox, no. 27, 1980, p. 21-35, maps, photos.)
ACU
The opening of the north is largely the story of changes in transportation. These are best examined at the Slave River portages on the historic entry corridor for the vast north-west. By using east side-channels, canoes and York boats could bypass or portage the worst rapids ... In the 1880s the new settlement of Fort Smith and Smith Landing (Fitzgerald) became the major break in the water route from Fort McMurray to the Arctic. A sixteen mile ox-cart road was developed gradually. The oil rush of 1919 prepped a switch to caterpillar tractors. In the 1930s the Ryan brothers were given a public freighting monopoly because the road was too distant to be maintained by the Alberta government. Protests led to the building of a rival road by Corser and Doyle. ... In the 1950s the federal government built an all-weather gravel highway. By this time Northern Transportation, a crown corporation, was handling most of the freighting. By the end of 1967 the railway to Great Slave Lake had diverted operations from Fort Smith to Hay River except for transfers of big barge. ... (Au)

V-55379
Indigenization of Christianity and syncretism among the Indians and Inuit of the western Arctic / Guattieri, A.R.
(Canadian ethnic studies, v. 12, no. 1, 1980, p. 47-57)
Footnotes. ACU
My aim was to ascertain ... the extent (if any) to which missionaries deliberately tried to indigenize or adapt Christian beliefs, symbols and practices to Native cultural forms and to their understandings of man, nature and the sacred ... The research disclosed that there has been negligible indigenization of Christianity. Nor was there evidence of significant syncretism. ... (Au)

V-57070
The consumption of caribou by whalingmen at Herschel Island, Yukon Territory, 1890-1908 / Bockstoce, J.R.
(Arctic and alpine research, v. 12, no. 3, Aug. 1980, p. 391-394, map, tables)
References. ACU
It has been maintained by several writers that American whalers substantially depleted the Porcupine caribou herd while wintering at Herschel Island, Yukon Territory. My research, based on the logbooks and journals of their vessels, has led me to conclude that the hunting pressure was not deleterious to the herd. ... (Au)

V-63339
Interethnic relations in the lower Mackenzie River region / Krech, S.
Interethnic relations in the lower Mackenzie River region from the abandonment period through the twentieth century are examined. Focus is placed on interactions between Eastern Kutchin and Mackenzie Inuit, although Eurocanadians and Metis also are included in a dynamic ethnic group framework. ... (Au)

V-55225
The origin of Canol's Mackenzie air fields / Finnie, R.S.
(Arctic, v. 33, no. 2, June 1980, p. 273-279)
ACU, NFMF
This account of the Canol's Mackenzie air fields is based on personal diaries and reflects the author's participation from the spring of 1942 to the summer of 1945. (Au)

V-54402
Farming in the Territories / Hunt, L.A.C.
(North/Nord, v. 25, no. 1, Jan./Feb. 1978, p. 20-23, photos.)
ACU
This article outlines the long history of gardening and forage crop production in the N.W.T. Technical, economic, and administrative problems, notably N.W.T. government agricultural policy, are analyzed. (ASTIS)

V-54445
On snowshoes to the barren grounds / Silliman, L.
(North/Nord, v. 25, no. 1, Jan./Feb. 1978, p. 50-51, ill., map)
ACU
This article describes a 3000 km snowshoe trip made by Casper Whitney in the early spring of 1895 to hunt the Barren Ground musk-ox. (ASTIS)

V-55338
Indigenization of Christianity and syncretism among the Indians and Inuit of the western Arctic / Guattieri, A.R.
(Canadian ethnic studies, v. 12, no. 1, 1980, p. 47-57)
Footnotes. ACU
My aim was to ascertain ... the extent (if any) to which missionaries deliberately tried to indigenize or adapt Christian beliefs, symbols and practices to Native cultural forms and to their understandings of man, nature and the sacred ... The research disclosed that there has been negligible indigenization of Christianity. Nor was there evidence of significant syncretism. ... (Au)

V-56293
Portaging on the Slave River (Fort Smith) / Mackinnon, D.S.
(Musk-ox, no. 27, 1980, p. 21-35, maps, photos.)
ACU
The opening of the north is largely the story of changes in transportation. These are best examined at the Slave River portages on the historic entry corridor for the vast north-west. By using east side-channels, canoes and York boats could bypass or portage the worst rapids ... In the 1880s the new settlement of Fort Smith and Smith Landing (Fitzgerald) became the major break in the water route from Fort McMurray to the Arctic. A sixteen mile ox-cart road was developed gradually. The oil rush of 1919 prepped a switch to caterpillar tractors. In the 1930s the Ryan brothers were given a public freighting monopoly because the road was too distant to be maintained by the Alberta government. Protests led to the building of a rival road by Corser and Doyle. ... In the 1950s the federal government built an all-weather gravel highway. By this time Northern Transportation, a crown corporation, was handling most of the freighting. By the end of 1967 the railway to Great Slave Lake had diverted operations from Fort Smith to Hay River except for transfers of big barge. ... (Au)
knew the way to the northwest coast of America. Although their guide left them there, the Dene travelled on to the upper Yukon River region, and subsequently made their way further inland. The traditions of the northern Dene identify the ferocious enemies of their ancestors as the Dhoen-on, and the leader of those enemies as Ta-tsan-eko, or The Crow Who Runs. The indications are that the Dhoen-on were people whom we regard as Mongols, and that their leader, Ta-tsan-eko, was none other than the mighty Genghis Khan. (Au)

V-68984

de Sainville : forgotten Mackenzie mapper / Neufeld, P.L.

For over six years from 1889 to 1894, Count V. Edouard de Sainville worked quietly in the Mackenzie Valley - exploring, surveying and mapping. With little fanfare, he returned to his native France, and the same silence that surrounded his life in Canada's Arctic seems to have surrounded his work to this day. Except for a handful of Northerners who met him then, a minor American explorer and a half-dozen government officials. North Americans were not informed of, or aware of the truly significant work carried out by this French nobleman. (Au)

V-69255

Among the Chiglits Eskimos / Pettitot, E. Hohn, F.O. [Translator].

(Edmonton : Boreal Institute for Northern Studies, 1981.)

v. 1, 202p. : ill., figures, maps ; 28cm.

(Occasional publication - Alberta. University. Boreal Institute for Northern Studies. 10)

ISBN 0-88068-17-7

Translation of "Les grand Esquimaux" by E. Otto Hohn.

ACU

Pettitot's work provides another and unique time perspective, and allows us detailed observation and early European portraits of the Canadian North and its indigenous inhabitants. His contributions range from geography, geology, and ethnology. His linguistic works include a French-English vocabulary. (ASTIS)

V-71994

Great Bear : a journey remembered / Watt, F.B.

Yellowknife : Outcrop Ltd., [1980].

228p. : photos. ; 24cm.

ISBN 0-89310-00-3

ACU

Great Bear. The name had magic in the early 1930s. It sparked a great mining rush in Canada, sending men North in desperate search of riches. pitchblende, the glossy, black mineral that sold for hundreds of dollars an ounce - was a bonanza in the bleakest days of the Depression. This is the story of one man who went to Great Bear. Ted Watt went in desperation and in hope, like the others. He takes us with him across the frozen, gale-swept face of Great Bear, to the edge of human endurance. Along the way, he saw men and events with a disciplined reporter's eye. Here are the colourful giants of those early days, mining men and bushpilots, native chiefs and lone prospectors. (Au)

V-76504

John Firth, legendary trader / Zealley, E.


References: ACU

Several historical anecdotes are recounted of the man, John Firth, who served in the Mackenzie River District, Peace River, and Fort McPherson region as a clerk for th Hudson's Bay Company from 1871-1920. (ASTIS)

V-86371

Matonabbee, Chipewyan guide and northern trading chief / Yerbury, J.C.


ACU

Matonabbee, a Chipewyan Indian and Northern trading chief, was best known as Samuel Hearne's guide and companion during his famous trek across the tundra to the Coppermine River and Great Slave Lake between 1770 and 1772. Little known to historians was Matonabbee's prior engagement by Ferdinand Jacobs, Governor
of Prince of Wales’s Fort or Fort Churchill, during August of 1761 to act as an ambassador and mediator of peace between the Athapaskan and Cree Indians in the general Great Slave Lake and Lake Athabasca areas. Unpublished information on Matonabee’s embassy and life history along with a brief account of the historical background to Athapaskan and Cree intertribal hostilities between 1750 and 1764, provide a glimpse into the Protohistoric Period. This was a time during which Northern Athapaskan cultures were undergoing adaptations to new conditions imposed through European influences such as disease, trade goods, and fur trade rivalries, although the Europeans had not yet visited the Indians in their own territories. These cultures are now known as the Hare, Dogrib, Slave, Beaver, and Chipewyan. ... (Au)

V-93267
The Coppermine River: art and reality / St-Onge, D.A.
(Canadian geographic, v.102, no. 4, Aug./Sept. 1982, p. 28-31, ill.)
ACU

... Every summer since 1979 I have travelled to the Coppermine Valley to study its geology, while examining its rocks, plants and wildlife, I also became fascinated by its legends and history. Reading the diaries and records left by Hearne and Franklin, and I was struck particularly by the detailed drawings made by two of Franklin’s companions, Robert Hood and George Back. The Franklin expedition of 1819-21 took place several decades before photography came into popular use, and the sketches were made as an official record of the terrain the explorers passed through. A comparison of these drawings with recent photographs of the same scenes reveals the remarkable degree of artistic licence taken by these early chroniclers. Intentionally or not, Hood and Back never drew the land as it really is. As a result, several generations of Europeans and North Americans were presented with romanticized images of Canada’s vast northland in general and the Coppermine Valley in particular. ... (Au)

V-115880
The Mackenzie yesterday and beyond / Aquilina, A.P.
204 p. : ill., maps : 22 cm.
ISBN 0-88839-083-1

Bibliography
ACU

The search for the northwest passage, fur, whales, gold, and now oil, tempted the intrepid to the north. They brought with them change— for the environment. For the people, for the culture— change so profound that it has not yet been fully understood. The recorded history of the area is brief, dramatic, intriguing. The struggles of the past, the dilemmas of the present, and the promise of the future are detailed in this fascinating look at Canada’s north. (Au)

V-131601
Early science and discovery in the western Arctic / Pluth, D.W.
(Arctic, v. 6, no. 2, Fall 1993, p. 10-15, ill., map)
ACU

This article describes how science has played a major role in the exploration of the North American Arctic, beginning with the meteorological observations made by John Ross. The explorations and mapping accomplished by Bering, Cook, Drake, Hearne, Mackenzie, Ross, Parry, Franklin, Richardson, Dease, Simpson and Rae are outlined. (ASTIS)


W-18011
The Dempster Highway, road to the Arctic / Bingman, J.
(Arctic in colour, v. 6, no. 4, 1978, p. 12-15, col. photos.)
ACU

Describes the Dempster Highway, its history and importance as the first all-weather highway in North America to cross the Arctic Circle. (ASTIS)

W-18020
Nahanni, somewhere over there and beyond / Krasemann, S.J.
(Arctic in colour, v. 6, no. 4, 1978, p. 25-29, col. photos.)
ACU

An account of a 12-day trip by the author and a party of eight people through the South Nahanni River Valley. (ASTIS)

W-34681
Coppermine / Raffen, J.
ACU

This article describes the Coppermine River from its source at Lac des Gres, 300 km northeast of Yellowknife, to the Arctic Ocean. Geographic and natural features along the route help to explain the popularity of this area for modern wilderness travellers. Contradicting pressures to develop these and other resources of the area may have to be answered soon. (ASTIS)

W-44610
Parke Canada hopes to preserve Tuktoyaktuk area. / Inuktitut, 1979 [1] Spring, p. 48-51, photos.)
Text in English and Inuktitut.
ACU

Parke Canada has proposed that a 12.6 square kilometer area of the Tuktoyaktuk Peninsula be set aside as a “National area of Canadian significance.” The presence there of hundreds of pingos is thought to be the largest concentration in the world, with Ibyuk Hill as the largest in Canada. The area also supports a very rich mammal and bird population. (ASTIS)

W-46230
A canoeist’s exploration of Nahanni Park / Harding, L.
(Canadian geographic, v.100, no. 3, June/July 1880, p. 80-97, col. photos., map)
ACU

The author describes the features encountered on a trip through the length of the South Nahanni River from Rabbitkettle Lake at the head of the Park. Historical anecdotes and references to earlier travels by Fallis and Patterson supplement this modern account of travel in the area. (ASTIS)
This article presents a description of rafting on the Yukon's Firth River. (ASTIS)

W-138177
Getting along in the Mackenzie Delta / Petro-Canada.
Cover title.
References.
ACU

This booklet is part of a series published by Petro-Canada to inform our employees about the environment and people of regions where resource development is being pursued. This booklet presents a brief sketch of the land plant and animal life, and people of the Delta region. It focuses on the Mackenzie Delta proper, with additional information on surrounding areas, including the Beaufort Sea coast from the Yukon/Alaska border to Cape Bathurst. (Au)

See Also: C-37206, C-37214, L-88943, O-42242

X - GENERAL

X-30317

(...) the Symposium would: (1) Outline the present state of knowledge. (2) Define still-existing problems. (3) Integrate the works of various disciplines in a synthesis of the region's environment and processes. Presentations at the Symposium were grouped into three broad disciplinary categories: air-ice-water, geology, and biology. One day was given over to each category. The sequence of presentations at the Symposium has been adhered to in compiling this volume. Two hours of each day's session were devoted to commentaries on the theme papers, general discussion, and questions from the floor. While a verbatim transcript of these exchanges is lacking, written questions and statements were solicited and are included here, together with the response they elicited. (...)

X-33693
Automatic time-lapse camera systems / Banner, J.A.

