

Michigan Geological Survey, Michigan Department of Natural Resources, Ann. Stat. Sum. 28, MICHIGAN'S OIL AND GAS FIELDS, 1977



Annual Statistical Summary 28

drilling statistics

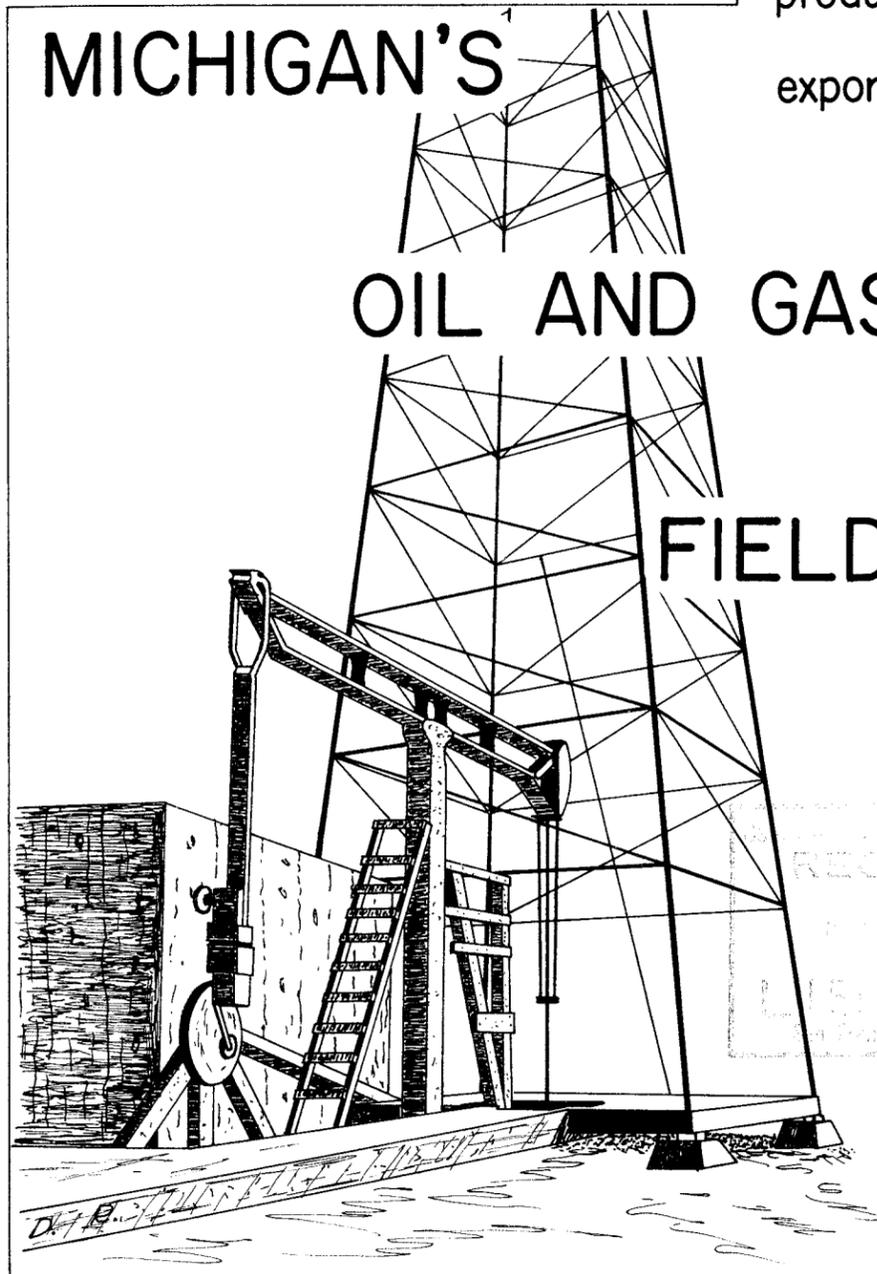
production

exports and imports

MICHIGAN'S

OIL AND GAS

FIELDS, 1977



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CONTENTS

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On November 14, 1977 the name GEOLOGICAL SURVEY DIVISION was reinstated. This name replaces the names GEOLOGY DIVISION and DIVISION OF GEOLOGY, which were in use from July 1, 1976 to November 13, 1977.

Michigan's Oil and Gas Field Annual Statistical Summaries are numbered with consecutive even numbers. Consecutive odd numbers are reserved for Mineral Industry of Michigan Annual Statistical Summaries.

PART 1
GENERAL STATISTICAL INFORMATION

	Page
Acknowledgements	2
Introduction	3
Oil and Gas Permits	3
Permits Terminated in 1977	4
Directionally Drilled Holes, 1977	4
Permits for Service Wells	5
Oil and Gas Hearings	5
Well Completions	5
Well Completions by Majors and Independents in 1977	5
Well Casing Used in 1977	6
Geological Survey Division Field Offices	7
Oil and Gas Districts Map	7
Drilled Footage	8
Oil and Gas Production by County	8
Oil and Gas Production	8
Condensate Production	9
Special Orders: No Flare, Spacing and Proration, Explanation	9
Oil and Gas Valuation	9
Oil and Gas Imports and Exports	9
New Field and Pool Discoveries	10
Analysis of Discovery Wells by Geologic System	13
Drilling Objectives	13
State Oil and Gas Revenues	13
Well Records and Oil and Gas Maps	13
Permits, Well Completions, Drilled Footage, Table 1	14

PART 2
OIL AND GAS FIELDS

Part 2, Oil and Gas Fields, Explanation	15
Northern Michigan Salina-Niagaran Oil and Gas Fields, Table 2	16-29
Northern Michigan Salina-Niagaran Oil and Gas Fields, Map	18-19
Michigan Oil and Gas Fields, Table 3	30-49
Michigan Oil and Gas Fields, Map	34-35
Gas Storage Reservoirs, Table 4	50-51
Pressure Maintenance and Secondary Recovery Operations, Table 5	52
Gas Plant Operations, Table 6	53
Michigan Refineries	53

PART 3
CUMULATIVE RECORDS

Part 3, Cumulative Records, Explanation	54
Cumulative Oil and Gas by County, 1977	55
Oil Production by Geologic System, Table 8	56
Trends in Michigan Oil Production	57
Gas Production by Geologic System, Table 9	58
Trends in Michigan Gas Production	59
Cumulative Oil by Geologic System, Table 10	60
Cumulative Gas by Geologic System, Table 11	61
Average Daily Oil and Gas Production by County	62
Cumulative Well Completions by County, Table 12	63
Permits, Discoveries, Well Completions, 1977 and Prior Years, Table 13	64
Precambrian Tests in Southern Peninsula	65
State Oil and Gas Revenue	66
Abbreviations	66
Directionally Drilled Holes, 1977	67
Directional Holes with Multiple Permit Numbers	67
New Permits for Previously Drilled Wells	68
Stratigraphic Succession in Michigan	Inside Back Cover

ACKNOWLEDGEMENTS

The Geological Survey Division's Oil and Gas Section consists of a Regulatory Control Unit, a Production-Proration Unit, and a Subsurface and Petroleum Geology Unit. A Cartographic Subunit is under the management of the Subsurface and Petroleum Geology Unit. Field operations are handled by personnel assigned to field offices within DNR Regions II and III. A Regional Geologist, under the supervision of the Regional Director, guides the overall activities of the several field offices within his region. Field offices are located at Plainwell, Cadillac, Gaylord, Mt. Pleasant, Imlay City, and Lansing. Field activities are mainly those associated with the responsibilities of the Regulatory Control and Production-Proration Units, but do include the gathering of certain year end oil-and-gas field statistics used to a limited extent in this report.

