NEWSLETTER

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CONTENTS

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ENERGY AND THE USA--

According to Richard J. Anderson, Associate Director of the Battelle Memorial Institute of Columbus, Ohio, the United State's energy situation can be best described as "miserable" and "on a collision course with catastrophe." The seriousness of declining domestic energy sources is not really appreciated by most of the population. Mr. Anderson says that our attitude of complacency has become embedded during the past 200 years, ever since the Pilgrims landed and saw the great forests of the northeastern United States.

Two hundred years ago, wood was the most important fuel, charcoal was used to melt iron, and the great forests created the impression that there was enough wood to last forever. As settlement moved westward, the enormous coal reserves in West Virginia and then Kentucky were found, reinforcing the notion of unending energy resources. And before the first 100 years of the United States had passed, oil was discovered in Pennsylvania. The story of the growth of oil and gas is known to nearly everyone and for the next 125 years, the United States was the world's biggest producer of petroleum until it was overtaken by the Soviet Union a few years ago.

During March of this year, for the first time in our history, the United States imported more oil than it produced. The ratio was 51 percent to 49 percent, although the balance has now improved to about 45 percent imported. The cost to us during March was $4 million per hour, 24 hours a day, seven days a week. The United States no longer has control over price, quality, or quantity of its oil imports, and even a tiny abberration in international affairs could have drastic results.

The real reason for the present situation, according to Mr. Anderson, is not excessive government controls, not a lack of interest and activity by the petroleum industry. The truth is that we are running out of oil. The end is in sight.

It is doubtful that any alternate energy source can have a major impact on the overall energy picture before the end of the century. Geothermal energy and wind energy will probably never supply more than a small fraction of our energy demand. Solar energy will certainly be an important energy factor by the year 2000, and it will eventually be extremely important; but we still have to learn how to collect, store, and transport it. Atomic energy is not the ultimate answer, although nuclear energy growth should be encouraged for the short term. The 56 nuclear reactors in the United States today supply only 1.8 percent of total energy demand. Environmental barriers to the use of coal have caused some coal men to the frustrated conclusion that "we can't mine it and we can't burn it." We do have a lot of coal, though--North Dakota has extensive reserves--and it may become an important factor in the overall energy picture. The future of oil shale is

questionable; it has been said that "the brown mineral in oil shale isn't oil and the rock isn't shale; otherwise the description is correct." Considerable research will be necessary before oil shale becomes an important factor in the total energy picture.

Approximately 30 to 40 billion dollars was spent on the space program. The energy task facing the United States is probably 10 times as large, but some way must be found for us to exist as a nation until new major energy sources are found. Conservation is a large part of the answer, because we waste between one-half and two-thirds of all the energy we consume.

ODDS OF FINDING OIL IN NORTH DAKOTA--

What are the chances of finding oil in North Dakota today compared to the chances in the remainder of the United States? Statistics show that the chances are about the same. Twenty-two percent of the exploratory ("wildcat") wells drilled in North Dakota were successful in 1974. This compares to a 23 percent success ratio for all exploratory wells drilled in the United States in 1974. In 1975, the North Dakota success ratio for wildcat wells dropped to 15 percent while the national success ratio remained about the same, 24 percent. Generally, oil is becoming harder to find in North Dakota than it once was. The success ratio for all wells drilled (wildcat, development, outpost, and extension locations) since oil was discovered in the state until January 1, 1976, is 47 percent. In 1966, the overall success ratio was 55 percent. This eight percent drop reflects the fact that no large oil discoveries (discoveries of oil fields covering broad areas) have been made recently. The discovery of such a large field and its ensuing development, which might involve the drilling of perhaps 30 to 40 additional development wells, would help to raise the overall success ratio.

The table below is a summary of drilling activity in North Dakota in 1975, broken down by counties. A total of 201 wells were drilled in 1975. Of these, 76 wells became producers. Outpost wells are defined as wells located more than one location from a field boundary, but less than a mile and a half away. Extension wells are defined as wells located directly off-setting a field boundary. For practical purposes, these are, in fact, exploratory wells and they would be classified so in most states. For this reason, outpost and extension wells are included with the wildcat wells in calculating success ratios.