This report provides construction and operation details for the automatic time-lapse camera system that was developed and used to monitor natural phenomena in northern Canada. Modified Eastman Kodak K9BA 16-mm strike-recording
motion picture cameras were used in this
system. Some of the results obtained with the
system are presented and discussed. Suggestions
for the adaptation of other cameras for
time-lapse photography are also given. (Au)

See Also: V-93297

X-41181
Coastal zone: an informal newsletter on the
resources of the Pacific and western Arctic
coasts of Canada.
V.1, no.1 (Mar.7, 1979) -
[Vancouver : Lands Directorate, Pacific Region,
Environment Canada, 1979- ].
28cm.
Quarterly.
ACU

The purpose of this publication is to publicize
research projects from any discipline focussing
on the British Columbian and western Arctic
waters and coasts. Descriptions of projects and
contact information is provided. Other regular
departments include notices of relevant
courses, calls for papers, publications, and a
calendar of events. (ASTIS)

Y - MISCELLANEOUS

Y-18953
Fort Smith news.
Fort Smith, N.W.T.: Canarctic Graphics, 1978-
111.; 43 cm.
Weekly.
Description based on no. 31 (Mar. 1979).
ACU

A weekly newspaper from Fort Smith providing
local news, sports and social events. (ASTIS)

Y-18941
Slave River journal.
111.; 43cm.
Weekly.
Description based on Mar. 8, 1979 issue.
ACU

A regional weekly newspaper serving the area
between Lake Athabasca and Great Slave Lake,
N.W.T. (ASTIS)

Y-50938
The mad trapper / Wisbe, R.
188p.; 22cm.
ISBN 0-7710-6976-7
ACU

This historical novel describes the mystery
surrounding the arrival of Albert Johnson in
Fort McPherson, his subsequent wounding of RCMP
Constable King at Rat River, and the epic
fifty-day pursuit through the Richardson
Mountains in winter led by Corporal Millen,
assisted by Wop May, which ended in Johnson's
and Millen's deaths at their final
confrontation, Feb. 18, 1932. (ASTIS)

Y-135305
Don Cardinal, bush painter of the north / Cooke,
L.
111.)
ACU

This article describes the life-style of the
painter, Don Cardinal and the subject matter of
his paintings - the buildings and the people of
small bush communities, wolves, and the
<table>
<thead>
<tr>
<th>Subject Index</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice - Physical properties</td>
<td>G-127663</td>
</tr>
<tr>
<td>Ice - Trafficability</td>
<td>L-48666</td>
</tr>
<tr>
<td>Ice blasting</td>
<td>Q-24511</td>
</tr>
<tr>
<td>Ice control</td>
<td>G-108308, G-130796, G-131164, G-56146, G-138593</td>
</tr>
<tr>
<td>Ice cores</td>
<td>G-19283, G-57908, G-62189, G-105058, G-115983</td>
</tr>
<tr>
<td>Ice cover</td>
<td>B-48518, G-24457, G-30040, G-85860, G-107255, G-108281, G-108286, G-108324, G-24449</td>
</tr>
<tr>
<td>Ice crossings</td>
<td>L-122637</td>
</tr>
<tr>
<td>Ice crystals - Orientation</td>
<td>C-21997, G-25518, G-55700, G-57908</td>
</tr>
<tr>
<td>Ice crystals - Structure</td>
<td>C-21997, G-41114</td>
</tr>
<tr>
<td>Ice erosion</td>
<td>G-127337</td>
</tr>
<tr>
<td>Ice floes</td>
<td>G-15482, G-25780, G-40517, G-42886, G-48020, G-70179, G-108291, G-108294, G-108392</td>
</tr>
<tr>
<td>Ice floes - Break-up</td>
<td>G-108340</td>
</tr>
<tr>
<td>Ice floes - Deformation</td>
<td>G-108340</td>
</tr>
<tr>
<td>Ice floes - Distribution</td>
<td>G-108286, G-108367</td>
</tr>
<tr>
<td>Ice floes - Measurement</td>
<td>G-107247, G-107255, G-107280, G-108286, G-108316, G-108367</td>
</tr>
<tr>
<td>Ice floes - Movement</td>
<td>G-108375</td>
</tr>
<tr>
<td>Ice floes - Strength</td>
<td>G-24457</td>
</tr>
<tr>
<td>Ice islands - Movement</td>
<td>G-108359, G-108375, G-127345</td>
</tr>
<tr>
<td>Ice jans</td>
<td>G-120464, G-130206, G-131862</td>
</tr>
<tr>
<td>Ice leads</td>
<td>G-60291, G-92118, G-92150, G-108316, I-68440</td>
</tr>
<tr>
<td>Ice loads - Measurement</td>
<td>M-123132, Q-126853, Q-127280, Q-127299, Q-127779</td>
</tr>
<tr>
<td>Ice loads - Testing</td>
<td>G-131324, M-133132</td>
</tr>
<tr>
<td>Ice mounds</td>
<td>C-21889</td>
</tr>
<tr>
<td>Ice navigation</td>
<td>D-108448, G-92118, G-92150, G-92169, G-108316, G-122670, L-54020, G-124192</td>
</tr>
<tr>
<td>Ice pile-up</td>
<td>G-122408, G-130320</td>
</tr>
<tr>
<td>Ice platforms</td>
<td>Q-30104, Q-56484, Q-127779</td>
</tr>
<tr>
<td>Ice pressure</td>
<td>G-70327, G-83470, G-92150, G-108260, G-108367, G-130320</td>
</tr>
<tr>
<td>Ice pressure - Measurement</td>
<td>G-70300, G-83500</td>
</tr>
<tr>
<td>Ice ride-up</td>
<td>G-130320, G-116220, G-127779</td>
</tr>
<tr>
<td>SUBJECT INDEX</td>
<td>-268-</td>
</tr>
<tr>
<td>---------------</td>
<td>-------</td>
</tr>
<tr>
<td>Indians - Social conditions</td>
<td>Q-25410, Q-118931</td>
</tr>
<tr>
<td>Indians - Trade and barter</td>
<td>V-33618</td>
</tr>
<tr>
<td>Indians - Treaties</td>
<td>T-2399</td>
</tr>
<tr>
<td>Industrial wastes - Environmental aspects</td>
<td>Q-25350</td>
</tr>
<tr>
<td>Industries</td>
<td>N-78514, Q-73822</td>
</tr>
<tr>
<td>Industries - Economic aspects</td>
<td>R-77739</td>
</tr>
<tr>
<td>Industries - Environmental aspects</td>
<td>F-128040</td>
</tr>
<tr>
<td>Industries - Social aspects</td>
<td>R-77739</td>
</tr>
<tr>
<td>Information services</td>
<td>A-12840, E-64467, F-88374, Q-118176, Q-138696, R-92185</td>
</tr>
<tr>
<td>Infrared remote sensing</td>
<td>G-81866, Q-108260</td>
</tr>
<tr>
<td>Inland water transportation</td>
<td>L-11075, L-27472</td>
</tr>
<tr>
<td>Insulating materials</td>
<td>N-19500, M-56928</td>
</tr>
<tr>
<td>Intrusions (Geology)</td>
<td>B-16810, B-40892, B-49980, B-82909, B-127931, B-83991, B-73992, B-74957, B-75450, B-81620, B-81752, B-87980, B-85013, B-98692, B-88706, B-92295, B-811848, B-117404, B-122246, B-122734</td>
</tr>
<tr>
<td>Inuit - Acculturation</td>
<td>Q-116823, T-46191, T-79588, T-119458, V-55379, V-63339, V-67164</td>
</tr>
<tr>
<td>Inuit - Alcohol abuse</td>
<td>T-125032</td>
</tr>
<tr>
<td>Inuit - Archaeology</td>
<td>U-5711, U-12033, U-12041, V-20095</td>
</tr>
<tr>
<td>Inuit - Archaeology - Paleoeskimo culture</td>
<td>U-53023, U-87335, U-87590</td>
</tr>
<tr>
<td>Inuit - Archaeology - Pre-Dorset culture</td>
<td>U-124036</td>
</tr>
<tr>
<td>Inuit - Archaeology - Thule culture</td>
<td>T-82286, U-82374, U-87930, U-125954, U-133953, U-138363</td>
</tr>
<tr>
<td>Inuit - Culture</td>
<td>V-67164</td>
</tr>
<tr>
<td>Inuit - Dances</td>
<td>T-119466</td>
</tr>
<tr>
<td>Inuit - Diseases</td>
<td>T-123188, T-125032</td>
</tr>
<tr>
<td>Inuit - Economic conditions</td>
<td>J-32166, L-120596, Q-77542, Q-85621, R-94234, T-6050, T-11812, T-95602, T-88145, T-89893, T-94242, T-95224</td>
</tr>
<tr>
<td>Inuit - Education</td>
<td>Q-92266</td>
</tr>
<tr>
<td>Inuit - Employment</td>
<td>J-32166, L-120596, Q-77542, Q-89621, R-94234, T-6050, T-11812, T-95602, T-88145, T-89893, T-94242, T-95224</td>
</tr>
<tr>
<td>Inuit - Food and nutrition</td>
<td>T-24171, T-35602, T-66817, T-79858, T-125032</td>
</tr>
<tr>
<td>Inuit - Health and hygiene</td>
<td>T-79588, T-123188, T-128032</td>
</tr>
<tr>
<td>Inuit - Housing</td>
<td>N-73156</td>
</tr>
<tr>
<td>Inuit - Hunting, trapping and fishing</td>
<td>Inuit - Inland water transportation</td>
</tr>
</tbody>
</table>
SUBJECT INDEX

Labour mobility R-77925, R-85834, R-111392
Labour supply P-106470, Q-24481, Q-95702, Q-95761, Q-95840, Q-95858, Q-95990, Q-105589, Q-106909, Q-116823, R-93416, R-94293, R-95540, R-95664, R-111392, T-95842, T-95974, T-106600, T-106627
Labour turnover Q-92266, T-109258
Lake ice - Break-up G-45799, G-122483
Lake ice - Strength G-21266, G-26476
Lake ice - Thickness G-21266
Lakes B-19907, C-83194, F-108561, I-10979, I-108235, J-73288
Lakes - Arsenic content I-34665, J-4944
Lakes - Composition I-38598
Lakes - Drainage F-64602, F-80330, F-81566
Lakes - Temperature H-85329
Land - Classification C-73733, H-107204, H-107220, J-16721, J-89001
Land clearing - Environmental aspects Q-111833, Q-118141, Q-118176
Land clearing - Equipment and supplies Q-111833, Q-118141
Land use C-14540, C-14559, I-89280, I-89303, L-71448, Q-26856, Q-63762, S-10867, S-14078, S-21105, S-37656, S-42250, S-42269, S-63495, S-69992, S-108596, T-63703
Land use - Economic aspects R-89834
Land use - Environmental aspects Q-82428, S-42260
Landfill Q-69264
Landforms A-30031, A-59439, A-90042, C-15768
Landslides A-31879, C-122548
Languages T-12521
Laser profilometry D-15601, G-92169, Q-108260
Laurentide Ice Sheet A-64807, A-66460, A-123404, B-113840
Laurentide Ice Sheet - Flow A-138532
Lava B-45713, B-85111, B-87980, B-107425
Lead mines and mining P-53937
Lead mines and mining - Environmental aspects P-37621
Lead mines and mining - Social aspects P-37621
Lead ores B-83437
Leaves H-140651
Lemmings I-20362
Lichens H-38911, H-51828, H-70378, H-107204, I-87122, J-31437
Light B-108170, Q-15504
Limestone B-92886
Lipid metabolism I-46310

-269-

Literature Y-50938
LNG pipelines - Design and construction Q-53422
Logistics L-21237, L-24562, Q-24448, Q-66583, Q-92362, Q-106100, Q-108472, Q-107902
Louchaux Indians - Legends T-134813
Louchaux Indians - Religion T-134813
Lumbering R-95613
Mackenzie Valley Pipeline I-2933, I-2941, I-2976, Q-2980, Q-2968, Q-3263, Q-5037, Q-6394, Q-23388, T-2399
Mackenzie Valley Pipeline - Design and construction L-11075, M-22660
Mackenzie Valley Pipeline - Economic aspects Q-64025, Q-93408, Q-95940, Q-95586, Q-106100, Q-108715, R-89899, R-93416, R-93475, T-89729, T-106054
Mackenzie Valley Pipeline - Employees Q-108715
Mackenzie Valley Pipeline - Environmental aspects H-25836, J-103721, Q-7978, Q-7986, Q-63410, Q-64025
Mackenzie Valley Pipeline - Social aspects Q-63762, Q-64025, Q-85840, Q-108715, R-89699, R-93475, T-11193, T-63703
Magnatism B-85111
Magnetic anomalies B-138894
Mammals I-46310, I-62022, I-63517, I-107875, I-117277, Q-28798, Q-26700, Q-92223, Q-92428, Q-116777, Q-116785, S-42250
Mammals, Fossil B-60178
Mammoth B-60178
Manpower policy P-88800, Q-116815, T-109258
Maps B-67318, B-109320, C-114111, G-10040, I-62022, I-107875, Q-32085, Q-92126, Q-42250, Q-45877, Q-87530
Marginal Ice Zone Experiment Q-138696
Marine biology D-48560, I-45186, I-107875, I-108628, Q-44504
Marine biology - Trace element content D-105872
Marine ecology B-48518, I-89280, I-88303, I-107875, I-108073, J-11606, J-108090, Q-92002, Q-92096, Q-92215, Q-107808, X-20317
Marine fauna A-108146, G-25526, I-11614, I-89290, I-89303, I-91546, J-108080, Q-25798, Q-29215, Q-108103, Q-118769
Marine fauna, Effect of pollution on Q-92002, Q-92096, Q-118765
Marine flora Q-92070, Q-92219
Marine flora, Effect of pollution on Q-92002, Q-92096
Marine LNG transportation Q-72126, Q-74195, Q-114782, Q-136689
Native peoples