The compilation and assembly of various oil and gas field data into a yearly report is a major responsibility of the Subsurface and Petroleum Geology Unit. Certain data collected by field office personnel are contributed to this report by Unit supervisors who are under the general supervision of R. M. Acker, Assistant State Geologist and Chief of the Oil and Gas Section. Unit supervisors who provided specific information are:

S. L. Alguire, Supervisor, Regulatory Control Unit.

Contribution: All data in columns under the headings "Number of Oil and Gas Wells" and "Brine Production" on Tables 2, 3, and 4.

James S. Lorenz, Supervisor, Production-Proration Unit.

Contribution: All Michigan oil and gas production data, oil and gas valuation figures, import and export figures, LPG and condensate figures, secondary recovery projects (Table 5), and refineries.

G. D. Ells, Supervisor, and D. M. Bricker and staff, Subsurface and Petroleum Geology Unit. All general drilling statistics and well completion data, discovery well and deep test data, cumulative records, and all other summary information not specifically provided by other Unit supervisors or by other agencies. Maintenance and compilation of statistics, assembly and manuscript preparation by staff members of the Subsurface and Petroleum Geology Unit: G. D. Ells, D. M. Bricker, R. C. Elowski, A. G. Ostrander, M. A. Morris, Margaret Schineman, Diane Schulte, Anita Welton, and Jane Thomas.

The compilers also acknowledge the assistance of Gas Section personnel, Public Utilities Division, Department of Commerce, in providing figures on natural gas imports via interstate pipelines, and the Lands Division, Department of Natural Resources, in providing figures for state revenue derived from various oil and gas transactions.

Michigan oil and gas production figures maintained by the Production-Proration Unit are compiled by the Unit from records obtained from the Michigan Department of Treasury and from records filed by producers and purchasers. All hydrocarbon production figures cited herein are subject to correction as warranted.

Inquiries concerning information contained in this publication should be directed to the appropriate Unit supervisor as noted earlier.

Compilers: G. D. Ells
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Lansing, Michigan
October, 1978

MICHIGAN'S OIL AND GAS FIELDS, 1977

INTRODUCTION

To help foster the development of Michigan's hydrocarbon resources, statistical data have been maintained and published for many years. This issue of the oil and gas field statistical summary brings together information on various facets of Michigan's oil and gas industry activities during 1977. Certain indices which show the trend of these activities from year to year are shown in chart form along with figures from prior years. Other charts reflect cumulative data and other historical information useful in oil and gas field evaluation.

The information contained in the 1977 oil and gas summary has been treated as uniformly as possible from year to year so that the data reflect accurately the actual figures and other information that should be credited to this year. The data found herein are mainly derived from records maintained by the Oil and Gas Section, Geological Survey Division, Department of Natural Resources.

This publication is essentially divided into three parts. The first summarizes significant statistics on oil and gas field activities for 1977 and includes other related records kept by the Oil and Gas Section. Part 2 contains specific information on Michigan's oil and gas fields, gas storage fields, and other related subjects. Part 3 contains cumulative records important to the oil and gas industry. Data for 1977 have been included in these cumulative records.

Certain well completion data are furnished to the American Petroleum Institute (API) and the American Association of Petroleum Geologists (AAPG) on a regular basis. Reports citing preliminary oil and gas statistics and production figures are also prepared for the Interstate Oil Compact Commission (IOCC). API publishes the data in monthly and quarterly reports. Year-end printouts of the data are made available to authors of the AAPG yearly Development Papers and to others. Year-end figures published by API are in general agreement with figures for similar categories published in this summary. Differences which may occur are shown under the appropriate subject heading in this report. Oil and gas production data are supplied by request to the United States Bureau of Mines for publication in their minerals yearbook.

Statistical data on Michigan oil and gas activities, derived from outside sources, are also published by the Oil and Gas News, Mt. Pleasant, Michigan; Petroleum Information, Incorporated, Denver, Colorado; American Petroleum Institute, Washington, D.C.; American Association of Petroleum Geologists, Tulsa, Oklahoma; Interstate Oil Compact Commission, Oklahoma City, Oklahoma; World Oil, Houston, Texas; and Oil and Gas Journal, Tulsa, Oklahoma.

It should be noted that certain figures for the number of exploratory, development, and service wells drilled and completed, the number of new fields and pools discovered, oil and gas production figures, and other data published in this summary may differ from figures reported by regional or national trade publications or by industry reporting services in 1977. The differences in the various statistics are generally minor and are due to methods of gathering and reporting well data, determining cutoff dates for reporting yearly statistics, and the necessity for making projections and estimates for certain types of reports.

Other factors which may result in statistical differences are internal decisions of the Oil and Gas Section regarding final year-end status of completed wells and decisions resulting from public hearings on oil and gas matters. For example, a well originally classified as a development well, and reported as such to one of the above organizations, may later be reclassified as the discovery well for a new pool or field, or a gas well might later be declared an oil well completion on the basis of new evidence. Frequently the changes in well status cannot be readily passed on to these outside organizations so that their records can be updated prior to publication of their final statistics. The discrepancies in year-end figures are almost without exception related to Niagaran reef exploration and development which has formed the largest part of Michigan drilling activities for the past several years.

PART I

1977 STATISTICAL DATA

*** OIL AND GAS PERMITS ***

Oil and gas drilling permits issued under Act 61, P.A. of 1939, as amended, during 1977 began with permit number 31415 and ended with permit number 32106. The total number of permits issued in 1977 was 692 as compared with 645 in 1976. The initial classification of wells to be drilled under these permits was as follows:

INITIAL CLASSIFICATION	1975	1976	1977
Exploratory wells	319	331	338
Development wells	293	253	296
Gas storage facility wells .	37	36	53*
Brine disposal wells	4	25	5
	<u>653</u>	<u>645</u>	<u>692</u>

*Includes 2 LPG storage wells.

The distribution of oil and gas drilling permits according to districts (see oil and gas districts map) through a five year period, including 1977, is as follows:

DISTRICTS	DRILLING PERMITS BY DISTRICT				
	Permits Issued				
	1973	1974	1975	1976	1977
Basin	120	98	100	110	135
Northern	173	210	219	221	261
Southeastern	67	62	70	98	111
Southwestern	28	44	108	73	67
Western	56	89	156	143	118
Totals	444*	503*	653*	645*	692*

*Includes terminated permits. Permits issued under Act 61, P.A. of 1939, as amended, are terminated one year after date of issue if actual drilling operations have not begun.

Since 1975, permits to drill wells for oil field brine disposal have been issued under the regular permit numbering system rather than under a separate permit numbering system as was done in the past. Deepening permits were issued for 51 wells during 1977 as compared with 47 the previous year. Deepening permits issued in 1977 began with number 1866 and ended with number 1916.

Michigan's oil and gas permit system began in 1927 with the issuance of permit number 1. Since then, permit numbers have been issued in numerically consecutive order. In many cases, wells which have been previously drilled and abandoned have been reopened and reworked under a new permit number. Also, some well locations for which permit numbers were issued but later terminated have been re-permitted and assigned new permit numbers. Such multiple permit numbers for the same well location may lead to some confusion. Therefore an attempt is being made to keep a published account of these possible sources of conflict. Terminated permits were listed for the first time in Annual Statistical Summary 16, 1972. Permit numbers issued for wells drilled under previous permits, or new permit numbers issued for terminated permits, were cited for the first time in Annual Statistical Summary 18, 1973. Permit numbers issued in 1977 for a previously drilled well or for a previously terminated permit are listed in Part 3. Permits issued in 1976 and terminated in 1977 are shown below.