Drilling Activity by County

	Wildcat		Development		Outpost		Extension		Total
	Prod	Dry	Prod	Dry	Prod	Dry	Prod	Dry	
Billings			3	2			3		8
Bottineau		9	5	7		3		2	26
Bowman	2	3	1	3			3		12
Burke		3	3			2	1	2	11
Divide		1	3	4	1				9
Dunn		2	2						4
Emmons		5							5
Golden Valley		3							3
Grant		1							1
Hettinger		2							2
McIntosh		3							3
McKenzie			6	5		1		1	13
Morton		1							1
Mountrail		2							2
Pierce		3							3
Renville	2	11	26	11		3	1	5	59
Slope		1							1
Stark		3	6	6				2	17
Ward		7				2			9
Williams	2	3	6					1	12
State Total	6	63	61	38	1	11	8	13	201

URANIUM IN NORTH DAKOTA--

The major North Dakota uranium occurrences that have been discovered up to now are found in thin lignite beds that immediately overlie or underlie a sandstone that acted as an aquifer. Groundwater moving through overlying sediments that contain uranium-bearing volcanic ash took the metal into solution as it moved through these sediments. Then, as the water containing the uranium moved through the aquifer and came in contact with the lignite, the organic compounds in the lignite extracted and concentrated the uranium from the water, somewhat like a filter removes particles from water.

Although uranium in lignite and related carbonaceous or organic material is fairly common, the only commercial American production from this source has come from the southwestern North Dakota and northwestern South Dakota area. Ore-grade uraniferous lignite was found in 1955 between Belfield and Amidon in southeastern Billings County. The first shipment of North Dakota ore was made from this area in 1956, but only a few hundred tons were shipped from both North and South Dakota in the 1950s because the lignite was not amenable to milling by the methods applied to the common sandstone ore of the Colorado Plateau. From 1962 to 1967, uraniferous lignite of the Dakotas was burned in kilns or pits; the ash was then shipped to mills in South Dakota, Colorado, and New Mexico where it was blended and treated along with sandstone ores. Both the burning and mining had been discontinued by the end of 1967, apparently because market demand could be more profitably satisfied elsewhere.

The total production from North Dakota during the 1962-67 period was listed by the U.S. Atomic Energy Commission as 85,138 tons of ore yielding 296 tons of "yellow cake" (U_3O_8). As of January 1, 1976, uranium ore reserves in North Dakota were listed at 240 tons of U_3O_8 at maximum "forward costs" of $8 per pound. "Forward costs" are those operating and capital costs yet to be incurred at the time an estimate is made. In other words, if you are willing to spend an additional $8 to obtain a pound of U_3O_8 (in addition to past expenditures for property acquisition, exploration, mine development, etc.), reserves will amount to 240 tons. At forward costs of $10 per pound, reserves are 446 tons; at $15, reserves are 919 tons; and at $30 per pound, reserves would be 1,192 tons of U_3O_8.

URANIUM STUDIES PUBLISHED--

The North Dakota Geological Survey and the University of North Dakota Geology Department cooperated over the past year in a study funded by the Energy Research and Development Administration (ERDA) to investigate uranium potential in southwest North Dakota. Aquifers in all the formations above the Pierre and below the Golden Valley Formation were investigated as potential source rocks for uranium.

As a result of the study, we published four new reports last month. The titles and authors of the new publications are as follows:

1. Geology of the Fox Hills Formation (Late Cretaceous) in the Williston Basin of North Dakota, With Reference to Uranium Potential by A. M. Cvancara; North Dakota Geological Survey Report of Investigation No. 55

2. The Stratigraphy and Environments of Deposition of the Cretacaceous Hell Creek Formation (Reconnaissance) and the Paleocene Ludlow Formation (Detailed), Southwestern North Dakota by Walter L. Moore; North Dakota Geological Survey Report of Investigation No. 56

3. Geology of the Cannonball Formation (Paleocene) in the Williston Basin, With Reference to Uranium Potential by A. M. Cvancara; North Dakota Geological Survey Report of Investigation No. 57

4. Geology of the Upper Part of the Fort Union Group (Paleocene), Williston Basin, With Reference to Uranium by Arthur F. Jacob; North Dakota Geological Survey Report of Investigation No. 58

These reports may be obtained from the North Dakota Geological Survey.