Native peoples - Medical care R-94277
Native peoples - Migration R-77825
Native peoples - Political activity I-115169, Q-138207
Native peoples - Population T-93513, T-109258
Native peoples - Social conditions J-115924, Q-116823, T-93513, T-108258, T-122050
Natural gas - Marketing Q-126152
Natural gas pipes E-61379
Natural gas transportation - Costs Q-54011
Natural gas transportation - Economic aspects Q-136140
Natural gas transportation - Environmental aspects Q-120618
Natural history B-16195, H-137170, W-138177
Natural resources J-105990, N-78514, R-89834, S-69892, T-89907
Nature conservation Q-87769, Q-106895, S-63495, S-118369, S-135534, S-135569
Navigation Q-106894, Q-114650
Nematodes I-52361, I-52434, I-52973, I-64279, I-123242
Neutral stress C-18414, F-7323
Newfoundland Oceans Research and Development Corporation Q-49034
Newspapers V-18953, V-19041
Nitrogen-fixation H-11754
Noise - Environmental aspects I-68721, I-106410, I-107786, I-124575, L-120996
Norman Wells Oilfield Expansion and Pipeline Project I-107780, I-118109, Q-56218, Q-77720, Q-105668, Q-112682, Q-112800, Q-116807, Q-116831, R-140767
Norman Wells Oilfield Expansion and Pipeline Project - Design and construction Q-118117, Q-118125, Q-118133, Q-118141, Q-118176, Q-118184, Q-118206, Q-118800, Q-139629
Norman Wells Oilfield Expansion and Pipeline Project - Economic aspects Q-118539
Norman Wells Oilfield Expansion and Pipeline Project - Environmental aspects I-118214, Q-118117, Q-118125, Q-118133, Q-118141, Q-118176, Q-118184, Q-118206, Q-118800, Q-139629
Northern Canada Power Commission Q-106941
Northern native fashions T-11517
Northern Transportation Company (Canada) L-131326
Northern Yukon Research Programme U-22756
Oxygen-18 ratio
Oil spill cleanup - Environmental aspects
Oil spill cleanup - Equipment and supplies
Oil spill cleanup - Testing
Oil spill detection
Oil spill dispersants - Testing
Oil spill dispersants - Toxicity - Testing
Oil spill dispersants
Oil spill movement
Oil spill prevention
Oil spills
Oil spills on lakes
Oil spills on land
Oil spills on land - Environmental aspects
Oil spills on rivers
Oil well drilling
Oil well drilling - Environmental aspects
Oil well drilling rigs
Oil wells
Optical properties
Oral history
Ordovician period
Ore-deposits
Ores - Sampling and estimation
Outdoor recreation
Oxygen-18 ratio of ice
Oxygen-18 ratio of permafrost
Oxygen-18 ratio of soil moisture
Pack ice
Pack ice - Strength
Pack ice - Velocity
Paleobotany
Paleoclimatology
Paleochronology
Paleoecology
Paleography
Paleohydrology
Paleomagnetism
Paleontology
Palynology
Parasites
Passive microwave remote sensing
Patterned ground
Pavements - Design and construction
Pelicans
Pegmatite
Pelicans
Pelecsuchia
Peat
Penguins
Permafrost
Permafrost - Deformation
Permafrost - Distribution
Permafrost - Drilling
Permafrost - Geophysical exploration
Pack ice
Pack ice - Movement
Pack ice strength
Paleomagnetism
Paleontology
Paleoecology
Paleography
Paleohydrology
Paleomagnetism
Paleontology
Palynology
Parasites
Passive microwave remote sensing
Patterned ground
Pavements - Design and construction
Photography in the natural sciences
I-118478
Photography in the social sciences
T-110767
Physical geography
A-30021, A-90042
J-16721, J-80001, J-90220, J-105899,
Q-87769, Q-92207, Q-132353
Phytoplankton
D-43850, H-1622, H-55239,
H-83200, I-45195, I-16527, P-19615, Q-15504
Pierre Radisson (Ship)
L-54020
Pipe Point Mines Limited
P-37621, P-91219, T-106178
Pingo's
C-21988, C-75965, C-120359, C-121568,
C-136433, C-136441, C-136450, D-73130,
F-7323, S-135519, W-44610
Pipelines
C-61379, L-112852, Q-42242,
Q-116623, Q-138525
Pipelines - Design and construction
M-56928, Q-116777, Q-116793
Pipelines - Environmental aspects
Q-105589
Pipelines - Social aspects
Q-105589
Pitchblende
D-122840
Plankton
D-43877, F-108651, F-88290,
I-89303, I-108049, I-108073, I-108081,
I-108235, I-117277, J-73288, Q-15555,
Q-26700, Q-118008
Plant anatomy
H-140285
Plant distribution
A-90042, H-3778, H-23841,
H-30155, H-38911, H-51233, H-51346,
H-51411, H-70360, H-70378, H-107044,
H-107220, H-113212, H-139710, H-139859,
I-117277
Plant ecology
F-88382, F-122718, H-140285
Plant growth
H-30180, H-44377, H-86261,
H-138959, H-140295
Plant nutrition
H-30147, H-140651
Plant physiology
H-140285, H-140651
Plant reproduction
H-113212
Plant taxonomy
C-14111, C-3778, H-4421,
H-23882, H-70360, H-106313, H-107204,
H-107220
Plant-soil relationships
C-17373, C-11411,
H-38911, H-44377, H-106313, H-122718,
H-140295
Plant-water relationships
H-85200
Plants - Toxicity
H-113557
Plants and climate
H-30188, H-44385,
H-86164, H-86245, H-86293
Plants and radiation
J-31437
Plants, Edible
H-113557
Plate tectonics
B-52876
Pleistocene epoch
A-138932, B-15085,
B-38873, B-52574, B-52582, B-57860, B-79790,
B-79812, B-120278, C-138662, U-48018,
U-59366, U-62893, U-74124, U-84352, U-89079
Pliocene epoch
B-91782
Polar bears
I-30332, I-107892, I-139742,
L-120596
<table>
<thead>
<tr>
<th>Content</th>
<th>Page 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedimentary rocks</td>
<td>G-108340, G-123102, Q-116220</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary rocks - Structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary rocks - Structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
<tr>
<td>Sedimentary rocks - Analysis</td>
<td>B-14060</td>
</tr>
<tr>
<td>Sedimentary rocks - Composition</td>
<td>B-74470</td>
</tr>
<tr>
<td>Sedimentary structures</td>
<td>B-141530, B-439759, B-52876, B-57627, B-7444, B-75489</td>
</tr>
</tbody>
</table>
Water - Sulphur content F-94528
Water - Temperature Q-118168
Water level Q-139696
Water masses D-108154, Q-92215
Water pH I-91545
Water pollution A-81175, I-34665, I-91545, P-63992, Q-12855, Q-13928, Q-118796
Water quality F-108661, H-85200, I-108049, I-106235, J-16527, J-73288, P-19616, P-19623, Q-12855, Q-25788, Q-26856, Q-118177, Q-118125
Water resources F-28711, F-90474, F-88307, F-88374, F-128040, N-79138, R-39462, R-52590
Water-supply F-7137, S-45977
Water-supply engineering N-56480, N-56928, N-56936
Watershed management R-39462, R-52590
Weather forecasting E-11630, E-64467, E-126403
Weathering of petroleum Q-87572, Q-115711
Welding Q-126152
Whales Q-26700, Q-44504, U-123353
Whaling I-9784, N-25860, Q-43990, T-15512, V-24155, V-57070, V-85970
White spruce C-125270, H-44377
White whale I-9784, I-43915, I-43923, I-44006, I-47210, I-73051, I-92177, I-107751, I-107786, I-10780, I-119214, Q-26856, Q-26484, Q-107021
Winter roads - Environmental aspects I-135623
Wolverines I-52507
Wolves I-93165, I-135631
Work camps Q-96342
Work camps - Environmental aspects Q-118117
Work camps - Social aspects T-106127
Zinc mines and mining P-37621
Zinc mines and mining - Environmental aspects P-37621
Zinc mines and mining - Social aspects P-37621
Zinc ores B-83437
Zircon B-106186, B-107385
Zoology I-38504, J-16721, J-89001, 0-3280, W-106267
Zirconium 0-83437
Zirconium and mining P-37621
Winter resources F-83740, F-88307, F-88374.
Winter architecture 1-11686, 1-21300, 1-66640, 1-107000, 1-107786, 1-10780, 1-117280, 1-119214, Q-26856, Q-26484, Q-107021
Winter weather forecasting D-108189, D-108243
Winter winds D-92134, D-92142, G-70211, G-70335
Wind erosion B-120251
Winds 0-25801, D-108169, D-108243, D-128112, E-8737, E-15458, E-92061, E-128403, G-19305, G-25565, G-25665, G-26670, G-92940, G-123285, Q-24520, Q-80462, Q-87556, Q-96377, Q-107930, Q-115746
Winds - Forecasting D-108189, D-108243
Winds - Measurement D-92134, D-92142, G-70211, G-70335
Darnley Bay region, N.W.T.  R-75450
Dawson, Y.T.  I-115169
Dawson region, Y.T.  B-38873, B-81698,

Dealy Island, N.W.T.  U-73032
Dease Arm region, N.W.T.  B-81701
Dempster Corridor, N.W.T.  F-20664, Q-28966
Dempster Corridor, N.W.T./Y.T.  L-36242, Q-26956, Q-118971, Q-118940
Dempster Corridor, Y.T.  C-11411

Dempster Highway, N.W.T.  C-38830, Q-17019
Dolphin and Union Strait, N.W.T.  A-108006, Q-97436, Q-126152
Dolphin and Union Strait region, N.W.T.  A-108006

Drygesse Lake, N.W.T.  I-54259
Eagle Lake (51 00 N, 113 19 W), Alberta  Q-21296, Q-26476
Eagle Plain, Y.T.  H-96295, H-96253, H-96261
Eagle River, Y.T.  C-24198, C-122521
Edmonton, Alberta  R-77224

Ellesmera Island, N.W.T.  S-59447
Elliott, Alaska  H-30163

eEskimo Lakes, N.W.T.  H-11754
Eskimo Lakes region, N.W.T.  H-51250, S-21105, S-42269
Faber Lake region, N.W.T.  B-14435
Fairbanks region, Alaska  B-120728, U-62693

Firth River, Y.T.  S-123534, W-120570
Firth River region, Y.T.  I-79456, S-63495
Fisherman Lake region, N.W.T.  B-86150
Flat River, N.W.T.  P-19623

Fort Franklin, N.W.T.  Q-116777, Q-116807, R-123525
Fort Good Hope, N.W.T.  Q-116777, Q-116807, R-123528
Fort Good Hope region, N.W.T.  F-20664, T-43974, T-105830, V-69256

Fort Liard, N.W.T.  R-84290
Fort McPherson, N.W.T.  E-138126, I-115169, Q-116785, Q-116807, R-108464, R-123528, V-76503
Fort McPherson region, N.W.T.  I-133760
Fort Nelson River, British Columbia  F-88390
Fort Norman, N.W.T.  C-28029, Q-116777,
<table>
<thead>
<tr>
<th>Name</th>
<th>Latitude/Longitude</th>
<th>Index Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hans Island, N.W.T.</td>
<td>Q-116807, R-113192, R-123528, X-33693</td>
<td>Q-137723</td>
<td></td>
</tr>
<tr>
<td>Harris River, N.W.T.</td>
<td>F-108561, G-82350</td>
<td>I-15423</td>
<td></td>
</tr>
<tr>
<td>Hay River, N.W.T.</td>
<td>G-26476, G-122483</td>
<td>Q-116777, Q-116807, T-105961</td>
<td></td>
</tr>
<tr>
<td>Hay River (town), N.W.T.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hay River region, N.W.T.</td>
<td>B-6777, C-14832, I-46310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearne Lake, N.W.T.</td>
<td>B-3735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Lake region, N.W.T.</td>
<td>H-3778, I-38814</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearne Island, Y.T.</td>
<td>A-12840, H-107212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hill Island Lake region, N.W.T.</td>
<td>B-73881</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holman, N.W.T.</td>
<td>Q-9873, Q-8881, Q-116807, R-108464, R-125928, T-125048, T-24171, T-35602, T-108455, T-123168, T-125022</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hooper Island, N.W.T.</td>
<td>C-123862</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horton River, N.W.T.</td>
<td>B-67334</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hottah Lake region, N.W.T.</td>
<td>B-14435, B-111848</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Howards Pass, N.W.T./Y.T.</td>
<td>P-115828</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hudson Bay</td>
<td>I-119377, Q-13021, Q-114650, V-24155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hudson Strait, N.W.T.</td>
<td>Q-114650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hutchison Bay, N.W.T.</td>
<td>I-117250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Igloolik, N.W.T.</td>
<td>Q-116807, S-45977</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illisarvik Lake, N.W.T.</td>
<td>C-121649, C-121720</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imperial River region, N.W.T.</td>
<td>B-123331</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indin Lake region, N.W.T.</td>
<td>B-58718</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inuvik, N.W.T.</td>
<td>C-39316, C-112321, C-121991, E-39594, E-138126, F-89808, H-30163, H-30180, H-30350, I-38890, I-91693, M-39160, M-56928, M-114170, Q-8873, Q-8881, Q-30120, Q-30171, Q-88862, Q-106828, Q-108498, Q-116875, Q-116807, R-108464, R-123528, S-45977, S-139513, T-16121, T-79588</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inuvik region, N.W.T.</td>
<td>C-50610, C-121835, C-122564, C-125270, E-39594, E-139327, H-44377, H-44385, H-51284, H-68765, L-17949, R-81405</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Itchen Lake, N.W.T.</td>
<td>I-25852</td>
<td></td>
<td></td>
</tr>
<tr>
<td>James Bay region, Quebec</td>
<td>M-22860, T-72079</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jean-Marie River (settlement), N.W.T.</td>
<td>Q-116777</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June Lake region, N.W.T.</td>
<td>B-105562</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaktovik, Alaska</td>
<td>I-115169</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keith Island, N.W.T.</td>
<td>B-62111</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kennedy Channel region, N.W.T.</td>
<td>Q-137723</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Richards Island, N.W.T. B-39730, B-47945, B-48840, B-73709, B-111430, N-75396
Richardson Mountains, Y.T. B-124800, H-96245, H-96253, H-137910, I-96210
Rock River (67 18 N, 137 06 W), Y.T. U-122190
Rocky Mountains, Alberta H-38911
Sabine Peninsula, N.W.T. Q-12990, Q-1328
Sachs Harbour, N.W.T. T-108456
Sachs Harbour (settlement), N.W.T. A-12840, L-12096, Q-9873, Q-9881, Q-116807, R-108456, R-123528
Saskatchewan I-123242
Saskatchewan, Northern F-128040, J-58882
Scandinavia 1-119377
Scotland Q-74192
Sadgwick, Mount, Y.T. B-111988
Sekwi Mountain, N.W.T. B-109562
Selwyn Mountains, N.W.T. B-135399
Selwyn Mountains, Y.T. B-64866, B-74039, B-107603
Shallow Bay (68 50 N, 135 40 W), N.W.T. C-15741, C-61336
Shingle Point, Y.T. L-29955
Sibiri, U.S.S.R. I-119377, U-28622
Simpson Islands, N.W.T. B-51063
Slave Delta, N.W.T. F-88323
Slave River, N.W.T. D-80420, I-31909, N-79138
Slave River region, N.W.T. C-14532, F-88323, N-79138, V-65293
Smoking Hills, N.W.T. H-85200, H-140651, I-91545, I-112178, J-79197
Somerset Island, N.W.T. I-52361, I-52434
South Nahanni River, N.W.T. W-19020, W-46230
South Nahanni River region, N.W.T. B-64666, B-81752, H-51234, W-51780, W-118923
St. Lawrence, Gulf of, Canada G-123285
St. Lawrence River, Canada/U.S. L-117951
Stefansson Island, N.W.T. I-117277
Stokes Point, Y.T. Q-138507
Subarctic regions I-46310
Summer's Harbour, N.W.T. Q-53325, Q-54038
Summit Lake (62 21 N, 129 21 W) region, Y.T. B-14370
Sunn Hills, Alberta Q-63576
Taltson Lake region, N.W.T. B-138660
Thlewcy Lake region, N.W.T. B-81612
Thomsen River region, N.W.T.  A-773741, F-121622
Trout Lake (68 49 N, 138 44 W), Y.T.  I-62537
Tuft Point watera. N.W.T.  I-107786, I-108049
Tuktoyaktuk, N.W.T.  A-19818, C-59374, C-111783, C-139386, 6-115883, I-126202, S-21105, 5-42259, 5-135918
Tuktoyaktuk Peninmula, N.W.T.  8-39934, 8-12868, 8-112876, 8-52884, 0-109932, C-15180, C-01989, C-21907, C-75965, C-120359, C-122700, F-7323, 1-44681, 1-117250, 5-58447, W-44610
Tuktoyaktuk Peninsula watera, N.W.T.  G-18627, I-44687, I-106892, I-124745, J-16233, Q-43838
Tuktoyaktuk region, N.W.T.  B-10932, C-15180, C-21889, C-19587, C-75965, C-120356, C-122700, F-7323, I-44687, I-117250, S-59447, W-44610
Tungsten, N.W.T.  R-77585
Tungsten region, N.W.T.  A-50194, H-66550
Tununuk, N.W.T.  C-63673
Tununuk Point, N.W.T.  L-29947, L-29955, Q-30120, Q-30171
Tuortok Lake region, N.W.T.  B-64785
Union Island, N.W.T.  B-122840
Victoria Island (71 00 N, 110 00 W) waters, N.W.T.  S-69892
Virginia Falls region, N.W.T.  B-81515
Viscount Melville Sound, N.W.T.  D-92134, D-94552, G-92169, I-41688, I-107042, I-117277, Q-92215
Viscount Melville Sound region, N.W.T.  I-117277
Wager Bay, N.W.T.  5-59447
Waterloo, Ontario  Q-80462, Q-107980
Wernecke Mountains, Y.T.  B-87980
Whitehorse, Y.T.  Q-91464, Q-116807, R-123528
Willow Creek region, Y.T.  H-96245, H-96253
Wilson, N.W.T.  B-81752
Wise Bay, N.W.T.  I-107077
Wollaston Peninsula, N.W.T.  A-138932
Wood Buffalo National Park, Alberta/N.W.T.  I-93165
Yellowknife, N.W.T.  B-4693, J-7129, M-56936, P-16080, P-25828, P-63592, P-94714, P-94730, P-84757, F-94777, 1-74885, 5-26450, 1-11677, Q-77224, R-109929, R-123528, S-14079, S-78379, S-37243, T-122090, T-131458
Yellowknife River, N.W.T.  V-55328
Yukon Highway, Alaska  C-38830
Yukon-Prudhom Road, Alaska  L-65204
Zama, Alberta  Q-105686, Q-119539, Q-139629
Zed Creek, N.W.T.  F-108561
Abdelnour, R. Q-1678, Q-116220  
Abrahams, G. R-94234  
Acreman, J. Q-107848  
Acres Consulting Services Limited Q-108022  
Acres-Santa Fe Incorporated G-108308  
Acres/Santa Fe Pomeroy Arctic Services Q-23345  
Acton, D.F. C-14559  
Adam, K.N. L-103470  
Adams, C.N. H-140651  
Adams, W.A. Q-15504  
Adams, W.J. I-119377  
Addison (W.D.) and Associates V-18619  
Addison, E.M. I-152907  
Addison, W.D. V-18619  
Addison, W.E. V-18619  
Aird, W.J. A-12840  
Aitken, J.D. B-16390, B-51497, B-82103, B-87971, B-107425  
Albany I-115576  
Alaska Highway Pipeline Panel L-19593, Q-25410, Q-26956, Q-29661, Q-118931, Q-118940  
Alaskan Arctic Gas Study Limited F-50474  
Alberta Gas Trunk Line Company Limited R-95818  
Alberta University, Boreal Institute for Northern Studies I-93165, Q-24481, Q-98702  
Alberta University, Dept. of Zoology I-113476  
Albery, Pullar, Dickson and Associates G-92169  
Alexander, K. H-106313  
Allgeire, C.J. B-107395  
Allen, A.A. Q-485  
Allen, D.L. I-117250  
Allen, L. I-107000, I-107867  
Allen, V. C-121509  
Allison, I. B-49980, P-94730  
Allison, L. F-88374  
Alliston, W.G. I-90018, I-90034, I-107026, I-115576  
Alllyn, F.B. Q-116351  
Alllyn, N. G-55425, G-122459  
Alllyn, N.F.B. Q-126853  
American Association of Cost Engineers, Canadian Sections M-22560  
Amoco Canada Petroleum Company Ltd. G-24457  
Anders, G. R-94250, R-94277  
Andersen, R. U-28622  
Anderson, J.C. F-82180, F-82201, G-82350  
Anderson, R.G. B-64866, B-81752, B-122734  
Anderson, R.V. I-52973  
Andreashek, D. I-30333, I-107632  
Annesley, I.R. B-138886  
Anthony, G. V-18619  
Aquatic Environments Limited F-50474, I-10879, I-58602, I-108049, J-73288, Q-11817, Q-118125, Q-118168  
Aquilina, A.P. V-115860  
Archibald, R. I-30325  
ARCO Alaska, Inc. I-115576  
Arctic Canada Limited G-41114, G-1678, Q-26760, Q-26778, Q-107956  
Arctic Institute of North America X-30317  
Arctic Laboratories Limited B-108162, B-108170, D-105872, D-107085, D-108197, D-113077, D-136489, I-108111, Q-107107, Q-107115, Q-107948, Q-119711  
Arctic Pilot Project (Canada) I-107816  
Arctic Science and Technology Information System Q-113395  
Arctic Sciences Limited D-92134, D-92142, D-108154, D-110369, Q-87556, Q-87580, Q-89281  
ARESCO Ltd. U-87590  
Armstrong, R.L. B-85103  
Arnold, C.D. U-5711, U-53023, U-87335, U-138363, V-20095  
Arnold, C.L. Q-127337  
Arsenault, L.D. G-30040, G-69663, G-69671, G-81668  
Art Pearsons & Associates I-96237  
Asch, M.I. V-66078  
Associated Engineering Services Ltd. R-89834  
Atlas, R.M. I-4162  
Audretsch, A. B-124800  
Auld, R.G. M-19461  
Baedsgaard, H. B-85111  
Bachmayer, G.W. R-5940  
Badham, J.P.N. B-16810, B-72311  
Badone, E. U-22519  
Baird, W.F. D-108189  
Baner, E.W. B-47910  
Bancroft, A.W.F. I-96903  
Banke, E. G-92118  
Banke, E.G. G-122416  
Banner, J.A. C-28029, X-33693
AUTHOR INDEX