Permits issued in 1976 and terminated in 1977

1859*	31135	31268	31390
1860*	31193	31272	31396
31007	31194	31285	31397
31032	31227	31299	31411
31065	31232	31309	31413
31072	31236	31311	31414
31110	31238	31324	
31123	31257	31332	
31124	31260	31349	

*Deepening permits

Directionally drilled holes. Environmental and economic considerations have necessitated the drilling of a large number of directional holes since 1972, particularly to help locate Niagaran reefs. Many of these holes involve using the upper part of a previously drilled hole which, after being initially completed as a dry hole, was plugged back to an appropriate depth and directionally drilled to a more favorable subsurface location. These directionally drilled holes fall in three main categories: 1) a single directional hole completed as either a producer or a dry hole; 2) cases where two or more directional holes have been drilled to separate bottom-hole targets from the same surface location by using the same upper part of the hole; and 3) cases where one or more directional holes have been deviated to new bottom-hole targets after the original vertically drilled test failed to encounter reefing. Only one producing well is allowed per well bore, regardless of the number of holes directionally drilled from the same well bore.

Each new directional hole, even if drilled from the same surface location and using the upper part of a previously drilled test, is treated as a separate test and is assigned its own unique permit number. Each additional hole drilled from the same surface location retains the same well name and number as the original hole, except that the suffix "A", "B", "C", etc., is added to the well number. In some instances, permits for directional holes were terminated and then re-permitted under a new number. An attempt has been made to record and publish permit numbers for directionally drilled tests for the benefit of those people who may find the information useful in computer-well data systems. Permit numbers issued for directional holes for 1976 and directional holes with two or more permit numbers are listed in Part 3. Permits issued in 1977 for directional holes are as follows:

Permit numbers issued in 1977 for directional holes

31415	Otsego County	31752	Otsego County
31427	Macomb County	31759	Oakland County
31430	Eaton County	31761	Kalkaska County
31435	Wexford County	31762	Oakland County
31436	Gd. Traverse County	31774	Calhoun County
31437	Gd. Traverse County	31776	Otsego County
31439	Macomb County	31784	Gd. Traverse County
31449	Gd. Traverse County	31785	Mason County
31454	Wexford County	31796	Otsego County
31457	Gd. Traverse County	31798	Otsego County
31460	Gd. Traverse County	31799	Otsego County
31465	Gd. Traverse County	31800	Otsego County
31471	Otsego County	31801	Otsego County
31476	Gd. Traverse County	31803	Wexford County
31481	Manistee County	31816	Kalkaska County
31482	Manistee County	31820	Manistee County
31483	Gd. Traverse County	31822	Manistee County
31489	Manistee County	31823	Kalkaska County
31490	Macomb County	31832	Gd. Traverse County
31503	Calhoun County	31833	Manistee County
31513	Gd. Traverse County	31834	Mason County
31521	Otsego County	31836	Gd. Traverse County
31552	Gd. Traverse County	31848	Macomb County
31554	Gd. Traverse County	31850	Gd. Traverse County
31558	Alpena County	31851	Gd. Traverse County
31559	Gd. Traverse County	31855	Benzie County
31563	Wexford County	31870	Otsego County
31565	Gd. Traverse County	31873	Manistee County
31566	Kalkaska County	31879	Manistee County
31572	Gd. Traverse County	31889	Kalkaska County
31587	Calhoun County	31890	Benzie County
31588	Gd. Traverse County	31894	Manistee County
31591	Gd. Traverse County	31897	Kalkaska County
31599	Kalkaska County	31902	Manistee County
31605	Macomb County	31907	Manistee County
31610	Kalkaska County	31910	Gd. Traverse County
31613	Gd. Traverse County	31925	Kalkaska County
31614	Eaton County	31945	Otsego County
31622	Gd. Traverse County	31948	Gd. Traverse County
31637	Gd. Traverse County	31949	Kalkaska County
31638	Alpena County	31962	Kalkaska County
31641	Gd. Traverse County	31966	Presque Isle County
31642	Manistee County	31971	Manistee County
31643	Gd. Traverse County	31989	Otsego County
31644	Crawford County	31995	Manistee County
31646	Otsego County	31997	Manistee County
31647	Manistee County	32005	Calhoun County
31649	Gd. Traverse County	32006	Manistee County
31650	Macomb County	32008	Otsego County
31656	Kalkaska County	32009	Mason County
31658	Gd. Traverse County	32010	Manistee County
31663	Kalkaska County	32019	Manistee County
31680	Gd. Traverse County	32022	Manistee County
31683	Gd. Traverse County	32032	Otsego County
31693	Kalkaska County	32036	Manistee County
31699	Macomb County	32037	Gd. Traverse County
31700	Macomb County	32059	Manistee County
31702	Kalkaska County	32065	Manistee County
31706	Otsego County	32066	Ingham County
31711	Eaton County	32073	Otsego County
31715	Manistee County	32074	Manistee County
31726	Calhoun County	32086	Gd. Traverse County
31727	Otsego County	32089	Manistee County
31743	Manistee County	32096	Manistee County
31750	Gd. Traverse County	32105	Manistee County

Service well permits. The fluctuation in the number of permits issued to drill gas storage wells and other service well types over a five year period is as follows:

SERVICE WELL PERMITS					
Type of Service Well	1973	1974	1975	1976	1977
Gas storage	66	30	37	28	51
LPG, Water Injection	8	11	0	14	2
Brine disposal, etc.	1	1	4	11	5
	75	42	41	53	58

Rework applications, transfers of ownership, etc. In addition to issuance of permits for various types of wells covered under Act No. 61, P.A. of 1939, as amended, 219 applications were received and approved for rework operations on existing wells. Letters of termination were sent out for 33 previously issued permits. Transfers of ownership were processed for 72 wells. Corrections of location, well name, or other detail involving specific permits were made for 50 wells, and cancel and transfer of permit were made for 9 others. The surface location as well as the projected bottom-hole location is published for each permitted directionally drilled hole. After the well is drilled and the directional survey is filed, the correct bottom-hole location is determined from the survey record and then published as a correction for the initial projected bottom-hole location. Corrections of this type were published for 110 wells drilled during 1976 and 1977.

Oil and gas hearings. During 1977, Oil and Gas Section activities also included scheduling and preparation for hearings on oil and gas matters and the issuance of orders resulting from these hearings. These activities are summarized as follows:

Oil Advisory Board Hearings held	9
Causes heard	41
(Includes 3 causes continued, 4 causes dismissed and 2 causes denied and 1 emergency order.)	
Spacing Orders issued	35
(Includes 9 amendments to spacing orders)	
Abrogation of Spacing Orders	4
Administrative Hearings held	18
Includes: 9 exceptions to spacing orders	
1 pressure maintenance project	
1 exception to general rule	
1 reclassify pool from gas to oil	
1 established 2 separate reservoirs and multiple zone completion	
1 established 2nd well on 160-acre voluntary unit and established proration	
2 unitization orders	
Show Cause Hearing	1
Department Environmental Hearing	1
(10 permits issued in Pigeon River)	

*** WELL COMPLETIONS ***

There were 547 new-hole exploratory and development wells which reached total depth and were considered either completed producers with production casing set, or dry holes during 1977. The 547 wells considered as completed during the past year do not include service wells, old wells drilled to deeper objectives, or reworked wells. Well completion figures for individual counties are shown in Table 1. The fluctuation in the number of new-hole completions and the resulting number of oil, gas, or dry holes over a five year period is as follows:

EXPLORATORY AND DEVELOPMENT WELL COMPLETIONS							
Year	Exploratory Wells			Development Wells		Totals	
	Oil	Gas	Dry	Oil	Gas		
1973	38	37	117	43	10	56	301
1974	54	39	173	80	22	62	430
1975	53	17	213	112	21	117	533
1976	30	36	234	90	21	99	510
1977	35	36	230	101	34	111	547

There were 50 new-hole service well completions in 1977. The figure does not include reworked wells or old wells converted to gas storage facility wells. The fluctuation in the number of service well completions over a five year period is as follows:

SERVICE WELL COMPLETIONS					
Year	GS	INJ	LPG	BDW	Totals
1973	60	5	2	1	68
1974	38	13	2	1	54
1975	37	0	0	1	38
1976	25	13	0	12	50
1977	43	2	1	4	50

Drilling statistics for Michigan published by API and derived from data supplied by the Geological Survey (G.S.) are shown below, along with figures for the same categories published herein as final year-end figures. API figures have been extracted from the Quarterly Review of Drilling Statistics for the United States, Fourth Quarter, 1977, Annual Summary 1977, American Petroleum Institute, Vol. XI, No. 4, March 1978, Tables I, II, III, and V, pp. 14-22.

API EXPLORATORY AND DEVELOPMENT WELL COMPLETIONS							
Year	Exploratory Wells			Development Wells		Totals	
	Oil	Gas	Dry	Oil	Gas		
1977	36	33	260	113	36	117	595
G.S.	35	36	230	101	34	111	547

TOTAL WELLS DRILLED IN MICHIGAN (API)					
Year	Oil	Gas	Dry	Service	Total Wells
	Wells	Wells	Holes	Wells	All Types
1977	149	69	377	5	600
G.S.	136	70	341	50*	597

*API does not require information on wells drilled for gas storage. The Geological Survey considers gas storage wells as a class of Service Well. 43 of the 50 Service Wells cited were gas storage facility wells.

NEW-FIELD WILDCAT WELLS DRILLED IN MICHIGAN (API)					
Year	Oil	Gas	Total Producing	Dry	Total New-Field
	Wells	Wells	Wells	Holes	Wildcat Wells
1977	35	33	68	258	326
G.S.	35	36	71	230	301

Major and independent company well completions. Requests are frequently made for statistics on major oil company drilling activities in Michigan. The figures cited for the major companies do not include wells drilled by independents under farmout agreements with a major company or wells drilled by independents but partially supported by dry hole money or some other significant assistance from a major oil company. Independent oil companies, who have drilled most of Michigan's wells, are too numerous to cite individually. All figures cited for majors and independents were derived from inspection of operator names appearing on completion records. On the following chart, in cases where two or more companies were joint operators in a drilling venture, the well completion was attributed to the company whose name appears first (generally the major interest holder) on the official records. Although there appears to be no single definition of what constitutes a major company, the following companies are frequently cited as belonging in that category: Atlantic-Richfield, Cities Service, Continental Oil Company, Exxon, Getty Oil Company, Gulf Oil Company, Marathon Oil Company, Mobil Oil Corporation, Phillips Petroleum Company, Shell Oil Company, Standard Oil of California, Standard Oil of Indiana, Standard Oil of Ohio, Sun Oil Company, Texaco, Inc., and Union Oil of California. The preceding list is not official nor necessarily complete. A number of these companies or their affiliates drilled wells in Michigan in 1977.

WELL COMPLETIONS BY MAJORS AND INDEPENDENTS IN 1977

Major Company	Exploratory			Development			Service*	Totals
	Oil	Gas	Dry	Oil	Gas	Dry		
Amoco	6	4	21	7	2	6	0	46
Cities Serv.	0	0	1	0	0	0	0	1
Getty	1	0	5	0	0	1	0	7
Marathon	0	0	2	8	0	0	0	10
Mobil	0	0	1	3	0	1	1	6
Shell	14	14	77	21	12	44	2	184
Union	0	0	0	2	0	0	1	3
Gulf	0	0	2	0	0	0	0	2
Sun	0	0	0	5	0	0	0	5
Sub-totals	21	18	109	46	14	52	4	264
Independents	14	18	121	55	20	59	46	333
Totals	35	36	230	101	34	111	50	597

*Includes GS-OBS, LPG, WI, BDW wells.

Total: Exploratory Wells 301; Development Wells 246; Service Wells 50.

Exploratory Wells drilled by Majors 49%.
Exploratory Wells drilled by Independents 51%.

Exploratory Discoveries made by Majors 55%.
Exploratory Discoveries made by Independents 45%.

Development Wells drilled by Majors 46%.
Development Wells drilled by Independents 54%.

Producing Development Wells drilled by Majors 44%.
Producing Development Wells drilled by Independents 56%.

Discovery to Exploratory Dry Hole Ratio -
Majors 1:2.80; Independents 1:3.78.

Well casing used in 1977 well completions. Periodically, inquiries are made concerning the amount of casing (pipe) used in Michigan wells during a given year. Almost all oil and gas tests drilled in this state utilize rotary drilling techniques and require the setting of surface pipe and an intermediate casing string. A conductor pipe is set on many holes, and all wells completed as producers require a string of production casing. Pipe size ranges and amounts have been determined from records of wells completed in 1977. For convenience, casing tallies have been related to a range of casing sizes as shown in the following chart.

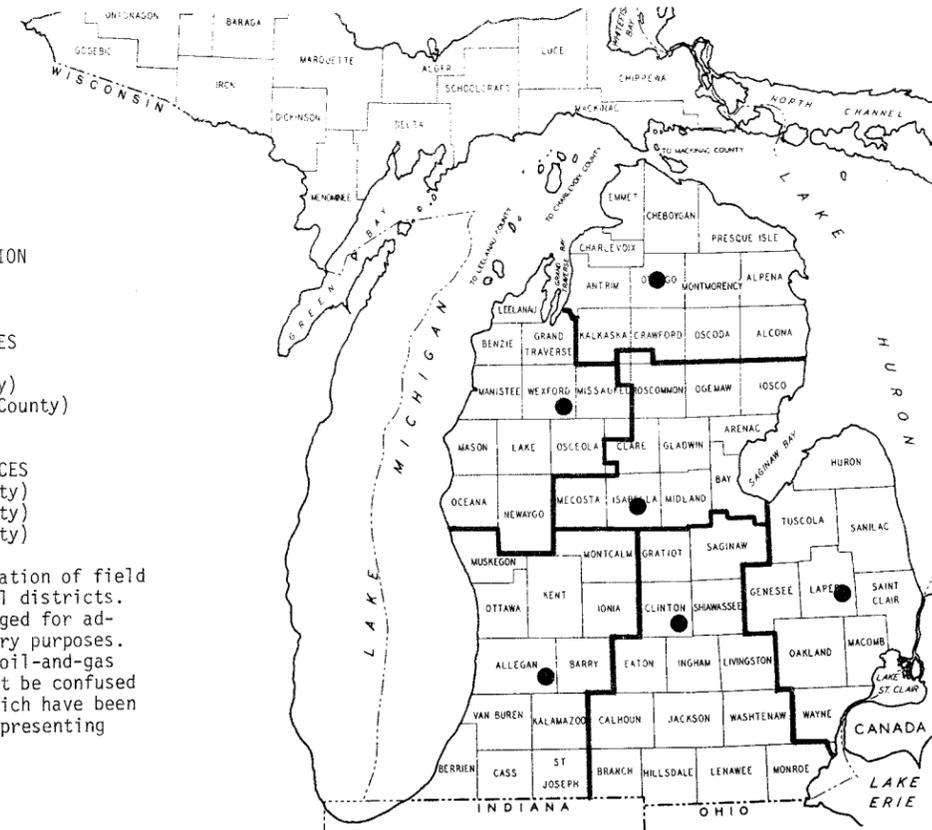
	Conductor Pipe	Surface Pipe	Intermediate Pipe	Production Pipe
Casing Size Range Used	13"-20" Dia.	10"-13" Dia.	6"-10" Dia.	4-1/2"-6" Dia.
Normal Size Used	16"	11-3/4"	8-5/8"	5-1/2"
Average Weight	75#/ft.	53#/ft.	37#/ft.	19#/ft.
No. feet used (1)	29,746	305,703	1,363,133	1,028,191
Miles (2)	5.63	57.90	258.17	194.73
Tons (3)	1,115.48	8,101.13	25,217.96	9,767.82