WYOMING COAL SLURRY PIPELINE STUDY--

The North Dakota Geological Survey is cooperating with the United States Geological Survey by supplying data for a study of the Mississippian Madison Group in the Powder River and Williston basins in Wyoming, Montana, and North and South Dakota. The study is being conducted to see how the Madison in these basins will be affected by withdrawal of water for the proposed Wyoming to Arkansas Coal Slurry Pipeline. The Madison is the largest oil-producing formation in North Dakota, and a number of Madison oil fields are under pressure maintenance programs.

BRINE DISPOSAL STUDY UNDERWAY--

The Cretaceous Newcastle, Fall River, and Lakota Formations and the Pennsylvanian Minnelusa Formation are being studied with a view toward future brine disposal. Oil field brines currently are the only brines being disposed of in North Dakota. These are being injected into the sands of the Cretaceous Fall River-Lakota Formations and the Mississippian Madison Group. However, it is expected that, with gasification and liquefaction of lignite, and the possible development of a potash industry, it will be necessary to dispose of other brines.

GEOLOGY AND THE ENVIRONMENT--

The NDGS is involved in a variety of projects of an environmental nature. A nearly-finished, detailed hydrologic study on a sanitary landfill site in typically glaciated terrain near Langdon, North Dakota, will help us to evaluate the effects of solid waste disposal on local groundwater supplies in other areas. We continue to cooperate with the State Health Department in evaluating possible landfill sites for communities throughout the state.

We recently finished a study providing physical data for the four counties included in the Red River Resources Conservation and Development Council (Pembina, Walsh, Nelson, and Grand Forks Counties). The study involved the preparation of maps showing evaluations of water and mineral resources, construction suitability, waste disposal suitability, and geologic hazards. These maps will be used to help in establishing sound land-use planning in the area. A similar study of the physical environment by NDGS personnel involves geology, soils, water, and vegetation in the Minot area.

HISTORICAL NOTE FOR A BICENTENNIAL YEAR--

Geological exploration of western North and South Dakota started over a century ago through the chance meeting of perhaps the most productive, cantankerous, grand old man of American geology, James Hall of New York, and a young medical student from Oberlin College in Ohio, Ferdinand V. Hayden.

In the mid 1850s, the Sioux were confronted with the ageless problem of an interloper of questionable sanity. After all, what person would scurry about in the summer dust and January snow, clambering over rattlesnake-infested ledges, tirelessly inching his way up steep buttes, and perching on the edge of space, hammering large rocks into little rocks? "Man-who-picks-up-stones-running" was judged to be ill-in-the-head and quite harmless; as to the latter, he was; to the former, not quite. Hayden had many miles to go before he died.

Hayden and Hall met while Hayden was a student at Oberlin. Hayden moved to Albany, New York, to enter medical school and study geology with Hall, living with the Halls. Upon graduation, a combination of Hall's prodigious need for new fossil materials and Hayden's desire to venture into the unknown, led Hayden, under the leadership of Fielding B. Meek, already a noted paleontologist, to undertake explorations and fossil collecting in the badlands of what is now South Dakota. Hayden did not go back to a medical practice at the end of that first summer; rather, he devoted his energies to the exploration of the Northern Plains.

From these early travels of Hayden evolved the first of the great American Surveys. Western North Dakota (Fort Union) was a jumping-off point for explorations that resulted in the first real knowledge of North Dakota and Montana lignites. Hayden's reports led to the establishment in 1872 of Yellowstone National Park, and thus the entire national park system. He discovered the cliff dwellings of Mesa Verde in 1874, and his reports precipitated the first of three gold rushes to Cripple Creek, Colorado, in 1873. A wealth of fossil dinosaurs and mammals of our region were added to the collections of the U.S. National Museum.

Hayden's glowing reports of the potential of the Great Plains and the Mountain West sparked a generation of expansion west of the Mississippi. Agricultural pioneers led this expansion; Hayden's reports provided the western congressmen and entrepreneurs with the weapons to open the purse strings of the federal government and eastern financial centers to develop the west.

Dedicated to his purpose, skilled in his field, and tireless in his zeal, Hayden is a good representative of the kind of people -47° does not keep out.