Baragar, W.R.A. B-117412
Bardoux, M.V. B-138886
Barichello, N. I-135640
Barnes, J.R. Q-127256
Barrie, M. T-12521, T-77380
Barrie, J.V. D-105066
Barrodale Computing Services Ltd. C-136433
Barry, P.S. Q-6351, Q-6360, V-32816
Barry, S.?., I-101042
Barry, T.W. 1-42250, 1-310, 7-29963, 1-101042,
Barrett, R. 0-25704
Basham, F.C. 6-89702
Baynes, R. M. T-77380
Bazin Consultants Ltd. I-11886, I-31208,
Beauforest Environmental Support Services Ltd. L-108413, T-108456
Beauforest Gas Project F-43869, F-43899
Beauforest Sea Alliance Q-112712, Q-112720
Beauforest-Delta Oil Project Limited Q-42277
Beche, B.F. B-52574, U-15369, U-22518,
Belknap, J. Q-26450
Bell, J.B. F-103365
Bell, J.S. N-84510
Bell, R.T. B-111988
Bellegay, R.D. D-66419
Bengeyfield, W. D-43850
Benoit, L. W-118823
Berch, J.G. G-72133
Berger, T.R. Q-64025
Bergman, K.M. Q-127337
Bernard, D.R. I-121100
Bernard, M.F. Q-124184
Bernier, L.M.J. I-117277
Berry, W.O. E-15458
Berube, Y. P-63592
Berzins, W. Q-127299
Betsa, J.D. I-108049
Betteridge, J.P. L-122637
Bingham, D.K. B-58076
Bingham, J. W-19011

Birch, J.R. Q-87556
Bird and Marine Limited B-6777
Bird, C.D. H-4421, H-51829, H-70378
Biedee, J. I-91537
Bissett, D. R-93467
Black, R.A. I-123242
Black, R.A. H-51284
Bliss, L.C. H-30163, H-30198, H-30341,
H-51284, H-7978, H-7986, H-30120, H-30139
Bockstoe, J.R. V-57070
Bohnec, R.B. T-80403
Boles, B. I-52507
Bolton, L. A-137375
Bond, W.A. I-109844
Bone, R.W. R-111132, R-140767
Bonn, W. Q-108634
Bonnichsen, R. U-62693
Boone, D.J. Q-116084
Bornhold, B.D. D-15474
Bosted, G. Q-107948
Bostock, M.H. B-67300, B-73881, B-81710,
B-122890, B-138860
Boston, N.E.J. Q-122535
Bowles, K. T-105643, T-105651
Bowling, S.A. B-111848
Boyd, A.D. Q-83876
Boyd, J.W. C-101524, H-100064
Boyd, W.L. C-101524, H-100064
BP Alaska Exploration, Inc. I-115576
Brache, J. B-52876
Brakel, J. Q-116190, Q-130300
Brakel, W.D. T-15512
Brannan, D.R. B-73709
Brassard, G.R. H-102059
Brates, K. Q-87602
Brazda, A.R. I-101974
Bredin, T.F. A-98655
Bregman, N. U-22519
Brideaux, W.W. B-47945, B-48840
Brink-Kjaer, O. D-108243
British Columbia Research, Division of Applied Biology Q-13021
Brook, G.A. F-37850
Brooks, D.B. Q-122157
Brown (R.J.) and Associates Q-24520, Q-87599
Brown, I.R. T-93513
Brown, R.J.E. C-83194, C-99376
Brown, S. Q-126321
Brown, R.P. Q-84123
Brown, P. Q-118201
Bruce, J.C. Q-116254, Q-126438, Q-126853
Brouwer, F. V-65870
Brunton, D.F. H-70360
Bryant, W.J. Q-12955
Buttow, D. M-54240
Buist, I. Q-120669
Buist, I.A. Q-71366, Q-80470, Q-80853
Bujak, J.P. B-91782, Q-112445
Bunch, J.N. Q-11657
Burden Van Dine, M. T-12521, T-77380
Burgers, A. G-130206
Burgess, M. C-121509
Burgess, N.C. Q-127400
Burnet, P. Q-138207
Burns, B. I-108219
Burns, B.M. E-18040
Burns, G.B. I-79812
Burns, R.A. F-80330
Burwash, R.A. B-51063, B-67849
Butler, D.R. A-33537
Butt, K.A. G-29254, G-68647, G-130435
Byers, S.C. I-107034
Calvert, W. I-30333, I-58769, I-89478, I-93815, I-107018, I-107816, I-107832
Cameron, E.M. B-58688
Campbell, F.H.A. B-88005, B-111724
Campbell, F.R. J-58882
Campbell, I. U-12041
Canada, O-106852, T-9903, T-10456, T-11665, T-11979, T-13323, T-13927
Canada Marine Engineering Ltd. G-108359, G-108375, Q-108405
Canada Steamship Lines Inc. L-117951
Canada, Air Transportation Administration, Western Region, Civil Aviation Branch L-13714
Canada, Arctic Land Use Research Program I-62022, J-73288, L-29947, L-29985, N-20710, N-42480, Q-20702, Q-88838, Q-88862, Q-88010, Q-109784
Canada, Arctic Transportation Agency L-11975
Canada, Atmospheric Environment Service G-136822
Canada, Atmospheric Environment Service, Central Services Directorate E-18040
Canada, Beaufort Sea Project D-1074, Q-11720, Q-18775, Q-32220
Canada, Beaufort Weather and Ice Office E-126403
Canada, Dept. of Agriculture C-14559
Canada, Dept. of Communications Q-106879
Canada, Dept. of External Affairs Q-106917
Canada, Dept. of Fisheries and Oceans Q-106887
Canada, Dept. of Fisheries and Oceans, Arctic Research Directors Committee T-124575
Canada, Dept. of Fisheries and Oceans, Freshwater Institute Q-108537
Canada, Dept. of Public Works, Western Region, Design and Construction Branch, Marine Directorate L-27472
Canada, Dept. of Regional Economic Expansion Q-106852
Canada, DIAND B-4510, B-6777, C-14559, D-113069, D-113077, I-107000, I-107018, I-107867, I-117250, Q-24248, Q-105895, Q-106844, Q-112632, R-105546, S-10987, S-14079, S-21106, S-42280, T-9903, T-10465, T-11665, T-13323, T-13927, T-95974, T-105627
Canada, DIAND, Data Management Section T-105597, T-105600
Canada, DIAND, Economic Staff Group T-95842
Canada, DIAND, Steering Committee on Dome/CANMAR Operations Q-16470, Q-23221, Q-23248, Q-23256
Canada, DIAND, Steering Committee on Dome/CANMAR Operations, Environmental Analysis Sub-Committee Q-16489
Canada, DIAND, Steering Committee on Dome/CANMAR Operations, Social, Economic, Cultural Review Sub-Committee Q-16497
Canada, DIAND, Steering Committee on Dome/CANMAR Operations, Technical Sub-Committee Q-16500
Canada, Ecological Land Classification and Evaluation Division J-16721
Canada, Employment and Immigration Canada (Commission) Q-106909
Canada, Enviornment Canada C-114111, H-106313, Q-106895
Canada, Environmental-Social Program, Northern Pipelines Q-93599, R-93416, T-93513, T-95842
Canada, EPS I-25844, Q-108022
Canada, EPS, Environmental Emergency Branch, Research and Development Division Q-18309, Q-69264
Canada, EPS, Northwest Region, Environmental Emergency Branch Q-17485
Canada, EPS, Northwest Region, N.W.T. District Office I-25852
Canada, Federal Environmental Assessment Review
I
<table>
<thead>
<tr>
<th>Author Name</th>
<th>Phone Number</th>
<th>Primary Company</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. V. Erickson</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>R. B. Fuggle</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>J. L. McEwen</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>J. R. Norbury</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>L. P. R. Oakey</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>W. H. R. Pendse</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>R. P. R. Reid</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>R. K. S. Smith</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>S. M. Steen</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>R. D. Thorne</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>R. L. Wilson</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>R. J. Young</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
<tr>
<td>T. R. Ziegler</td>
<td>604-962-4121</td>
<td>EERC</td>
<td></td>
</tr>
</tbody>
</table>


- **Federal Environmental Assessment Review Office**
- **Seminar on the Beaufort Sea/Mackenzie Delta Development Plan, November 13, 1980**