- (1) Total footage: 2,726,773
- (2) Total miles: 516.43
- (3) Total tonnage: 62,715.78 based on an average weight for all sizes of 46# per foot.

NEW WELL COMPLETIONS BY DISTRICTS, 1977

Classification of New Well Completions	Basin		Northern		Western		Southwestern		Southeastern		Total	
	1976	1977	1976	1977	1976	1977	1976	1977	1976	1977	1976	1977
Exploratory Wells												
Oil	2	3	17	18	8 ⁽²⁾	10	3	4	0	0	30	35
Gas	3 ⁽¹⁾	3	16	18	10	11	3	2	4	2	36	36
D&A	32	25	101	115	45	31	24	23	32	36	234	230
Total	37	31	134	151	63	52	30	29	36	38	300	301
Development Wells												
Oil	18	29	17	28	29	16	14	14	12	14	90	101
Gas	2	1	6	16	2	4	1	0	10	13	21	34
D&A	14	7	43	47	28	34	11	13	3	10	99	111
Total	34	37	66	91	59	54	26	27	25	37	210	246
Service Wells												
WI	13	0	0	1	0	0	0	1	0	0	13	2
BDW	1	2	4	0	7	2	0	0	0	0	12	4
GS	13	34	0	0	12	2	0	0	0	7	25	43
LPG	0	0	0	0	0	1	0	0	0	0	0	1
Total	27	36	4	1	19	5	0	1	0	7	50	50
Total Completions	98	104	204	243	141	111	56	57	61	82	560	597

- (1) Includes extension discovery to Morton Gas Field, Mecosta County.
- (2) Includes one oil well discovery resulting from reopening and completion of a dry hole credited to 1974.



GEOLOGICAL SURVEY DIVISION

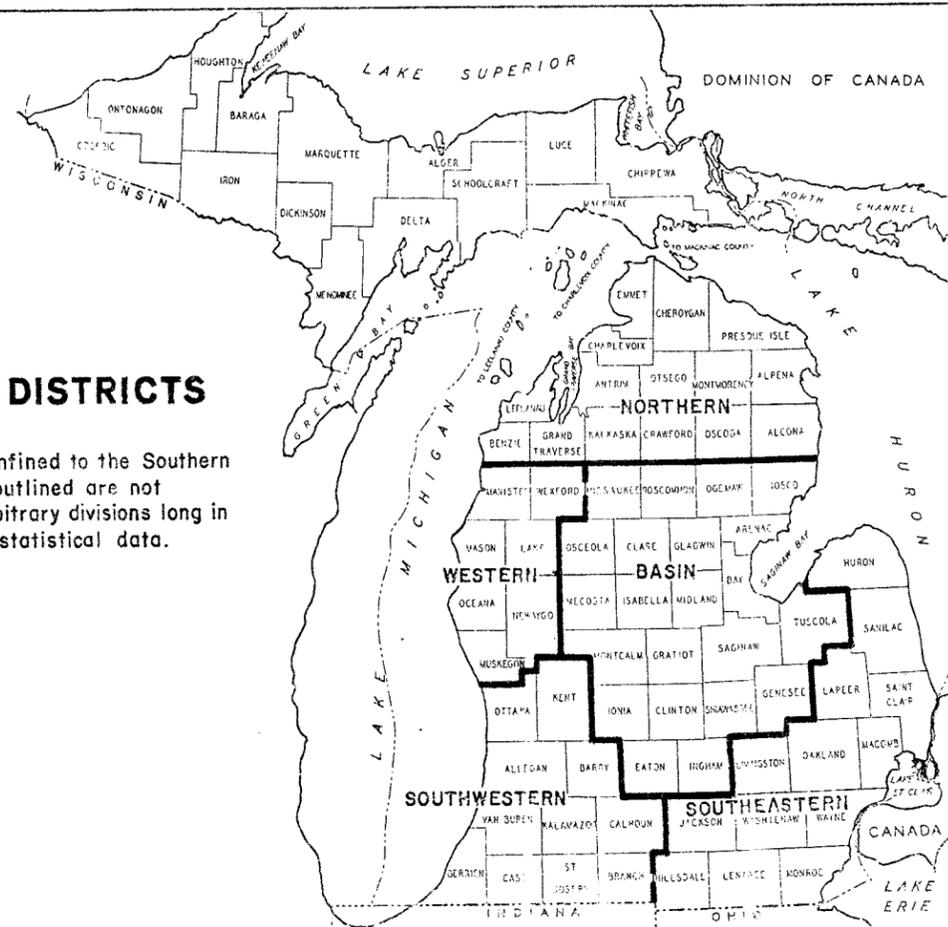
DNR REGION II FIELD OFFICES
Gaylord (Otsego County)
Cadillac (Wexford County)
Mt. Pleasant (Isabella County)

DNR REGION III FIELD OFFICES
Rose Lake (Clinton County)
Plainwell (Allegan County)
Imlay City (Lapeer County)

Dots show the general location of field offices within the several districts. These districts are arranged for administrative and regulatory purposes. Though frequently called oil-and-gas districts, they should not be confused with those shown below which have been in use for many years in presenting statistical data.

OIL AND GAS DISTRICTS

All oil and gas fields are confined to the Southern Peninsula. The districts outlined are not geologic provinces but arbitrary divisions long in use in presenting regional statistical data.