ENERGY: THE SEARCH GOES ON--

The North Dakota Geological Survey, and especially E. A. Noble, helped the University of North Dakota News Service produce a half-hour television program on significant energy research underway on the UND campus in Grand Forks. Entitled "Energy: The Search Goes On," the program was shown on Prairie Public Television at 7:30 p.m., Monday, June 21, on KGFE, channel 2, Grand Forks, and KFME, channel 13, Fargo. Developed with technical assistance from the Office of Instructional Communications, the program was written by Rosemary Vocino, former University Relations staff member, and narrated by Myron Curry of the Speech Department. The program deals with Project Lignite, a multi-million dollar effort to discover methods of liquifying coal; Project Reclamation, a major attempt to find better ways of reclaiming spoil banks; the Engineering Experiment Station, which is conducting numerous energy-related studies; and a variety of other research activities.

Hopefully, the program will be aired at a later date as well as on the June 21 date.

NEW EDUCATIONAL MATERIALS--

Our efforts at providing educational materials continue; work is underway on a nontechnical North Dakota geology book (The Face of North Dakota--The Geologic Story) that should fill a need for

earth science teachers and serve as a handbook on North Dakota geology for interested non-geologists. We have a geologic highway map in the drafting stage, and we will soon have a geologic postcard available. We recently completed a variety of interpretive educational materials which we provided to several state parks, to the U.S. Forest Service, and to the State Department of Public Instruction. Survey staff members continue to speak to a variety of groups, and our program aids see heavy use. We have completed our guidebook series on the geology of North Dakota. Even as we completed the last two guidebooks--the ones on northwest and southwest North Dakota--it became necessary to reprint the first four guidebooks, all of which had been in short supply, as well as our non-technical publication on the prairie, and our pamphlet describing the geology along the South Loop Road in Theodore Roosevelt National Memorial Park. We also completed another taped slide commentary recently, this one on energy as it relates to North Dakota.

ROCK AND MINERAL COLLECTING IN NORTH DAKOTA--

The Survey receives many requests from "rockhounds" for information about rock and mineral collecting in North Dakota. North Dakota has no surface exposures of igneous or metamorphic rock in which deposits of the more valuable gem stones are commonly found. It is one of about 15 states each of whose annual production of gem stones, as estimated over the years by the U.S. Geological Survey and the U.S. Bureau of Mines, has been $1,000 or less. Even so, many interesting varieties of rocks and minerals are found in the state.

The gem stones of North Dakota are principally those formed by the precipitation of silica from cold water solutions. Moss agates are found in the gravels of the Yellowstone and Missouri Rivers in McKenzie County, especially on gravel bars where the Yellowstone and Missouri Rivers join, and near the town of Cartwright. Scenic agate, tube agate, iris agate, jasper, and sard are all commonly found in western North Dakota. Lake Superior type agates have been found along the Red River in places, and in the old beaches of Lake Agassiz.

Petrified wood is found in areas where the Hell Creek, Ludlow, Tongue River, and Sentinel Butte Formations are exposed, especially in badlands areas (a generalized geologic map of North Dakota that shows where these formations are exposed is available from the Survey). Petrified wood is common along the Little Missouri River in McKenzie County. An excellent occurrence of petrified wood is located northeast of Searing in McKenzie County, and another location is 11 miles northwest of Mott in Hettinger County. Another outstanding location is about 10 miles north of Taylor in Dunn County. Petrified wood can be collected in many locations along the Cannonball River in Hettinger County and along the Cedar River in Adams County. The wood along the Cannonball River in Grant County is particularly well silicified.

Agatized fossil Sequoia cones and wood are recovered from the Hell Creek Formation near the junction of the Cannonball River and Cedar Creek in Grant County. The silicified, dark brown, walnut-sized cones, which belong to the species Sequoia dakotensis, may be exceptionally well preserved. Silicified pods of the extinct Katsura tree, the Tempyska fern, and Osmundites are also found with petrified wood.

Teredo-bored petrified wood is a fossil wood riddled with irregular, elongate borings that give the substance an abstract appearance. The borings were made by worm-like, bivalve mollusks ("clams") that are commonly called shipworms. (One genus of shipworm is Teredo; several other genera may have been responsible for the borings.) Modern species of shipworms bore their way into driftwood, pilings, and even ships. Teredo-bored wood found along the lower Sheyenne River in Ransom County is well silicified, jet black with the Teredo borings filled with amber-colored chalcedony. Teredo-bored wood is found in rock formations of marine origin. Most of the North Dakota Teredo wood has been collected from the Cannonball Formation, especially in the Bismarck-Mandan area. Teredo-bored wood has been officially designated as North Dakota's state fossil.