**Q-298** - **AUTHOR INDEX**

Feuerherdt, W. R. | E-8737
Findlay, B. F. | E-15598
Findlay, D. C. | E-111988
Fingas, M. F. | Q-132519
Fink, R. P. | Q-92088
Finn, W. D. L. | O-116157
Finnis, R. S. | V-4430, V-45225
Fisher, L. G. | I-127043
Fissell, D. B. | D-92142, D-113069, Q-87556
Fitzgerald, G. R. | B-15368, B-57860
Fitzpatrick, J. | Q-127272
Flater, W. A. | Q-107830
Fleck, E. S. | I-135631
Fletcher, E. B. | C-18414
Flouquet, A. | V-67164
Fluor Canada Ltd. | F-43893
Foerster, H. | R-52980
Foothills Pipe Lines (North Yukon) Ltd. | Q-31399
Foothills Pipe Lines (South Yukon) Ltd. | H-96614, H-96245
Forbes, D. L. | A-30031, A-74446
Ford, D. C. | F-37850
Ford, J. | I-107786
Ford, J. K. B. | I-107840
Forrest, D. | Q-117919
Forth, T. G. | T-93519
Foster, C. R. | Q-87580, Q-89281
Foster, T. | P-115428, Q-23230, Q-85683
Foundation Company of Canada Limited | Q-24449
Fraker, P. N. | I-47210, I-92177, I-107791
Fraker, R. N. | I-58838
Frennon, P. B. | C-121720
Frederking, R. | G-12753, G-129437
Frederking, R. M. W. | G-82189, G-88866, G-122378, G-122475, G-123102
Freedman, W. | Q-51306
French, H. M. | A-73747, C-6858, C-12217, C-125950, F-125622, F-125630, F-20702, G-60151, G-88838, G-109754
Frideres, J. S. | T-72079
<table>
<thead>
<tr>
<th>Author Name</th>
<th>Index Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frith, R.A.</td>
<td>B-58700, B-58718, B-124826</td>
</tr>
<tr>
<td>Frittsaion, F.</td>
<td>I-44687</td>
</tr>
<tr>
<td>Fritz, P.</td>
<td>C-15156, C-121649</td>
</tr>
<tr>
<td>Fritz, W.H.</td>
<td>B-566, B-64653, B-73849</td>
</tr>
<tr>
<td>Fryer, B.J.</td>
<td>B-14060</td>
</tr>
<tr>
<td>Fuglem, M.D.</td>
<td>Q-19550</td>
</tr>
<tr>
<td>Fujino, K.</td>
<td>C-111082, C-139386, G-115983</td>
</tr>
<tr>
<td>Fujimori, Y.</td>
<td>E-139327</td>
</tr>
<tr>
<td>Fukuda, M.</td>
<td>C-111082</td>
</tr>
<tr>
<td>Fuller, W.A.</td>
<td>I-32212, I-100587</td>
</tr>
<tr>
<td>Fung, D.</td>
<td>Q-118546</td>
</tr>
<tr>
<td>Fyson, W.K.</td>
<td>B-40282, B-80942</td>
</tr>
<tr>
<td>Gagne, R.M.</td>
<td>F-80303</td>
</tr>
<tr>
<td>Gaia, K.P.</td>
<td>Q-127256</td>
</tr>
<tr>
<td>Gajtani, M.</td>
<td>C-121711</td>
</tr>
<tr>
<td>Gallagher, J.P.</td>
<td>Q-108502</td>
</tr>
<tr>
<td>Gamberg, J.B.</td>
<td>G-69647</td>
</tr>
<tr>
<td>Gamble, D.J.</td>
<td>Q-5037</td>
</tr>
<tr>
<td>Gandhi, S.S.</td>
<td>B-74527, B-88706, B-92875, B-92983, B-122840</td>
</tr>
<tr>
<td>Gardner, P.M.</td>
<td>T-63657</td>
</tr>
<tr>
<td>Garfield, D.E.</td>
<td>V-13951</td>
</tr>
<tr>
<td>Garrett, D.H.</td>
<td>Q-18783, Q-19321</td>
</tr>
<tr>
<td>Garrett, J.F.</td>
<td>D-4766</td>
</tr>
<tr>
<td>Gault, J.T.</td>
<td>R-89273</td>
</tr>
<tr>
<td>Geddes, F.E.</td>
<td>I-118214</td>
</tr>
<tr>
<td>Geldsetzer, H.J.</td>
<td>B-88021</td>
</tr>
<tr>
<td>Gell, A.W.</td>
<td>G-82350</td>
</tr>
<tr>
<td>Gell, W.A.</td>
<td>C-15180, C-21988, C-21997</td>
</tr>
<tr>
<td>Gemini North Ltd.</td>
<td>G-95761, G-95958, R-95818, T-95974, T-105627</td>
</tr>
<tr>
<td>Geomarine Associates Ltd.</td>
<td>C-136441</td>
</tr>
<tr>
<td>Geraci, J.R.</td>
<td>I-52450, I-54968, Q-11592, T-24171</td>
</tr>
<tr>
<td>Gerein, H.J.F.</td>
<td>S-45977</td>
</tr>
<tr>
<td>Geurts, M.A.</td>
<td>A-113859, H-112941</td>
</tr>
<tr>
<td>Geurts, M.A.</td>
<td>A-64807</td>
</tr>
<tr>
<td>Gibb, R.A.</td>
<td>B-87827</td>
</tr>
<tr>
<td>Gibbins, W.A.</td>
<td>P-45691</td>
</tr>
<tr>
<td>Gill, D.</td>
<td>C-27987, H-102199, I-63517, N-6238, N-7277</td>
</tr>
<tr>
<td>Gillan, J.G.</td>
<td>T-104388</td>
</tr>
<tr>
<td>Gilmour, J.</td>
<td>R-136271</td>
</tr>
<tr>
<td>Giovando, L.F.</td>
<td>D-74969</td>
</tr>
<tr>
<td>Giuliani, M.</td>
<td>L-112852</td>
</tr>
<tr>
<td>Gladwell, R.W.</td>
<td>G-25739, G-41106, G-70327, G-83470</td>
</tr>
<tr>
<td>Glassford, R.G.</td>
<td>T-15121</td>
</tr>
<tr>
<td>Gleadow, J.</td>
<td>Q-127400</td>
</tr>
<tr>
<td>Global Marine Inc.</td>
<td>G-25577</td>
</tr>
<tr>
<td>Godwin, C.I.</td>
<td>B-74055</td>
</tr>
<tr>
<td>Gaff, S.P.</td>
<td>B-45719, B-85111</td>
</tr>
<tr>
<td>Golder, Brauner and Associates Ltd.</td>
<td>B-21245</td>
</tr>
<tr>
<td>Goliger, G.</td>
<td>M-73166</td>
</tr>
<tr>
<td>Golke, W.R.</td>
<td>N-20710</td>
</tr>
<tr>
<td>Gallop, M.A.</td>
<td>I-50822</td>
</tr>
<tr>
<td>Goodfellow, W.D.</td>
<td>B-60281, B-74470, B-74489</td>
</tr>
<tr>
<td>Goodman, M.A.</td>
<td>C-121959, C-138614, Q-138806</td>
</tr>
<tr>
<td>Goodman, R.H.</td>
<td>Q-132619</td>
</tr>
<tr>
<td>Goodwin, C.R.</td>
<td>Q-113395</td>
</tr>
<tr>
<td>Goodwin, J.A.</td>
<td>P-94749</td>
</tr>
<tr>
<td>Goodwin, R.J.</td>
<td>Q-87564</td>
</tr>
<tr>
<td>Gordey, S.P.</td>
<td>B-14370, B-64866, B-74039</td>
</tr>
<tr>
<td>Gordon, B.C.</td>
<td>U-102717, U-124036</td>
</tr>
<tr>
<td>Gordon, M.P.</td>
<td>B-120278</td>
</tr>
<tr>
<td>Goski, B.C.</td>
<td>H-23841</td>
</tr>
<tr>
<td>Gotthardt, R.</td>
<td>U-122190</td>
</tr>
<tr>
<td>Gottlieb, L.D.</td>
<td>H-113212</td>
</tr>
<tr>
<td>Gough, D.I.</td>
<td>M-94510</td>
</tr>
<tr>
<td>Greig, E.H.</td>
<td>J-11604</td>
</tr>
<tr>
<td>Grantz, A.</td>
<td>Q-44920</td>
</tr>
<tr>
<td>Gray, A.L.</td>
<td>G-68663, G-69671, G-81868, Q-124192</td>
</tr>
<tr>
<td>Gray, D.M.</td>
<td>C-63673</td>
</tr>
<tr>
<td>Gray, L.</td>
<td>G-30040</td>
</tr>
<tr>
<td>Gray, P.A.</td>
<td>L-112530</td>
</tr>
<tr>
<td>Gray, R.B.</td>
<td>G-30040</td>
</tr>
<tr>
<td>Green, R.</td>
<td>J-73288</td>
</tr>
<tr>
<td>Green, R.H.</td>
<td>I-38598, J-73288</td>
</tr>
<tr>
<td>Greene, D.F.</td>
<td>C-125270</td>
</tr>
<tr>
<td>Gregory, A.F.</td>
<td>A-103683</td>
</tr>
<tr>
<td>Graisman, P.</td>
<td>D-108600</td>
</tr>
<tr>
<td>Griffiths, W.B.</td>
<td>I-107077</td>
</tr>
<tr>
<td>Grotzinger, J.</td>
<td>B-73911</td>
</tr>
<tr>
<td>Grotzinger, J.P.</td>
<td>B-81540, B-115568</td>
</tr>
<tr>
<td>Grover, B.</td>
<td>N-79138</td>
</tr>
<tr>
<td>Grodke, N.E.</td>
<td>H-140295</td>
</tr>
<tr>
<td>Guaitieri, A.R.</td>
<td>V-55379</td>
</tr>
<tr>
<td>Guay, F.</td>
<td>A-64807, B-81874</td>
</tr>
<tr>
<td>Gullbault, J.P.</td>
<td>B-134287</td>
</tr>
<tr>
<td>Name</td>
<td>Page Numbers</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Johnson, H.O.</td>
<td>Q-108057</td>
</tr>
<tr>
<td>Jakimchuk (R.D.)</td>
<td>Management Associates Ltd. I-89906</td>
</tr>
<tr>
<td>Jakimchuk, R.D.</td>
<td>1-89906, I-90026, I-133779, I-132793, Q-107050</td>
</tr>
<tr>
<td>James, R.R.</td>
<td>T-126985</td>
</tr>
<tr>
<td>Jasieniuk, M.A.</td>
<td>H-23892, J-63606</td>
</tr>
<tr>
<td>Jeffries, R.L.</td>
<td>H-113212</td>
</tr>
<tr>
<td>Jefferson, C.W.</td>
<td>B-45730</td>
</tr>
<tr>
<td>Jeletzky, J.A.</td>
<td>B-39730, B-75485</td>
</tr>
<tr>
<td>Jenner, G.A.</td>
<td>B-14060</td>
</tr>
<tr>
<td>Jernstof, A.</td>
<td>J-78197</td>
</tr>
<tr>
<td>Jessen, S.</td>
<td>Q-74152</td>
</tr>
<tr>
<td>Johansen, C.</td>
<td>Q-83933</td>
</tr>
<tr>
<td>Johansson, B.M.</td>
<td>Q-72125</td>
</tr>
<tr>
<td>Johnson, B.R.</td>
<td>C-136433</td>
</tr>
<tr>
<td>Johnson, L.</td>
<td>U-103110</td>
</tr>
<tr>
<td>Johnson, S.R.</td>
<td>I-29971, I-50822, I-68640, I-119377</td>
</tr>
<tr>
<td>Johnson, D.I.</td>
<td>B-117463</td>
</tr>
<tr>
<td>Johnston, R.A.C.</td>
<td>I-29980</td>
</tr>
<tr>
<td>Jonason, I.R.</td>
<td>B-74470, B-74489</td>
</tr>
<tr>
<td>Jones, H.E.</td>
<td>Q-114580</td>
</tr>
<tr>
<td>Jones, J.M.</td>
<td>M-133132</td>
</tr>
<tr>
<td>Jones, M.A.</td>
<td>I-108049</td>
</tr>
<tr>
<td>Jones, W.L.</td>
<td>F-50474</td>
</tr>
<tr>
<td>Jones, P.B.</td>
<td>B-52876</td>
</tr>
<tr>
<td>Jopling, A.V.</td>
<td>U-68021</td>
</tr>
<tr>
<td>Josephson, D.S.</td>
<td>Q-96377</td>
</tr>
<tr>
<td>Judge, A.</td>
<td>C-121509</td>
</tr>
<tr>
<td>Judge, A.S.</td>
<td>C-12034, C-20290, C-61417, Q-19550</td>
</tr>
<tr>
<td>Kabzema, R.D.</td>
<td>A-80042, J-90239</td>
</tr>
<tr>
<td>Kajikawa, M.</td>
<td>F-803508</td>
</tr>
<tr>
<td>Kameneri, D.C.</td>
<td>B-34371</td>
</tr>
<tr>
<td>Kemphus, L.W.</td>
<td>G-120464, G-131982</td>
</tr>
<tr>
<td>Kaneko, T.</td>
<td>I-4162</td>
</tr>
<tr>
<td>Karamanski, T.J.</td>
<td>Q-32018</td>
</tr>
<tr>
<td>Karlen, J.E.</td>
<td>Q-87602</td>
</tr>
<tr>
<td>Kashino, R.K.</td>
<td>I-107034</td>
</tr>
<tr>
<td>Kato, K.</td>
<td>C-111082, C-139386, G-115983</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Index Numbers</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Kung, T.</td>
<td>F-20864</td>
</tr>
<tr>
<td>Kuo, C.-Y.</td>
<td>R-77925, R-77968, R-81332, T-91154, T-105392</td>
</tr>
<tr>
<td>Kupfer, G.</td>
<td>T-6050, T-46191, T-106089, T-106127</td>
</tr>
<tr>
<td>Kurfurts, P.J.</td>
<td>C-15237</td>
</tr>
<tr>
<td>Kuyt, E.</td>
<td>I-29963, I-101974</td>
</tr>
<tr>
<td>Kyle, J.R.</td>
<td>B-83437</td>
</tr>
<tr>
<td>Lachou, G.</td>
<td>A-139041</td>
</tr>
<tr>
<td>Ladanyi, B.</td>
<td>C-121835, C-122564</td>
</tr>
<tr>
<td>Laguitton, D.</td>
<td>P-63592</td>
</tr>
<tr>
<td>Lake, W.H.</td>
<td>Q-12980</td>
</tr>
<tr>
<td>Lalonde, A.E.</td>
<td>B-81523, B-111759, B-138878</td>
</tr>
<tr>
<td>Lalonde, M.E.</td>
<td>E-15458</td>
</tr>
<tr>
<td>Lambert, J.D.H.</td>
<td>H-101786</td>
</tr>
<tr>
<td>Lambert, M.B.</td>
<td>B-81612, B-81620</td>
</tr>
<tr>
<td>Lanari, R.</td>
<td>Q-108715, T-106084</td>
</tr>
<tr>
<td>Lending, E.</td>