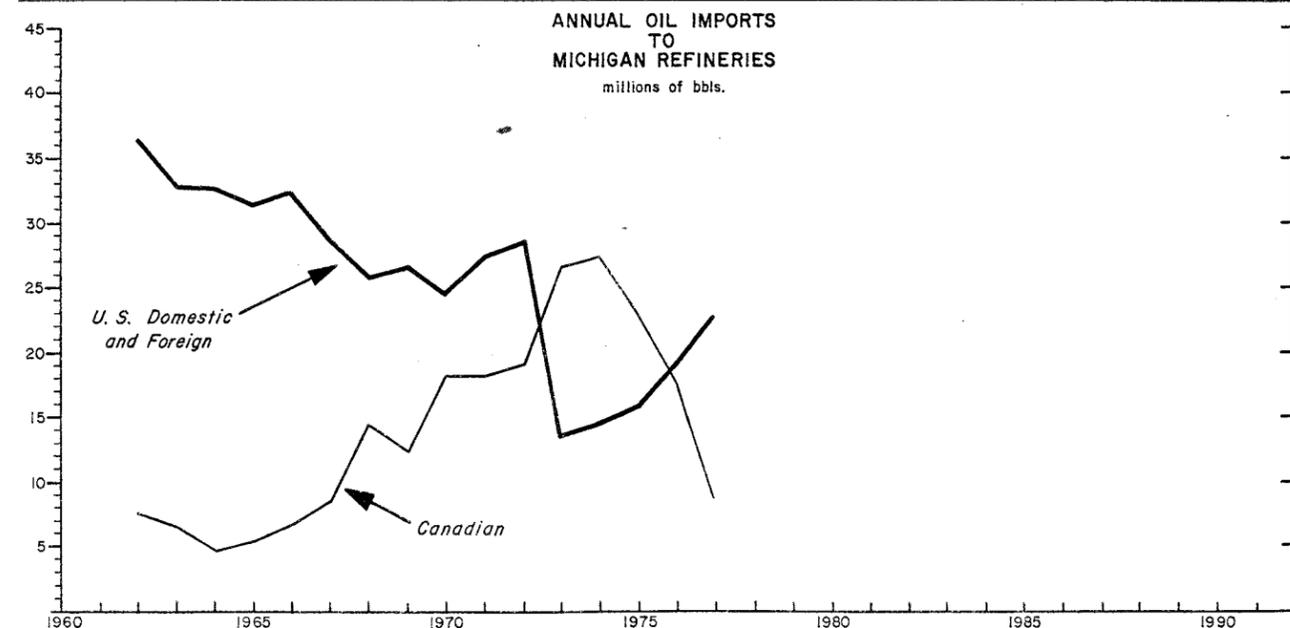
Imports of Canadian crude via pipeline from western Canada oil fields continued to decline. Canadian imports amounted to 17,457,497 in 1976 but declined to 8,236,323 in 1977. The trend of U.S. domestic and foreign and Canadian imports to Michigan refineries from 1962 through 1977 is shown graphically. Imports by month during 1977 are as follows:

1977 CRUDE OIL IMPORTS (Bbls.)			
	Domestic and Foreign	Canadian	Total
January	2,101,447	1,309,100	3,410,547
February	2,026,250	1,149,000	3,175,250
March	2,485,461	1,264,169	3,749,630
April	2,111,361	961,006	3,072,367
May	2,209,333	719,082	2,928,415
June	1,862,232	499,873	2,362,105
July	1,720,175	414,802	2,134,977
August	1,516,743	244,129	1,760,872
September	1,346,636	339,683	1,686,319
October	1,070,062	214,902	1,284,964
November	1,750,688	659,464	2,410,152
December	2,689,916	461,113	3,151,029
Total	22,890,304	8,236,323	31,126,627

Most Michigan produced crude oil goes to Michigan refineries but some is exported. The amount credited to out-of-state terminal decreased from 7,753,993 barrels in 1976 to 7,241,754 barrels in 1977. Records kept by the Production-Proration Unit show the following exports, by month, of Michigan produced crude:

1977 CRUDE OIL EXPORTS (Bbls.)	
January	591,648
February	413,712
March	732,223
April	725,976
May	769,025
June	704,820
July	667,452
August	496,860
September	749,974
October	571,955
November	431,407
December	386,702
Total	7,241,754

Natural gas imports to Michigan markets and gas storage fields in 1977 via interstate pipelines, primarily from Texas, Louisiana, Oklahoma, and Kansas fields, amounted to 772,470,777 Mcf, a decrease from the 793,678,469 Mcf imported in 1976. Compilations by the Office of Gas Operations, Michigan Public Service



Commission, show the following monthly imports during 1977:

1977 PIPELINE GAS IMPORTS (Mcf)	
January	35,441,580
February	47,186,542
March	69,418,554
April	75,846,218
May	84,418,555
June	75,847,931
July	82,627,432
August	76,373,036
September	82,097,163
October	68,611,313
November	41,756,806
December	32,845,647
Total	772,470,777

*** NEW FIELD AND POOL DISCOVERIES ***

Once again Silurian reefs were the main type of oil and gas trap found in 1977. All appear to have been located by seismic exploration methods. Most were found along the northern reef trend extending from Mason County to Presque Isle County. Others were found in the southern part of the basin in the Calhoun-Eaton-Ingham County area, and in the Macomb-St. Clair County area of the Southeastern District. Of the 71 exploratory wells initially classified as 1977 discovers, 66 were Niagaran reef reservoirs.

All the new discoveries are tentatively classified as Class E pools having possible oil and gas recoveries as defined by the Committee of Statistics of Drilling, American Association of Petroleum Geologists. These classes, shown below, are used to give some estimate or measure of reserves found by a discovery well.

- Class A - Over 50 million barrels oil or 300 BCF gas
- Class B - 25-50 million barrels oil or 150-300 BCF gas
- Class C - 10-25 million barrels oil or 60-150 BCF gas
- Class D - 1-10 million barrels oil or 6-60 BCF gas
- Class E - 1 million barrels or less oil, or less than 6 BCF gas
- Class F - Abandoned as non-profitable

Michigan wells are initially classified as near as possible according to guidelines established by AAPG and API (AAPG Bulletin, Vol. 58/8, August 1974, pp. 1501-1503). Classifications such as exploratory, development, and the various types of service wells, are made after inspection of appropriate oil and gas maps and noting