Rhomboidal gypsum crystals are common in places in the Cretaceous Hell Creek Formation and in the Tertiary Ludlow Formation where they crop out in Morton County. "Rosettes" of marcasite crystals are found in the Tertiary coal beds in many places. Gypsum crystals are also abundant in the shale of the Carlile Formation, exposed in the Pembina Hills area of northeastern North Dakota, and in offshore sediment of glacial Lake Agassiz. At the current rate of production, the deposits of these materials are virtually inexhaustible.

Less well-known materials of potential interest to the rock hobbyist occur in the state, and still other materials not yet known to occur or not now exploited might well be searched for. Glassy clinker from burnt coalbeds, similar to obsidian and pitchstone, is apparently little used for gem purposes despite its attractive appearance. Prospecting could also be carried on for hard vitreous clots of coal from the vicinity of coal fires, which could be used like jet. The possibility exists that the bentonite beds in Stark and Bowman Counties, and elsewhere in the state, may contain opaline quartz, barite concretions, celestite crystals, zeolites, and other gem materials. Glacial erratic boulders, found throughout the glaciated areas of the state, may contain any of a large variety of gem materials, but the occurrence of these is entirely unpredictable.

UND GEOLOGY DEPARTMENT--

The North Dakota Geological Survey is fortunate in being right "next door" to the University of North Dakota Geology Department. The North Dakota Geological Survey was established by legislative action in 1895, with the Professor of Geology of the State University acting ex officio as State Geologist and the resulting integration of the Geology Department and the NDGS has benefited both agencies throughout the years. It has been helpful to students who have had the advantage of Survey experience during their training period, and it has allowed the Survey to undertake projects for which manpower would be otherwise unavailable.

The Department of Geology of the University of North Dakota maintains a strong curriculum in the traditional phases of geologic studies; graduate research is correspondingly broad. Teaching and research programs emphasize field aspects of geology. Field trips are part of many undergraduate and graduate courses, and emphasis is placed on the ability of students to use laboratory and classroom experience to map and interpret geology in the field. In addition, most graduate research involves or is oriented toward fieldwork.

Twelve faculty work with an average of 55 undergraduate majors and 35 graduate students, of which a third are doctoral candidates. Faculty members include:

1. Odin Christensen (Ph.D., 1975, Stanford Univ.), Assistant Professor;
2. Lee Clayton (Ph.D., 1965, Univ. Illinois), Professor;
3. Timothy Cross (Ph.D., 1976, Univ. So. California), Assistant Professor;
4. Alan Cvancara (Ph.D., 1965, Univ. Michigan), Professor;
5. C. B. Folsom (M.S., 1952, Colo. Sch. Mines);
6. Lee Gerhard (Ph.D., 1964, Univ. Kansas), Associate Professor;
7. F. D. Holland, Jr. (Ph.D., 1958, Univ. Cincinnati) Professor;
8. Frank Karner (Ph.D., 1963, Univ. Illinois), Professor;
9. Walter Moore (Ph.D., 1959, Univ. Wisconsin), Professor;
10. Stephen Moran (Ph.D., 1969, Univ. Illinois), Associate Professor;
11. E. A. Noble (Ph.D., 1961, Univ. Wyoming), Professor, Departmental Chairman, and North Dakota State Geologist; and
12. John Reid (Ph.D., 1961, Univ. Michigan), Professor.

GEOLOGY LIBRARY--

The Geology Library, shared by Survey, Faculty, and UND students, is a branch of the University of North Dakota Chester Fritz Library. It is located on the third floor of Leonard Hall directly across from the NDGS offices. The Geology Library contains approximately 15,000 bound volumes, including about 11,000 books. The library subscribes to more than 200 different earth science and related journals. It is a repository for all U.S. Geological Survey topographic and geologic maps and its other publications. Copies of all theses that have been completed in the UND Geology Department are available in the library. In addition, the Geology Library contains the publications of the other State Geological Surveys and geological publications of numerous foreign countries. The library receives materials from approximately 300 places in exchange for NDGS publications. Special geologic maps and aerial photographs are available for use in the library.