<td>B-59834</td>
</tr>
<tr>
<td>Landisault, F.</td>
<td>A-64807</td>
</tr>
<tr>
<td>Langhorne, P.J.</td>
<td>G-87908</td>
</tr>
<tr>
<td>Laporte, P.J.</td>
<td>P-45691</td>
</tr>
<tr>
<td>Larsen, G.</td>
<td>Q-87602</td>
</tr>
<tr>
<td>Larsen, P.</td>
<td>Q-87602</td>
</tr>
<tr>
<td>Lasch, J.E.</td>
<td>Q-116130</td>
</tr>
<tr>
<td>Latour, P.B.</td>
<td>I-30333</td>
</tr>
<tr>
<td>Lau, J.S.O.</td>
<td>C-15237</td>
</tr>
<tr>
<td>Laubitz, D.R.</td>
<td>I-41688</td>
</tr>
<tr>
<td>Law, T.C.</td>
<td>C-17388, C-18422</td>
</tr>
<tr>
<td>Lawrence, A.</td>
<td>L-54020</td>
</tr>
<tr>
<td>Lawrence, W.</td>
<td>A-139041</td>
</tr>
<tr>
<td>LeBlanc, L.</td>
<td>Q-132705</td>
</tr>
<tr>
<td>LeBlond, N.R.</td>
<td>I-62200, I-137987</td>
</tr>
<tr>
<td>LeBlond, P.H.</td>
<td>D-108243</td>
</tr>
<tr>
<td>Lee, J.E.</td>
<td>Q-136018</td>
</tr>
<tr>
<td>Lee, S.-K.</td>
<td>I-38890</td>
</tr>
<tr>
<td>Leinonen, P.J.</td>
<td>Q-102890</td>
</tr>
<tr>
<td>Lemborg Consultants (Canada) Inc.</td>
<td>Q-108553</td>
</tr>
<tr>
<td>Lemieux, R.</td>
<td>Q-108853</td>
</tr>
<tr>
<td>Lemon, D.D.</td>
<td>D-82134, D-113069, Q-87556</td>
</tr>
<tr>
<td>Lentin, J.K.</td>
<td>B-52676</td>
</tr>
<tr>
<td>Lenz, A.C.</td>
<td>B-50628, B-90646</td>
</tr>
<tr>
<td>Leland, W.N.</td>
<td>B-21253, B-25526</td>
</tr>
<tr>
<td>LeScheck, L.A.</td>
<td>G-99481</td>
</tr>
<tr>
<td>Leskiw, K.</td>
<td>B-124800</td>
</tr>
<tr>
<td>Leveille, P.</td>
<td>A-64807</td>
</tr>
<tr>
<td>Levin, S.K.</td>
<td>G-68639</td>
</tr>
<tr>
<td>Leveen, V.M.</td>
<td>A-90042, J-90239</td>
</tr>
<tr>
<td>Lewis, C.P.</td>
<td>A-30031</td>
</tr>
<tr>
<td>Lewkowicz, A.G.</td>
<td>A-73741, F-121622, F-121630</td>
</tr>
<tr>
<td>LGL Ecological Research Associates, Inc.</td>
<td>I-108410</td>
</tr>
<tr>
<td>Lichty-Federovich, S.</td>
<td>I-122815</td>
</tr>
<tr>
<td>Lindi, F.M.</td>
<td>B-122939</td>
</tr>
<tr>
<td>Lindsay, R.M.</td>
<td>Q-63852</td>
</tr>
<tr>
<td>Lissauer, J.W.</td>
<td>D-128112</td>
</tr>
<tr>
<td>Livingstone, C.E.</td>
<td>G-69663, G-69671, G-81868</td>
</tr>
<tr>
<td>Lo, R.C.</td>
<td>C-121981</td>
</tr>
<tr>
<td>Lobregger, U.</td>
<td>I-29880</td>
</tr>
<tr>
<td>Lockhart, W.L.</td>
<td>G-108837</td>
</tr>
<tr>
<td>Logan, W.J.</td>
<td>Q-30058</td>
</tr>
<tr>
<td>Loman, G.J.A.</td>
<td>Q-130206</td>
</tr>
<tr>
<td>Long, D.G.F.</td>
<td>B-51497</td>
</tr>
<tr>
<td>Lord, C.</td>
<td>P-45691</td>
</tr>
<tr>
<td>Lotre, G.</td>
<td>B-134287</td>
</tr>
<tr>
<td>Loveridge, W.D.</td>
<td>B-92975, B-92983, B-106186</td>
</tr>
<tr>
<td>Lowings, M.</td>
<td>G-82118</td>
</tr>
<tr>
<td>Lowry, R.T.</td>
<td>G-69639, Q-124182</td>
</tr>
<tr>
<td>Lu, C.-M.</td>
<td>R-77925</td>
</tr>
<tr>
<td>Lubinsky, I.</td>
<td>I-108218</td>
</tr>
<tr>
<td>Ludvigsen, R.</td>
<td>B-26018, B-59884, B-107433, B-114888</td>
</tr>
<tr>
<td>Lyon, J.</td>
<td>Q-138215</td>
</tr>
<tr>
<td>MacAulay, H.A.</td>
<td>C-12084, C-17865, C-17873, C-61336, C-121703, F-80330</td>
</tr>
<tr>
<td>Macdonald, D.</td>
<td>J-16233</td>
</tr>
<tr>
<td>MacDonald, E.M.</td>
<td>Q-134171, R-92185</td>
</tr>
<tr>
<td>MacDonald, G.N.</td>
<td>A-60194</td>
</tr>
<tr>
<td>MacDonald, J.R.</td>
<td>C-64109</td>
</tr>
<tr>
<td>MacDonald, N.D.</td>
<td>D-64491</td>
</tr>
<tr>
<td>Macdonald, R.W.</td>
<td>D-3751, D-66419, D-113069, D-113077, D-136849, Q-15555, Q-123609</td>
</tr>
<tr>
<td>Mackay, D.</td>
<td>Q-87572, Q-102890, Q-103580, Q-108618</td>
</tr>
<tr>
<td>Mackay, D.K.</td>
<td>F-102830</td>
</tr>
<tr>
<td>Mackay, J.R.</td>
<td>B-67324, C-14451, C-21261, C-50610, C-75865, C-79887, C-100086, C-112321, C-120389, C-121702, C-123862, F-7323, F-64602, F-81566, F-102830, H-99147</td>
</tr>
<tr>
<td>Author Name</td>
<td>Index</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Mackenzie Delta Gas Development System</td>
<td>R-95540</td>
</tr>
<tr>
<td>Mackenzie, B.</td>
<td>I-108219</td>
</tr>
<tr>
<td>Mackinnon, C.S.</td>
<td>N-124001, V-65293</td>
</tr>
<tr>
<td>MacKean Atlantic Limited</td>
<td>Q-87785</td>
</tr>
<tr>
<td>MacKean Marlex Inc.</td>
<td>I-107824</td>
</tr>
<tr>
<td>MacLauchlan, L.</td>
<td>I-108111, Q-107107</td>
</tr>
<tr>
<td>MacLean, D.A.</td>
<td>H-30180</td>
</tr>
<tr>
<td>MacLeod, W.G.</td>
<td>L-18970</td>
</tr>
<tr>
<td>MacNeill, I.K.</td>
<td>S-63495</td>
</tr>
<tr>
<td>MacNeill, M.R.</td>
<td>D-4766</td>
</tr>
<tr>
<td>Macpherson, J.E.</td>
<td>P-37621</td>
</tr>
<tr>
<td>MacWatt, D.</td>
<td>L-108413</td>
</tr>
<tr>
<td>MacWatt, D.J.</td>
<td>T-108456</td>
</tr>
<tr>
<td>Mahnic, R.J.</td>
<td>R-140767</td>
</tr>
<tr>
<td>Mathias, N.J.</td>
<td>B-50202</td>
</tr>
<tr>
<td>Neir, M.</td>
<td>I-127043</td>
</tr>
<tr>
<td>MacKale, Holloway &amp; Associates Ltd</td>
<td>R-88834</td>
</tr>
<tr>
<td>Makino, S.</td>
<td>I-70050</td>
</tr>
<tr>
<td>Makko, D.A.</td>
<td>B-135399</td>
</tr>
<tr>
<td>Mamet, B.L.</td>
<td>B-47910</td>
</tr>
<tr>
<td>Mancini, C.V.</td>
<td>Q-127388</td>
</tr>
<tr>
<td>Manders, P.M.</td>
<td>Q-91383</td>
</tr>
<tr>
<td>Mann, G.J.</td>
<td>I-10979, I-62537</td>
</tr>
<tr>
<td>Mansfield, A.W.</td>
<td>I-124575</td>
</tr>
<tr>
<td>Mansfield, B.</td>
<td>Q-71323, Q-71331</td>
</tr>
<tr>
<td>Marcellus, R.W.</td>
<td>G-108332, G-108399, G-108375, G-122461, G-108405, G-132780</td>
</tr>
<tr>
<td>Markham, W.E.</td>
<td>G-84582</td>
</tr>
<tr>
<td>Marko, J.R.</td>
<td>Q-15539, Q-8756, Q-87680, Q-89281</td>
</tr>
<tr>
<td>Marks, A.</td>
<td>Q-92320</td>
</tr>
<tr>
<td>Marsh, A.H.</td>
<td>H-51829, H-70378</td>
</tr>
<tr>
<td>MARTEC Limited</td>
<td>G-82118</td>
</tr>
<tr>
<td>Martell, A.W.</td>
<td>I-20362, I-32241, I-76884, I-1313760, I-139742</td>
</tr>
<tr>
<td>Martin, A.</td>
<td>C-63673</td>
</tr>
<tr>
<td>Martin, L.C.</td>
<td>F-43869, F-43883, Q-92088</td>
</tr>
<tr>
<td>Martin, M.</td>
<td>I-310</td>
</tr>
<tr>
<td>Martin, S.</td>
<td>Q-44857</td>
</tr>
<tr>
<td>Mary Collins Consultants Limited</td>
<td>Q-8873, Q-8881, Q-15008, Q-29804, Q-30309</td>
</tr>
<tr>
<td>Masterson, D.M.</td>
<td>G-13124</td>
</tr>
<tr>
<td>Matthews, A.P.</td>
<td>T-79558</td>
</tr>
<tr>
<td>Matthews, J.V.</td>
<td>B-66150, C-123862, U-49875</td>
</tr>
<tr>
<td>Maurice, Y.T.</td>
<td>B-138908</td>
</tr>
<tr>
<td>Mayhall, J.T.</td>
<td>U-15369</td>
</tr>
<tr>
<td>Mayhood, D.W.</td>
<td>J-73288</td>
</tr>
<tr>
<td>McAllister Engineering Ltd.</td>
<td>Q-108030</td>
</tr>
<tr>
<td>McAllister, D.E.</td>
<td>B-67741, B-79790</td>
</tr>
<tr>
<td>McArthur, L.W.</td>
<td>B-74055</td>
</tr>
<tr>
<td>McCart, D.</td>
<td>Q-118117, Q-118125, Q-118168</td>
</tr>
<tr>
<td>McCart, P.J.</td>
<td>Q-118117, Q-118168</td>
</tr>
<tr>
<td>McCart, P.J.</td>
<td>I-10879, I-58602, I-62537, J-73288</td>
</tr>
<tr>
<td>McClymont, D.</td>
<td>I-14028</td>
</tr>
<tr>
<td>McComiskey, J.E.</td>
<td>J-16527</td>
</tr>
<tr>
<td>McConnell, W.H.</td>
<td>T-7951, T-7960</td>
</tr>
<tr>
<td>McCormack, J.</td>
<td>P-106470</td>
</tr>
<tr>
<td>McCourt Management Ltd.</td>
<td>I-22624, I-118108, I-118214, Q-118800</td>
</tr>
<tr>
<td>McCourt, K.H.</td>
<td>I-118214, Q-107080</td>
</tr>
<tr>
<td>McCracken, A.D.</td>
<td>B-90646</td>
</tr>
<tr>
<td>McCracken, C.</td>
<td>N-78514, R-76910</td>
</tr>
<tr>
<td>McCreath, D.R.</td>
<td>Q-132845</td>
</tr>
<tr>
<td>McCreath, P.L.</td>
<td>Q-6394</td>
</tr>
<tr>
<td>McCulloch, J.A.W.</td>
<td>E-15458</td>
</tr>
<tr>
<td>McCullum, H.</td>
<td>T-77836</td>
</tr>
<tr>
<td>McCullum, K.</td>
<td>T-77836</td>
</tr>
<tr>
<td>McDonald, E.J.</td>
<td>I-76554</td>
</tr>
<tr>
<td>McDougall, J.C.</td>
<td>Q-6444</td>
</tr>
<tr>
<td>McGill University, Marine Sciences Centre</td>
<td>Q-107948</td>
</tr>
<tr>
<td>McGlynn, J.C.</td>
<td>B-14435</td>
</tr>
<tr>
<td>McGonigal, D.</td>
<td>Q-86306, G-107239, G-108324, G-108367, G-122335, G-122408</td>
</tr>
<tr>
<td>McGrath, P.H.</td>
<td>B-122839, B-138894</td>
</tr>
<tr>
<td>McGregor, J.A.</td>
<td>B-16365, B-62103</td>
</tr>
<tr>
<td>McInnes, K.L.</td>
<td>J-31437</td>
</tr>
<tr>
<td>McIntyre, D.J.</td>
<td>B-49840, B-73946</td>
</tr>
<tr>
<td>McKee, P.M.</td>
<td>I-108570</td>
</tr>
<tr>
<td>McKenzie, M.B.</td>
<td>Q-72125</td>
</tr>
<tr>
<td>McLaren, M.A.</td>
<td>I-90018, I-90034</td>
</tr>
<tr>
<td>McLellan, P.</td>
<td>G-108266</td>
</tr>
<tr>
<td>McLennan, S.W.</td>
<td>B-14060</td>
</tr>
<tr>
<td>McLeod, C.L.</td>
<td>I-108631</td>
</tr>
<tr>
<td>McMullen, J.D.</td>
<td>Q-12963, Q-13528</td>
</tr>
<tr>
<td>McMurray, E.W.</td>
<td>B-62111</td>
</tr>
<tr>
<td>McNeil, D.H.</td>
<td>B-74497, B-86633</td>
</tr>
<tr>
<td>McQueen, J.</td>
<td>H-85278</td>
</tr>
<tr>
<td>McRoberts, E.C.</td>
<td>C-17388, C-18414, C-18422</td>
</tr>
<tr>
<td>Meijer-Drees, N.C.</td>
<td>B-64645</td>
</tr>
<tr>
<td>Author</td>
<td>Index</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Melville, K.M.</td>
<td>Q-71340, Q-80798</td>
</tr>
<tr>
<td>Maintz, R.E.</td>
<td>B-139017</td>
</tr>
<tr>
<td>Melady, E.</td>
<td>H-113557</td>
</tr>
<tr>
<td>Melbye, F.J.</td>
<td>U-19369</td>
</tr>
<tr>
<td>Meldrum, S.W.</td>
<td>R-93416</td>
</tr>
<tr>
<td>Mellor, H.</td>
<td>D-113068, D-125889</td>
</tr>
<tr>
<td>Meldrum, S.K.</td>
<td>G-125999, G-24511, G-25500</td>
</tr>
<tr>
<td>Malrose, S.K.</td>
<td>G-130796</td>
</tr>
</tbody>
</table>