1977 DISCOVERY WELLS

County Location	Field Name	Operator and Lease	Permit Number	Depth to Pay	Total Depth	Initial Production (N)IP t= (T)IP MCF/GPD	Producing Formation	Basis for Loc.	AAPG Pool Class
NEW FIELDS									
Calhoun	Clarence	J.O. Mutch	31766	3090	3355		20 ^t (est.)	Salina-Niagaran	Seis. E
Calhoun	19-15-4W	Lynn Est. & DeBruyn Prod.Co.#1-19	31447	3260	3395	F 120 ^t		Niagaran	Acreeage E
Calhoun	11-15-5W	Key & Hogle #2-11	31455	3164	3300	218 ^t		Niagaran	Seis. E
Calhoun	15-15-5W	MGU Dev.Co.,Mask,Markei & Wood	31720	3210	3225	20		Niagaran	Acreeage E
Calhoun	15-15-5W	Koyl et al #2-15				+200 BWD			
Calhoun	30-15-5W	Fortuna Oil & M.Z.Sokolowski	31583	2939	3100		1200 ^t	Niagaran	Seis. E
Calhoun	30-15-5W	Williams #1-15							
Calhoun	30-15-5W	Lee	31893	2988	3104	93		Salina	Seis. E
Calhoun	30-15-5W	MCLain & Lambrecht #1-30				+94 Mcft		A-1 Carb.	
Crawford	24-28N-4W	Frederic	31409	6991	7577		144Cond/Day	Niagaran	Seis. E
Crawford	24-28N-4W	Michigan Oil Co.	31145	6912	7441		+1700 ^t		
Crawford	27-28N-4W	Bender-SallingHansenStFrederic#27	31990	4012	4362		100Cond/Day	Salina-Niagaran	Seis. E
Eaton	7-2N-3W	Kulka & Schmidt & Mich. Oil Co.					+4250 ^t		
Eaton	7-2N-3W	Mulkey-Verhele #1-7					Not Available	Niagaran	Seis. E
Eaton	12-1N-3E	Trolz & Assoc.	31739	3720	4180	130		Niagaran	Seis. E
Eaton	12-1N-3E	Rottenbacher-Kress et al #1				+140 Mcft			
Eaton	13-1N-3W	Consumers Power Co.	31430	3924	4008	F 216		Niagaran	Seis. E
Eaton	13-1N-3W	Williams-Teel et al #1-13				+250 Mcft			
Eaton	22-1N-3W	Kulka & Schmidt & Mich. Oil Co.	31525	3520	4020		2000 ^t	Niagaran	Seis. E
Grand Traverse	22-26N-11W	Hoffman #1-22							
Grand Traverse	22-26N-11W	NME Co.	31449*	5592	5862		152Cond/Day	Niagaran	Seis. E
Grand Traverse	26-26N-11W	Shumsky-State-Blair #1-22A					+3700 ^t		
Grand Traverse	26-26N-11W	Shell Oil Co.	31512	5930	6110		221Cond/Day	Niagaran	Seis. E
Grand Traverse	26-26N-11W	Weaver et al #4-26					+5327		
Grand Traverse	26-26N-11W	NME Co.	31637*	5716	6020	282		Niagaran	Seis. E
Grand Traverse	3-25N-12W	SALON et al #1-8				+299 Mcft			
Grand Traverse	3-25N-12W	Miller Bros.,NME Co.&Tribal Oil Co.	31205*	5381	5724	272		Niagaran	Seis. E
Grand Traverse	4-25N-11W	State-Grant #2-3				+200 Mcft			
Grand Traverse	4-25N-11W	Shell Oil Co.	31575	5961	6194	366		Niagaran	Seis. E
Grand Traverse	4-25N-11W	Henry et al #2-4				+515 Mcft			
Grand Traverse	4-25N-11W	Shell Oil Co.	31623	5847	6196	F 418		Niagaran	Seis. E
Grand Traverse	4-25N-11W	Fraser-State-Mayfield #3-4				+345 Mcft			
Grand Traverse	9-25N-11W	Shell Oil Co.	31784*	6088	6287	552		Niagaran	Seis. E
Grand Traverse	12-25N-11W	Bauer-Mikowski et al #8-16B				+763 Mcft			
Grand Traverse	12-25N-11W	Shell Oil Co.	30096	6449	6685		130Cond/Day	Salina-Niagaran	Seis. E
Grand Traverse	12-25N-11W	Cronkite #3-12				+3937 ^t			
Grand Traverse	13-25N-11W	Shell Oil Co.	31613*	6461	6714		130Cond/Day	Niagaran	Seis. E
Grand Traverse	13-25N-11W	Medford et al #4-13A				+4729 ^t			
Grand Traverse	29-25N-11W	Shell Oil Co.	31426	6391	6610	412		Niagaran	Seis. E
Grand Traverse	29-25N-11W	Phoenix Petroleum Corp. #3-29				+614 Mcft			
Grand Traverse	33-25N-11W	Shell Oil Co.	31513*	6478	6671		40Cond/Day	Niagaran	Seis. E
Grand Traverse	33-25N-11W	State-Mayfield #1-33A				+2794 ^t			
Grand Traverse	33-25N-11W	Mayfield(Antrim Gas) Traverse Corp.	31356	1804	6746		Not Available	Antrim	Seis. E
Grand Traverse	33-25N-11W	Weidenfeller #1-33					159Cond/Day	Niagaran	Seis. E
Grand Traverse	25-26N-10W	Shell Oil Co.	31565*	6554	6751		+2953 ^t		
Kalkaska	16-28N-5W	State-Paradise #2-25C	31952	7097	7254	F 312		Niagaran	Seis. E
Kalkaska	16-28N-5W	Amoco Production Co.				+370 Mcft			
Kalkaska	17-28N-5W	Simpson-St.Blue Lk."A" #1-16	31788	6850	7070		190Cond/Day	Niagaran	Seis. E
Kalkaska	17-28N-5W	Amoco Production Co.					+4000 ^t		
Kalkaska	18-28N-5W	St.-Blue Lake "G" #3-17	31663*	6885	7089		120Cond/Day	Niagaran	Seis. E
Kalkaska	18-28N-5W	Amoco Production Co.					+3000 ^t		
Kalkaska	23-28N-5W	Ausable Trails #2-18	31970	6785	7440		216Cond/Day	Salina-Niagaran	Seis. E
Kalkaska	23-28N-5W	Shell Oil Co.					+3164 ^t		
Kalkaska	32-28N-5W	Richman-St.-Blue Lk.#1-23	31318	7120	7573		20Cond/Day	Niagaran	Seis. E
Kalkaska	32-28N-5W	Amoco Production Co.					+4000 ^t		
Kalkaska	28-28N-6W	St.-Blue Lk."H" #1-32	31693*	6882	7156	F 312		Niagaran	Seis. E
Kalkaska	28-28N-6W	Amoco Production Co.							
Kalkaska	31-28N-6W	Simpson Unit "M" #2-28	31274*	6870	7025	F 418		Niagaran	Seis. E
Kalkaska	31-28N-6W	Amoco Production Co.				+290 Mcft			
Kalkaska	3-27N-7W	Short-St.-Cold Springs Unit#1-32	31522	6647	6827	316		Niagaran	Seis. E
Kalkaska	3-27N-7W	Shell Oil Co.				+380 Mcft			
Kalkaska	23-27N-7W	State-Kalkaska #1-3	31656*	7027	7166		210Cond/Day	Niagaran	Seis. E
Macomb	24-4N-14E	Shell Oil Co.	31492	2780	2900		+4198 ^t		
Manistee	1-23N-15W	Reef Petroleum Corp.					750 ^t	Niagaran	Seis. E
Manistee	17-23N-15W	Pilat et al #1-24	31874	4538	4790	408		Niagaran	Seis. E
Manistee	17-23N-15W	Shell Oil Co.				+290 Mcft			
Manistee	18-23N-15W	Hayes #2-1	31940	4429	4528	354		Niagaran	Seis. E
Manistee	18-23N-15W	Hejl-St.-Bear Lake #1-17				+370 Mcft			
Manistee	18-23N-15W	Shell Oil Co.	31598	4361	4547		65Cond/Day	Niagaran	Seis. E
Manistee	35-23N-15W	Valentine et al #1-18					+5750 ^t		
Manistee	19-22N-15W	Miller Bros.,Reef, Shell & Total	31422	4839	4985		500Cond/Day	Niagaran	Seis. E
Manistee	19-22N-15W	Miller-Bear Lake #1-35					+50,000 ^t		
Manistee	19-22N-15W	Shell,NME,Total,MillerBros&Wiser	30770	4456	4575		698 ^t	Salina-Niagaran	Seis. E
Manistee	19-24N-13W	Fink et al #1-19							
Manistee	19-24N-13W	Miller Bros.,Total & Wiser Oil	31485	5007	5450	18		Niagaran	Seis. E
Manistee	24-24N-13W	State-Cleon #2-19				+36 Mcft			
Manistee	24-24N-13W	Miller Bros,NME Co. & Total	31804	5857	6052		23Cond/Day	Niagaran	Seis. E
Manistee	27-24N-13W	State-Cleon et al #2-24					+213 ^t		
Manistee	27-24N-13W	Miller Bros,Total,Wiser & Mich.Oil	31777	5724	5860		171Cond/Day	Niagaran	Seis. E
Manistee	31-24N-13W	Lyke & Leik #2-27					+148,000 ^t		
Manistee	31-24N-13W	Shell Oil Co.	31873*	5220	5543		92Cond/Day	Niagaran	Seis. E
Manistee	32-24N-13W	Drotleff #1-31					+4461 ^t		
Manistee	32-24N-13W	Shell Oil Co.	31894*	5418	5683		109Cond/Day	Niagaran	Seis. E
Manistee	14-22N-16W	State-Cleon et al #1-32A					+3031 ^t		
Manistee	14-22N-16W	Shell Oil Co.	30535	4342	4881	F 51		Niagaran	Seis. E
Manistee	17-22N-16W	Gauthier et al #1-14							
Manistee	17-22N-16W	Shell Oil Co.	31737	4116	4285	408		Niagaran	Seis. E
Manistee	18-22N-16W	Commerce Investment et al #1-17				+394 Mcft			
Manistee	18-22N-16W	Energy Acquisition & Flynn Energy	31636	3902	4130	F 220 in 7 hrs.		Niagaran	Seis. E
Manistee	24-22N-16W	BGHL Investments et al #2-18							
Manistee	24-22N-16W	Shell Oil Co.	30812	4677	4776	225		Niagaran	Seis. E
Manistee	25-22N-17W	Bahr et al #4-24				+400 Mcft			
Manistee	30-23N-14W	Traverse Corp.	31899	4040	4230	143		Niagaran	Seis. E
Manistee	30-23N-14W	Sobota #1-25				+41.8Mcf ⁴ +167BWD			
Manistee	6-23N-13W	Traverse Corp.	31362	4598	5190		7500 ^t	Niagaran	Seis. E
Manistee	6-23N-13W	Ziehm #1-30							
Manistee	25-24N-15W	Reef Petroleum Corp.	31467	5015	5505		80Cond/Day	Niagaran	Seis. E
Manistee	25-24N-15W	State-Marilla #1-6					+2100 ^t		
Manistee	25-24N-15W	Getty Oil Co.	31481*	4490	4775	148		Niagaran	Seis. E
Manistee	25-24N-15W	State-Pleasanton #1-25				+185 Mcft			