SEDIMENTOLOGICAL ANALOG BEGUN--

Oil-producing carbonate rocks of the Madison Group Frobisher-Alida interval (Mississippian age) and the Red River Formation (Ordovician age) are typically shallow-water strandline deposits with complex diagenetic histories. Initial studies of these rock units, now underway at the NDGS, concentrate on porosity development in the Glenburn Field (Madison Group) and a reconnaissance of the Red River Formation.

Questions under study in each of these units are:

1. What were the depositional environments?
2. What was the origin of the carbonate grains?
3. What are the origins of the mud, which is matrix and, in some cases, the whole rock?
4. What is the diagenetic paragenesis and what boundary conditions controlled porosity development?
5. What are the trapping factors?

Modern analogs of shelf and strandline environments will be used to aid in interpretations. A Faculty Research Grant to Drs. Timothy Cross and Lee Gerhard entitled "Modern Sedimentological Analog for Petroliferous Strata, Williston Basin, North Dakota: An Unusual Occurrence of Mixed Limestone and Clastic Sediments" has supported a field-sampling program on the northern peripheral shelf of St. Croix, U.S. Virgin Islands, in a corollary study to the North Dakota Madison and Red River Formation studies.

LIGNITE AND STRIP MINING--

The North Dakota Geological Survey continues to become increasingly involved in studies aimed at evaluating the state's lignite resources and developing methods for successfully returning strip-mined lands to original or better vegetation productivity. The Survey currently has several studies underway dealing with strip-mining effects on the physical environment as well as several studies pertaining to the reclamation of mined lands. During the past year, Survey staff personnel mapped lignite deposits in several areas as part of the county groundwater studies or as specific studies dealing with depositional environments of coal-bearing strata.

A contract with the United States Geological Survey Conservation Branch last year enabled us to proceed with a drilling and logging program to determine the depth, thickness, and quality and to correlate significant strippable lignite beds. During the 1975 field season, drilling was conducted in the Williston, Gascoyne, and Dunn Center to Stanton areas in an attempt to develop a preliminary inventory of overburden materials. This inventory should serve as a basis for studies related to reclamation potential or problems and it should serve as a data base to make preliminary estimates of the effect of mining on local subsurface hydrologic conditions. The contract has been renewed for the 1976 field season.

A grant from the Old West Regional Commission has enabled us to work out the detailed stratigraphy of the coal-bearing strata in the Underwood and Beulah areas. This two-year study involves instrumentation and collection of baseline hydrologic data with predictive modeling of the effects of mining upon groundwater supplies in the soon-to-be-mined Underwood area. We have been able to proceed with instrumentation and monitoring of the effects of mining on groundwater in an active mining area, the Indianhead Mine at Beulah. This involves chemical analyses of the overburden and determination of lithologic and hydrologic controls on the overburden materials. Drs. Gerry Groenewold and Steve Moran of the NDGS are now preparing the final report, to be out in July, of the two-year study. A similar study is underway at the Center Mine. Detailed geologic and hydrologic studies in the Knife River Basin will further assist the state in planning for the orderly development of coal resources in that area.

Another detailed study funded by North Dakota's Regional Environmental Assessment Program (REAP) concerns the geology and hydrogeology of the Knife River Basin area, which includes parts of Dunn, Mercer, and McLean Counties. This study is getting underway this summer.

PROJECTED NORTH DAKOTA COAL PRODUCTION--

We get a lot of inquiries from people who want to know who produces coal in North Dakota, how much they produce and what future production will be. The NDGS does not compile these statistics; they are handled by the U.S. Bureau of Mines, the Safety Division of the Workmans Compensation Bureau, and the State Tax Department. I do, however, have some preliminary data that may be of interest to some of you. I've compiled the statistics into a table, which follows. NDGS personnel cooperated with the Bureau of Mines in arriving at the statistics. Please note that the data listed are only preliminary estimates, based on our best knowledge as of June, 1976.