**Author Index**

**Melville Shipping Limited**

- L-117961

**Memorial University of Newfoundland, Centre for Cold Ocean Resources Engineering**

- G-107263

**Menley, R.A.**

- Q-30813

**Mercer, J.B.**

- G-69439, G-130435, G-130798, G-124192

**Merratt, J.S.**

- Q-23388

**Meteorological and Environmental Planning Limited**

- E-92061

**Metcalfe, N.**

- G-70262, G-108367, G-122408, G-130320

**Metal Association of the Northwest Territories**

- T-8400

**Metcalfe, M.**

- Q-116220

**Meyers, D.**

- P-84757

**Miall, A.D.**

- B-28521

**Michalchuk, J.**

- Q-13528

**Michel, F.A.**

- C-15156, C-121649

**Mihok, S.**

- I-67016, I-69973

**Millar, J.F.V.**

- U-92045, U-92053

**Millar, J.S.**

- I-46310, I-62138, I-87831

**Miller, R.**

- S-73024

**Miller, R.G.**

- B-84536

**Miller, S.**

- H-113587

**Miller, S.J.**

- I-135640

**Mills, P.F.**

- H-11216

**Mills, A.R.**

- Q-11720, Q-18775, Q-30082, Q-30821, Q-32220, Q-92312

**Milne, G.G.D.**

- Q-117220

**Milner, P.**

- L-74063

**Mitchell, R.**

- R-76053

**Miyamoto, H.K.**

- M-39160

**Moir, J.R.**

- G-120464, G-130206, G-131962

**Moir (J.D.) and Associates Limited**

- B-24546

**Moniz, E.**

- C-18422

**Montreal Engineering Company Ltd.**

- Q-92037

**Moore, H.**

- A-103683

**Moore, I.A.**

- I-25844, I-25852, I-61845

**Moore, J.R.**

- W-51780

**Moore, J.W.**


**Moore, R.K.**

- G-56227

**Moore, S.D.**

- Q-135704

**Morgah, E.D.**

- F.A., C-15156, C-121649

**Hihok, S.**

- 5-67016, 5-10383

**Miller, J.F.V.**

- U-92046, U-12053

**Morganstern, N.R.**

- C-21920, C-57809, C-68225, C-122548, C-122866, G-25488

**Morissette, J.**

- Q-84250

**Morlan, R.E.**

- B-79790, U-19224, U-31925, U-49875, U-69366

**Morrell, W.R.**

- I-29971, I-119377

**Morris, W.A.**

- B-87980, B-107425

**Morrison, D.A.**

- U-125854

**Morrison, T.B.**

- G-108332, G-108359

**Morrow, D.W.**

- B-64645, B-81515

**Mortimer, A.**

- L-74063

**Moylea, P.G.**

- V-43613

**MPS Associates Ltd.**

- Q-23388, T-89642

**Muehlenbachs, K.**

- B-85111

**Muller, F.**

- C-98850

**Muller, F.B.**

- E-11630, E-64467

**Mulvey, R.H.**

- I-52361, I-52434, I-52873

**Murphy, D.L.**

- D-182112

**Murray, T.**

- C-17388

**Murtha, P.A.**

- I-134961

**Musztur, A.**

- I-78456

**Nairn, R.M.**

- Q-127302, Q-127396

**N.W.T. Bureau of Statistics**

- R-77224

**N.W.T. Dept. of Education, Programme Development Division**

- T-134813

**N.W.T. Dept. of Information**

- Q-106011

**N.W.T. Dept. of Planning and Program Evaluation**

- T-22330

**N.W.T. Dept. of Renewable Resources**

- L-113530

**N.W.T. Game Management Division**

- I-20400

**N.W.T. Legislative Assembly, Special Committee on Constitutional Development**

- R-135593

**N.W.T. Science Advisory Board**

- T-69817

**Nadreau, J.P.**

- Q-26778

**Nagell, B.**

- J-78197

**Nagy, J.A.**

- H-23841

**Neave, K.G.**

- C-12084, C-17885, C-17973, C-61417
<table>
<thead>
<tr>
<th>Author Name</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petitetot, E.</td>
<td>V-69256</td>
</tr>
<tr>
<td>Petro-Canada</td>
<td>I-107875, Q-139606, W-138177</td>
</tr>
<tr>
<td>Petroleum Industry Committee on the Employment of Northern Residents</td>
<td>R-11215</td>
</tr>
<tr>
<td>Pettaplace, W.W.</td>
<td>C-103165</td>
</tr>
<tr>
<td>Phillips Petroleum Company</td>
<td>I-115576</td>
</tr>
<tr>
<td>Pierce, S.P.</td>
<td>A-12840</td>
</tr>
<tr>
<td>Pilkington, G.R.</td>
<td>E-104108, G-108294, G-108387, Q-124248, Q-122416, B-130320, Q-108405, Q-132780</td>
</tr>
<tr>
<td>Pistoruzak, W.M.</td>
<td>Q-31070, Q-71366, Q-80853</td>
</tr>
<tr>
<td>Pleit, F.</td>
<td>B-72320</td>
</tr>
<tr>
<td>Plouff, D.</td>
<td>B-90366</td>
</tr>
<tr>
<td>Pluth, D.W.</td>
<td>V-131601</td>
</tr>
<tr>
<td>Podgahm, W.A.</td>
<td>P-94773</td>
</tr>
<tr>
<td>Poirel, M.</td>
<td>I-31909, R-77585</td>
</tr>
<tr>
<td>Pollard, W.H.</td>
<td>C-57517</td>
</tr>
<tr>
<td>Pomeroy, J.W.</td>
<td>R-111392</td>
</tr>
<tr>
<td>Poston, H.J.</td>
<td>Q-2968</td>
</tr>
<tr>
<td>Poulin, V.A.</td>
<td>F-43893</td>
</tr>
<tr>
<td>Poulton, T.P.</td>
<td>B-111430, B-1248000</td>
</tr>
<tr>
<td>Powell, B.M.</td>
<td>C-59374</td>
</tr>
<tr>
<td>Powell, J.</td>
<td>Q-23230</td>
</tr>
<tr>
<td>Powell, T.G.</td>
<td>Q-39926</td>
</tr>
<tr>
<td>Pressad, N.</td>
<td>B-74527, B-88706</td>
</tr>
<tr>
<td>Prentice, J.R.</td>
<td>M-56996</td>
</tr>
<tr>
<td>Price, L.L.</td>
<td>B-74497</td>
</tr>
<tr>
<td>Primus, C.</td>
<td>N-79138</td>
</tr>
<tr>
<td>Pritchard, R.D.</td>
<td>G-85980</td>
</tr>
<tr>
<td>Prokopuk, R.</td>
<td>F-7137, J-7128</td>
</tr>
<tr>
<td>Pufahl, D.E.</td>
<td>C-38820, C-57508, C-122548</td>
</tr>
<tr>
<td>Pugh, D.C.</td>
<td>B-109320</td>
</tr>
<tr>
<td>Pui, N.</td>
<td>Q-132691</td>
</tr>
<tr>
<td>Quadra Economic Consultants Ltd.</td>
<td>L-28602</td>
</tr>
<tr>
<td>R and R Research Limited</td>
<td>N-42480</td>
</tr>
<tr>
<td>Radforth, J.R.</td>
<td>L-28947, L-28955</td>
</tr>
<tr>
<td>Radovic, D.</td>
<td>R-94277</td>
</tr>
<tr>
<td>Raffan, J.</td>
<td>W-34681</td>
</tr>
<tr>
<td>Railton, J.B.</td>
<td>Q-31178</td>
</tr>
<tr>
<td>Ramsauer, R.O.</td>
<td>Q-30040</td>
</tr>
<tr>
<td>Raoul, C.</td>
<td>R-77585</td>
</tr>
<tr>
<td>Ratynski, R.A.</td>
<td>I-138168</td>
</tr>
<tr>
<td>Raymont, M.E.D.</td>
<td>N-19500</td>
</tr>
<tr>
<td>Reddy, D.V.</td>
<td>G-5460</td>
</tr>
<tr>
<td>Reed, J.C.</td>
<td>X-30317</td>
</tr>
<tr>
<td>Rees, W.E.</td>
<td>I-137987, J-47120</td>
</tr>
<tr>
<td>Reesor, S.N.</td>
<td>C-121720</td>
</tr>
<tr>
<td>Reichenbach, I.G.</td>
<td>B-138586</td>
</tr>
<tr>
<td>Reid, A.B.</td>
<td>B-62111</td>
</tr>
<tr>
<td>Reid, D.E.</td>
<td>C-15733, C-15768</td>
</tr>
<tr>
<td>Reimer, E.M.</td>
<td>D-105066</td>
</tr>
<tr>
<td>Reimnitz, E.</td>
<td>A-136999</td>
</tr>
<tr>
<td>Renaud, R.</td>
<td>L-36242</td>
</tr>
<tr>
<td>Renaud, W.E.</td>
<td>I-106992</td>
</tr>
<tr>
<td>Renewable Resources Consulting Services Ltd.</td>
<td>I-11894, I-11908, I-90026, Q-107050</td>
</tr>
<tr>
<td>Rennie, J.A.</td>
<td>C-15768</td>
</tr>
<tr>
<td>Reuber, B.</td>
<td>Q-88862</td>
</tr>
<tr>
<td>Rhiness, J.</td>
<td>Q-119539</td>
</tr>
<tr>
<td>Ricard, J.L.</td>
<td>J-58882</td>
</tr>
<tr>
<td>Rice, H.M.</td>
<td>C-99422</td>
</tr>
<tr>
<td>Richards, W.E.</td>
<td>Q-54011</td>
</tr>
<tr>
<td>Richardson (N.H.) Consulting</td>
<td>S-108596</td>
</tr>
<tr>
<td>Richardson, N.H.</td>
<td>S-108596</td>
</tr>
<tr>
<td>Richardson, W.J.</td>
<td>I-28983, I-29971, I-68640, I-106410, I-115576</td>
</tr>
<tr>
<td>Ridgway, G.</td>
<td>Q-49034</td>
</tr>
<tr>
<td>Ridings, T.F.</td>
<td>G-69647</td>
</tr>
<tr>
<td>Rice, R.R.</td>
<td>N-42480</td>
</tr>
<tr>
<td>Rott, E.C.</td>
<td>Q-116130</td>
</tr>
<tr>
<td>Ritchie, J.C.</td>
<td>B-119867, H-81250, J-103721</td>
</tr>
<tr>
<td>RMC Resources Management Consultants Ltd.</td>
<td>Q-93408</td>
</tr>
<tr>
<td>Robbins, B.P.</td>
<td>B-39420</td>
</tr>
<tr>
<td>Robbins, R.J.</td>
<td>M-18461</td>
</tr>
<tr>
<td>Robertson, S.</td>
<td>B-87912</td>
</tr>
<tr>
<td>Roe, N.A.</td>
<td>I-107000, I-107867</td>
</tr>
<tr>
<td>Roggensock, W.D.</td>
<td>C-21920, C-39616</td>
</tr>
<tr>
<td>Rollison, C.</td>
<td>Q-23230</td>
</tr>
<tr>
<td>Roots, C.F.</td>
<td>B-81698, B-81701, B-111929</td>
</tr>
<tr>
<td>Roscoe, S.M.</td>
<td>B-124826</td>
</tr>
<tr>
<td>Rosenberg, D.M.</td>
<td>I-15423</td>
</tr>
<tr>
<td>Rosenau, D.G.</td>
<td>I-11908</td>
</tr>
<tr>
<td>Rosenzagger, L.W.</td>
<td>M-18461</td>
</tr>
<tr>
<td>Ross (S.L.) Environmental Research Limited</td>
<td>Q-107964</td>
</tr>
<tr>
<td>Ross, C.W.</td>
<td>Q-485</td>
</tr>
<tr>
<td>Ross, G.N.</td>
<td>B-81671, B-88021, B-120251</td>
</tr>
<tr>
<td>Author Name</td>
<td>Q-number(s)</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Ross, S.L.</td>
<td>Q-30098, Q-30074, Q-46536, Q-47740, Q-132586</td>
</tr>
<tr>
<td>Ross, W.G.</td>
<td>V-24155</td>
</tr>
<tr>
<td>Rotzler, J.R.</td>
<td>C-17353, G-29254, G-57908, G-69647, G-105058, G-130435</td>
</tr>
<tr>
<td>Rostad, H.P.W.</td>
<td>C-14532, C-14640, C-14599</td>
</tr>
<tr>
<td>Roth, D.R.</td>
<td>G-108375</td>
</tr>
<tr>
<td>Rouba, G.</td>
<td>I-4162</td>
</tr>
<tr>
<td>Roux, W.R.</td>
<td>H-11126</td>
</tr>
<tr>
<td>Roussel, M.E.</td>
<td>I-14028</td>
</tr>
<tr>
<td>Routledge, R.</td>
<td>G-130796</td>
</tr>
<tr>
<td>Rowe, J.S.</td>
<td>J-63606</td>
</tr>
<tr>
<td>Rowland, L.</td>
<td>P-139629</td>
</tr>
<tr>
<td>Royal Canadian Mounted Police</td>
<td>P-106968</td>
</tr>
<tr>
<td>Rueille, J.C.</td>
<td>B-62103</td>
</tr>
<tr>
<td>Rugh, D.J.</td>
<td>I-124745</td>
</tr>
<tr>
<td>Rundquist, L.A.</td>
<td>C-15741</td>
</tr>
<tr>
<td>Russell, D.E.</td>
<td>I-133760</td>
</tr>
<tr>
<td>Rutter, N.</td>
<td>B-134287</td>
</tr>
<tr>
<td>Rutter, N.W.</td>
<td>C-37206</td>
</tr>
<tr>
<td>Ryimes (J.E.) Engineering Ltd.</td>
<td>L-21270, L-24562, L-24716</td>
</tr>
<tr>
<td>Sacha Harbour Trappers Association</td>
<td>L-120596</td>
</tr>
<tr>
<td>Sackinger, W.N.</td>
<td>G-70173, G-70270, G-70289</td>
</tr>
<tr>
<td>Saito, M.</td>
<td>H-44377, H-44388</td>
</tr>
<tr>
<td>Sakel, A.</td>
<td>H-44377, H-44388</td>
</tr>
<tr>
<td>Salix Enterprises Ltd.</td>
<td>F-88382</td>
</tr>
<tr>
<td>Salter, R.E.</td>
<td>I-30822, Q-107821</td>
</tr>
<tr>
<td>Sangster, R.H.B.</td>
<td>M-19461</td>
</tr>
<tr>
<td>Sarvela, J.</td>
<td>H-86850</td>
</tr>
<tr>
<td>Sater, J.E.</td>
<td>X-30317</td>
</tr>
<tr>
<td>Saunasleja, A.</td>
<td>D-15601</td>
</tr>
<tr>
<td>Savage, H.</td>
<td>U-22187, U-102717</td>
</tr>
<tr>
<td>Savdie, I.</td>
<td>E-19458</td>
</tr>
<tr>
<td>Savigny, K.W.</td>
<td>C-122856</td>
</tr>
<tr>
<td>Sayed, M.</td>
<td>Q-116220</td>
</tr>
<tr>
<td>Scarfe, C.M.</td>
<td>B-45713, B-85111</td>
</tr>
<tr>
<td>Scheefen, O.</td>
<td>T-69817, T-79888</td>
</tr>
<tr>
<td>Scherer, U.</td>
<td>B-107395</td>
</tr>
<tr>
<td>Schiefer, K.</td>
<td>I-108570</td>
</tr>
<tr>
<td>Schinkel, D.R.</td>
<td>S-85570</td>
</tr>
<tr>
<td>Schroeder, C.H.</td>
<td>I-101974</td>
</tr>
<tr>
<td>Schulze, D.E.</td>
<td>B-79111</td>
</tr>
<tr>
<td>Schuurman, K.W.</td>
<td>G-130796</td>
</tr>
<tr>
<td>Schwab, D.</td>
<td>G-106367, G-122408</td>
</tr>
<tr>
<td>Author</td>
<td>Index</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Slaney, V.R.</td>