Estimated Future Production of
North Dakota Coal Mines
(June, 1976 Estimates)

County	Operator and Mine	Estimated Production (million short tons of coal) 1976	1978	1980	1982	1985
Adams	NL Industries, Inc. Smith-Ullman Mine	(less than 50,000 tons annually)				
Bowman	Knife River Coal Mining Co. Gascoyne Mine	2.5	2.5	2.5	2.5	2.5
Burke	Baukol Noonan, Inc. Larson Mine	.4	.4	.4	.4	.4
Dunn	Amax Coal Co.	--	--	--	13.0	13.0
Grant	Sprecher Coal Co. Sprecher Mine	(less than 50,000 tons annually)				
McLean	Falkirk Mining Co. Falkirk Mine	--	1.4	5.5	5.5	5.5
Mercer	Coteau Properties Co., Inc.[A/] Coteau Mine				5.0 2.5	10.0 5.0
Mercer	North American Coal Co. Indian Head Mine	1.3	1.3	1.3	1.3	1.3
Mercer/Oliver	Consolidation Coal Co. Glenharold	3.8	3.8	3.8	3.8	3.8
Mercer/Oliver	Knife River Coal Mining Co. Beulah Mine	1.7	1.7	1.7	4.2	4.2
Oliver	Baukol Noonan, Inc. Center Mine	1.6	4.4	4.4	4.4	4.4
Stark	Dickinson Coal Mining Co.	(less than 50,000 tons annually)				
Stark	Husky Industries--Husky Mine	.2	.2	.2	.2	.2
Ward	Consolidation Coal Co. Velva Mine	.6	.6	.6	.6	.6
Williams	Geo-Resources, Inc. Nelson Pit	(less than 50,000 tons annually)				
	ESTIMATED TOTALS	12.1	16.3	20.4	43.4	50.9

A/ A subsidiary of North American Coal Co.

WHOLESALE GASOLINE PRICES--

(This item has been adapted from an item in the Kansas Energy Newsletter for May/June, 1976).

According to a report by the Environment and Natural Resources Policy Division of the Congressional Research Service, prepared at the request of Senator Russell Long of Louisiana, when allowance is made for inflation, the price of a gallon of gasoline has risen only 3.28¢ in the past 25 years. In fact, the adjusted wholesale price of gasoline in 1972 and 1973 was almost 2¢ per gallon less than the 1951 price. Even with the relatively great increases since 1973, wholesale price increases over the 25-year period have been less than those for most other products.

The figures suggest at least three tentative conclusions:

1. The oil companies have done a reasonable job of supplying gasoline to the American consumer at "bargain" prices;
2. The relatively low increase in gasoline prices is one good reason for the lack of a legitimate attempt at fuel conservation by the American consumer;
3. There was some substance to the claim by the Arab nations that they had not been receiving a fair price for their crude oil.

Year	Wholesale Price (cents/gal.)	Adjusted Wholesale Price (cents/gal., 1950 dollars)
1950	10.86	10.86
1951	11.40	10.27
1952	11.38	10.54
1953	12.01	11.22
1954	11.66	10.90
1955	11.62	10.86
1956	11.75	10.59
1957	12.34	10.82
1958	11.74	10.12
1959	11.64	10.03
1960	11.61	10.01
1961	11.62	10.02
1962	11.52	9.93
1963	11.35	9.78
1964	11.27	9.72
1965	11.52	9.93
1966	11.59	9.50
1967	11.84	9.70
1968	11.55	9.24
1969	11.80	9.08
1970	12.33	9.13
1971	12.70	9.14
1972	12.70	8.70
1973	14.72	8.92
1974	25.53	13.03
1975	30.27	14.14

SURVEY ISSUES FIRST POTASH PERMIT--

The NDGS has issued the first permit for potash exploration, under the General Rules and Regulations for the Exploration and Production of Subsurface Minerals, which were adopted by the State Industrial Commission on August 1, 1968.

The potash permit went to the Burlington Northern Railroad for their #4-11 Helming located in the SE¼, Section 11, T. 159 N., R. 83 W., Bottineau County.

DRILLING PERMITS ISSUED BY THE NORTH DAKOTA GEOLOGICAL SURVEY--

From the last printing of the Newsletter to June 1, 1976, there have been 97 permits issued by the Oil and Gas Section of the Survey. Permits issued each month are listed in the Monthly Oil Production Report. Anyone desiring this information should subscribe to that publication.