<td>B-3735</td>
</tr>
<tr>
<td>Sloan, W.A.</td>
<td>V-33618</td>
</tr>
<tr>
<td>Sobodin, R.</td>
<td>T-66087</td>
</tr>
<tr>
<td>Small, R.J.</td>
<td>U-133353</td>
</tr>
<tr>
<td>Smart, S.</td>
<td>Q-112610</td>
</tr>
<tr>
<td>Smeltz, L.M.</td>
<td>P-63592</td>
</tr>
<tr>
<td>Smiley, B.D.</td>
<td>D-113068, Q-18775, Q-82312</td>
</tr>
<tr>
<td>Smith (M.W.) Geosciences Ltd.</td>
<td>C-108680</td>
</tr>
<tr>
<td>Smith, D.G.</td>
<td>R-105929, T-94420, T-105953</td>
</tr>
<tr>
<td>Smith, D.M.</td>
<td>T-91626</td>
</tr>
<tr>
<td>Smith, G.N.</td>
<td>I-80212</td>
</tr>
<tr>
<td>Smith, U.G.</td>
<td>G-25704, L-21237</td>
</tr>
<tr>
<td>Smith, K.</td>
<td>U-2622</td>
</tr>
<tr>
<td>Smith, M.W.</td>
<td>C-108680, Q-88838</td>
</tr>
<tr>
<td>Smith, T.G.</td>
<td>I-10235, I-52480, I-54968, Q-11692, T-24171, T-35602</td>
</tr>
<tr>
<td>Smith, V.I.</td>
<td>I-52450</td>
</tr>
<tr>
<td>Smullen, J.B.</td>
<td>G-105058</td>
</tr>
<tr>
<td>Snowdon, L.R.</td>
<td>B-52688, B-64254, B-81507, Q-39826, Q-80616</td>
</tr>
<tr>
<td>Soares, C.</td>
<td>G-108286</td>
</tr>
<tr>
<td>Sobczak, L.W.</td>
<td>B-20248</td>
</tr>
<tr>
<td>Socio-Economic Panel of Mackenzie Delta Producers Group</td>
<td>Q-99980</td>
</tr>
<tr>
<td>Sohio Alaska Petroleum Company</td>
<td>I-113522, I-118576</td>
</tr>
<tr>
<td>Sorenson, J.</td>
<td>Q-53325</td>
</tr>
<tr>
<td>Soulis, E.D.</td>
<td>C-15733</td>
</tr>
<tr>
<td>Spear, R.W.</td>
<td>B-138807</td>
</tr>
<tr>
<td>Speller, S.W.</td>
<td>S-42250</td>
</tr>
<tr>
<td>Spittlehouse, D.</td>
<td>J-63606</td>
</tr>
<tr>
<td>Srouji, G.A.</td>
<td>M-56936</td>
</tr>
<tr>
<td>St. Aubin, D.J.</td>
<td>I-52450, I-54968</td>
</tr>
<tr>
<td>St. Pierre, M.</td>
<td>P-89800</td>
</tr>
<tr>
<td>St.-Onge, D.A.</td>
<td>A-64807, A-113859, B-52582, B-67741, B-81574, B-139940, V-93297</td>
</tr>
<tr>
<td>St.-Onge, M.R.</td>
<td>B-64718, B-73911, B-73920, B-81523, B-111769, B-137278, B-138978</td>
</tr>
<tr>
<td>Stager, J.K.</td>
<td>Q-93588</td>
</tr>
<tr>
<td>Stanek, W.</td>
<td>C-114111, H-106313</td>
</tr>
<tr>
<td>Stanley Associates Engineering Ltd.</td>
<td>Q-95840</td>
</tr>
<tr>
<td>Stebbins, L.L.</td>
<td>I-100587, I-101451</td>
</tr>
<tr>
<td>Stedt, J.</td>
<td>T-69817</td>
</tr>
<tr>
<td>Steen, J.W.</td>
<td>D-108484, G-122416</td>
</tr>
<tr>
<td>Steer, M.E.</td>
<td>B-111848</td>
</tr>
<tr>
<td>Steere, W.C.</td>
<td>H-61233, H-51365</td>
</tr>
<tr>
<td>Stein, C.R.</td>
<td>B-75485</td>
</tr>
<tr>
<td>Stennig, D.G.</td>
<td>G-72133, Q-127272</td>
</tr>
<tr>
<td>Stephens, L.E.</td>
<td>C-111783</td>
</tr>
<tr>
<td>Stephens, C.</td>
<td>Q-54038</td>
</tr>
<tr>
<td>Stephens, F.</td>
<td>D-30007</td>
</tr>
<tr>
<td>Sterne, K.</td>
<td>C-68225</td>
</tr>
<tr>
<td>Stewart, D.B.</td>
<td>I-117277</td>
</tr>
<tr>
<td>Stewart, E.G.</td>
<td>V-65528</td>
</tr>
<tr>
<td>Stewart, H.R.</td>
<td>Q-127302</td>
</tr>
<tr>
<td>Stewart, J.M.</td>
<td>Q-121746</td>
</tr>
<tr>
<td>Stich, H.F.</td>
<td>B-60160</td>
</tr>
<tr>
<td>Strangway, D.W.</td>
<td>C-17353, C-40956</td>
</tr>
<tr>
<td>Strilchuk, A.R.</td>
<td>G-70300</td>
</tr>
<tr>
<td>Stucki, L.D.</td>
<td>T-96728</td>
</tr>
<tr>
<td>Sullivan, R.W.</td>
<td>B-106186</td>
</tr>
<tr>
<td>Surradi, D.C.</td>
<td>I-2933</td>
</tr>
<tr>
<td>Sutherland, J.G.</td>
<td>N-20710</td>
</tr>
<tr>
<td>Sutherland, D.J.</td>
<td>P-19815</td>
</tr>
<tr>
<td>Sutherland, I.</td>
<td>I-83208</td>
</tr>
<tr>
<td>Svenson, A.</td>
<td>J-79197</td>
</tr>
<tr>
<td>Svoboda, J.</td>
<td>J-31437</td>
</tr>
<tr>
<td>Swamiadas, A.S.J.</td>
<td>G-5460</td>
</tr>
<tr>
<td>Swan Wooster Engineering Company Limited</td>
<td>Q-83852, Q-83333, Q-83950, Q-83968, Q-83976, Q-84123, Q-96677</td>
</tr>
<tr>
<td>Stewman, R.</td>
<td>T-11258</td>
</tr>
<tr>
<td>Swyszcz, O.O.</td>
<td>E-16040</td>
</tr>
<tr>
<td>Sylvester, T.W.</td>
<td>H-65765</td>
</tr>
<tr>
<td>Symposium on Beaufort Sea Coast and Shelf Research, San Francisco, January 7-9, 1974</td>
<td>X-30317</td>
</tr>
<tr>
<td>Symposium on Permafrost Field Methods, 3 October, 1977, and Permafrost Geophysics, 4 October, 1977, Saskatoon, Canada</td>
<td>C-61336, C-61379, C-61395, C-61409, C-61417</td>
</tr>
<tr>
<td>Symposium on Permafrost Geophysics, 5th, Calgary, 13-14 November, 1978</td>
<td>C-83194</td>
</tr>
<tr>
<td>Szpurskiowski, C.</td>
<td>G-23220</td>
</tr>
<tr>
<td>Tait, D.</td>
<td>I-135640</td>
</tr>
<tr>
<td>Takeda, T.</td>
<td>E-139327</td>
</tr>
<tr>
<td>Talbot, S.S.</td>
<td>H-3778, H-51411</td>
</tr>
<tr>
<td>Author</td>
<td>Index</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Tam, G.</td>
<td>Q-107956</td>
</tr>
<tr>
<td>Tanno, K.</td>
<td>I-120499</td>
</tr>
<tr>
<td>Taylor, A.</td>
<td>C-121509</td>
</tr>
<tr>
<td>Taylor, D.G.</td>
<td>A-59439, J-16721, J-89001</td>
</tr>
<tr>
<td>Taylor, E.C.</td>
<td>Q-53309</td>
</tr>
<tr>
<td>Taylor, H.W.</td>
<td>J-31437</td>
</tr>
<tr>
<td>Taylor, T.N.</td>
<td>B-50202</td>
</tr>
<tr>
<td>Tebeau, P.A.</td>
<td>D-128112</td>
</tr>
<tr>
<td>Terasmae, J</td>
<td>H-99147</td>
</tr>
<tr>
<td>Teymouri, P.</td>
<td>Q-87564</td>
</tr>
<tr>
<td>Thackeray, B.T.</td>
<td>Q-12980</td>
</tr>
<tr>
<td>This, J.</td>
<td>J-16721</td>
</tr>
<tr>
<td>Thomas, D.C.</td>
<td>I-57122, I-101516</td>
</tr>
<tr>
<td>Thomas, D.J.</td>
<td>B-107093, B-108162, B-108170, D-108572, D-107095, D-107174, D-108197, D-110377, D-138649, I-108111, Q-107107, Q-107115, Q-107182, Q-108120, Q-123608</td>
</tr>
<tr>
<td>Thomas, D.R.</td>
<td>G-85960</td>
</tr>
<tr>
<td>Thomas, M.D.</td>
<td>B-57827</td>
</tr>
<tr>
<td>Thompson, D.C.</td>
<td>I-11894, I-11908, I-22624, 0-107080</td>
</tr>
<tr>
<td>Thompson, D.L.</td>
<td>B-122890</td>
</tr>
<tr>
<td>Thompson, R.I.</td>
<td>B-81688</td>
</tr>
<tr>
<td>Thomson, J.W.</td>
<td>H-51829, H-70378</td>
</tr>
<tr>
<td>Thomson, R.S.</td>
<td>L-19488</td>
</tr>
<tr>
<td>Thornton, D.E.</td>
<td>Q-30058</td>
</tr>
<tr>
<td>Thorsen, R.W.</td>
<td>A-123404</td>
</tr>
<tr>
<td>Thorton, D.E.</td>
<td>Q-115517</td>
</tr>
<tr>
<td>Tikkoo, R.N.</td>
<td>Q-43346</td>
</tr>
<tr>
<td>Timco, G.W.</td>
<td>G-62189, G-122378, G-123102, Q-129437</td>
</tr>
<tr>
<td>Timmermans, J.F.W.</td>
<td>T-79588</td>
</tr>
<tr>
<td>Tingley, D.</td>
<td>S-73024</td>
</tr>
<tr>
<td>Tipnis, R.S.</td>
<td>B-74095</td>
</tr>
<tr>
<td>Tirrul, R.</td>
<td>B-122807</td>
</tr>
<tr>
<td>Titus, L.</td>
<td>U-133353</td>
</tr>
<tr>
<td>Tod, J.F.</td>
<td>Q-95900</td>
</tr>
<tr>
<td>Tode, M.J.</td>
<td>I-70060, I-91893, I-120499</td>
</tr>
<tr>
<td>Todd, M.B.</td>
<td>Q-19798, Q-73822</td>
</tr>
<tr>
<td>Topham, D.R.</td>
<td>Q-15520</td>
</tr>
<tr>
<td>Toronto, University, Dept. of Anthropology</td>
<td>U-22758</td>
</tr>
<tr>
<td>Toronto, University, Media Centre</td>
<td>U-28428</td>
</tr>
<tr>
<td>Townsend, D.L.</td>
<td>Q-127302</td>
</tr>
<tr>
<td>Treude, E.</td>
<td>I-32166</td>
</tr>
<tr>
<td>Trice, A.R.</td>
<td>D-64491</td>
</tr>
<tr>
<td>Trimac Consulting Services Ltd.</td>
<td>L-29802</td>
</tr>
<tr>
<td>Trobek, D.</td>
<td>G-130796</td>
</tr>
<tr>
<td>Trofimenkoff, P.N.</td>
<td>G-26476</td>
</tr>
<tr>
<td>Trottier, T.</td>
<td>I-93165</td>
</tr>
<tr>
<td>Taul, P.T.P.</td>
<td>I-10979, J-73288</td>
</tr>
<tr>
<td>Tull, C.E.</td>
<td>I-50822</td>
</tr>
<tr>
<td>Turner, D.</td>
<td>T-2299</td>
</tr>
<tr>
<td>Twach, J.W.</td>
<td>L-19488</td>
</tr>
<tr>
<td>U.S. Bureau of Land Management</td>
<td>I-108410</td>
</tr>
<tr>
<td>U.S. Coast Guard, Office of Research and Development</td>
<td>D-128112</td>
</tr>
<tr>
<td>U.S. Coast Guard, Research and Development Center</td>
<td>D-128112</td>
</tr>
<tr>
<td>U.S. National Marine Fisheries Service</td>
<td>I-118478</td>
</tr>
<tr>
<td>U.S. National Marine Mammal Laboratory</td>
<td>I-118478</td>
</tr>
<tr>
<td>U.S. NOAA</td>
<td>I-118478</td>
</tr>
<tr>
<td>U.S. Office of Naval Research</td>
<td>G-85227</td>
</tr>
<tr>
<td>Ueda, H.T.</td>
<td>V-13951</td>
</tr>
<tr>
<td>University League for Social Reform</td>
<td>T-63703</td>
</tr>
<tr>
<td>Unreu, J.O.</td>
<td>C-121720</td>
</tr>
<tr>
<td>Urquhart, D.R.</td>
<td>G-23396, G-84410</td>
</tr>
<tr>
<td>Uscher, P.J.</td>
<td>T-94242</td>
</tr>
<tr>
<td>Uyeno, T.T.</td>
<td>B-10668, B-65851</td>
</tr>
<tr>
<td>Vaartouw and Sons Enterprises Ltd.</td>
<td>H-10740, H-96164, H-96248, H-96253</td>
</tr>
<tr>
<td>Vaartouw, M.</td>
<td>H-96245, H-96253</td>
</tr>
<tr>
<td>van Everdingen, R.D.</td>
<td>A-81175, B-90611, C-28028, F-94528, F-104850, X-33693</td>
</tr>
<tr>
<td>Van Ginkel Associates Ltd.</td>
<td>R-93475</td>
</tr>
<tr>
<td>Van Nostrand, T.</td>
<td>B-138868</td>
</tr>
<tr>
<td>Van Schmus, W.R.</td>
<td>B-11848</td>
</tr>
<tr>
<td>Vanderpost, J.M.</td>
<td>F-103365, H-25836</td>
</tr>
<tr>
<td>Vanstone, J.W.</td>
<td>T-89058</td>
</tr>
<tr>
<td>Vent, M.R.</td>
<td>G-30040</td>
</tr>
<tr>
<td>Venkatesh, S.</td>
<td>G-18627</td>
</tr>
<tr>
<td>Verge, P.</td>
<td>R-11509, T-11517</td>
</tr>
<tr>
<td>Verhagen, H.J.</td>
<td>G-130206</td>
</tr>
<tr>
<td>Vilks, G.</td>
<td>B-88518</td>
</tr>
<tr>
<td>Vincent, D.</td>
<td>I-66713</td>
</tr>
<tr>
<td>Vitt, D.H.</td>
<td>H-51349</td>
</tr>
<tr>
<td>Vittoratos, E.S.</td>
<td>G-55700, G-108278</td>
</tr>
<tr>
<td>Von Bitter, P.H.</td>
<td>B-59884</td>
</tr>
<tr>
<td>Wacasey, J.W.</td>
<td>I-11614</td>
</tr>
<tr>
<td>Wadhams, P.</td>
<td>G-35530, G-60321, G-108340</td>
</tr>
<tr>
<td>Name</td>
<td>Code</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Yeo, G.M.</td>
<td>B-45842, B-87963</td>
</tr>
<tr>
<td>Yerbury, J.C.</td>
<td>V-66371</td>
</tr>
<tr>
<td>Ying Shiu, W.</td>
<td>Q-88862</td>
</tr>
<tr>
<td>Yorath, C.J.</td>
<td>B-85332</td>
</tr>
<tr>
<td>Yorga, B.W.D.</td>
<td>U-65374</td>
</tr>
<tr>
<td>Yoshida, S.</td>
<td>H-44377, H-44385</td>
</tr>
<tr>
<td>Young, D.A.</td>
<td>I-11886</td>
</tr>
<tr>
<td>Young, F.G.</td>
<td>B-16195</td>
</tr>
<tr>
<td>Young, G.M.</td>
<td>B-88048</td>
</tr>
<tr>
<td>Younkin, W.E.</td>
<td>L-17849</td>
</tr>
<tr>
<td>Yow, C.S.</td>
<td>G-100796</td>
</tr>
<tr>
<td>Zeal, J.F.J.</td>
<td>F-103365</td>
</tr>
<tr>
<td>Zealley, E.</td>
<td>V-76503</td>
</tr>
<tr>
<td>Zoltei, S.C.</td>
<td>H-44377</td>
</tr>
<tr>
<td>Zwarun, S.</td>
<td>Q-136492</td>
</tr>
</tbody>
</table>