1977 DISCOVERY WELLS CONTINUED

Well	County	Operator	31493	3166	3187	550 ^t	Traverse	Acreage	E
Missaukee 31-22N-6W	Falmouth- Traverse Pool	Woods Oil Co. Agema #1	31967	5111	5261	100	Richfield	Acreage	E
Missaukee 31-22N-6W	Falmouth- Richfield Pool	Dart Oil & Gas Corp. Mothoek #1-31	31763	N.A.	3460	+190 Mcf ^t	SIGW-Gauge	Niagaran	Seis. E
Oakland 1-3N-11E	Avon 1-3N-11E	Reef Petroleum Corp. S & P Investment #1-1	31487	6121	6385	498	Not available	Niagaran	Seis. E
Otsego 31-30N-3W	Bagley 31-30N-3W	Shell Oil Co. State-Bagley #2-31	31380*	1134	5451	+504 Mcf ^t	44 ⁿ	Antrim	Seis. E
Otsego 13-31N-2W	Dover, Sec. 13	Wolverine Gas & Oil & Mich.Nat. Doyle #1-13A Res. Co.	31870*	5119	5334	189	Niagaran	Seis. E	
Otsego 23-31N-2W	Dover 22-31N-2W, Pool A	Delta Oil Co. Blanzly-Schrader #1-23	31392	6628	6725	+222Mcf ^t	Niagaran	Seis. E	
Otsego 11-29N-3W	Otsego Lake 11-29N-3W	Amoco Production Co. State-Otsego Lake "B" #1-11	31174	1500	1600	F 404 +300 Mcf ^t	.1 ⁿ	Antrim	Acreage E
Otsego 22-29N-3W	Otsego Lake, Sec. 22	Mureil L. Welch State-Otsego Lake #1-22	31727*	6561	6803	308	Niagaran	Seis. E	
Otsego 24-29N-3W	Otsego Lake 24-29N-3W	Shell Oil Co. State-Otsego Lk-Viking Club#2-24B	31246	6392	6848	+410 Mcf ^t	Niagaran	Seis. E	
Otsego 31-29N-3W	Otsego Lake 31-29N-3W	Shell Oil Co. State-Otsego Lake #1-31	31169	6412	7115	500 +1036 Mcf ^t	192 Cond/Day	Salina- Niagaran	Seis. E
Otsego 35-29N-3W	Otsego Lake 35-29N-3W	Shell Oil Co. State-Otsego Lake et al #1-35	31787	2960	3087	+3147 ^t	3190 ^t	Niagaran	Seis. E
Presque Isle 10-34N-5E	Belknap 10-34N-5E	Amoco Production Co. Lamb #1-10	31657	2978	3340	312	Niagaran	Seis. E	
Presque Isle 21-34N-5E	Belknap 21-34N-5E	Amoco Production Co. Berg-Brege Unit #1-21	31400	3153	3410	+ 52 Mcf ^t	Niagaran	Seis. E	
Presque Isle 34-34N-5E	Belknap 34-34N-5E	Shell Oil Co. Taratuta et al #1-34A	31528	3017	3237	400 +1432 Mcf ^t	Niagaran	Seis. E	
Presque Isle 12-34N-4E	Bismark 12-34N-4E	Amoco Production Co. St.-Bismark-Furhrmann Unit "B" #1-12	31355*	6231	6640	48 +800 Mcf ^t	Niagaran	Seis. E	
Wexford 6-24N-11W	Wexford 1-24N-12W	Shell Oil Co. Sullivan #1-6B	31454*	6156	6267	58 Cond/Day +3096 ^t	Niagaran	Seis. E	
Wexford 2-24N-12W	Wexford 2-24N-12W	Ind.Nat. Gas Corp. 348 Cond/Day	31280	6077	6324	+ 4300 ^t	Niagaran	Seis. E	
Wexford 3-24N-12W	Wexford 3-24N-12W	Kellogg-Clous #1-2A				150 Cond/Day +3502 ^t	Niagaran	Seis. E	
		Shell Oil Co. Courtade-Myers #1-3							

*Directionally drilled hole. Total depth listed is the true vertical depth and not the measured depth. Depths to pay are also true vertical depths.

(1) Well was originally drilled as a development well in the Mayfield 12-25N-11W field. Reclassified as a new pool discovery by administrative action in January, 1977.

Note: t = (T)IP refers to initial production after acid, sandfracture, or a combination of well stimulation methods.
n = (N)IP refers to natural initial potential or production
Cond. = barrels condensate

The wells listed as 1977 Niagaran reef discoveries are subject to reclassification as to product. Future development may also indicate reservoir connection with a nearby reef reservoir previously classified as a discovery and thus reclassified to development well status.

the location of the test in reference to established fields, dry holes, etc. Gas storage facility wells, water injection wells and other types of service wells are generally designated as such by the operator. The Lahee classification system for designating exploratory or development wells is particularly adaptable to structural traps but does not adapt to all situations involving small reefs such as are found in Michigan. Because of the apparent small areal extent of most reefs as shown by seismic anomalies and the close proximity of one reef to another, especially in the northern and southern reef belts, it has become increasingly difficult to classify with certainty all new well locations as exploratory or development.

Discovery wells credited to 1977 are shown on the forthcoming list. The list may show a few wells that were reclassified during 1978. Reservoir performance may show that a well previously classified as a development well should actually be considered as being in a separate reservoir or pool. Likewise, a so-called discovery well may actually turn out to be a development well to a nearby reef reservoir. Also, a discovery well may be completed as an oil well but at sometime later be reclassified as a gas well and conversely, a gas well may later be reclassified as an oil well. Changes in classification may be the result of action by the regulating agency after enough data has been accumulated on the well or wells, or may result from new data presented at public hearings and the decision of the Supervisor of Wells after thorough consideration of the new data.

An analysis of 1977 discovery wells according to geologic system and an analysis of drilling objective penetrated at total depth by wells completed in 1977 follows.

ANALYSIS OF 1977 DISCOVERY WELLS BY GEOLOGIC SYSTEM

System	Formation or Pay	Number of Discoveries		
		1975	1976	1977
Pennsylvanian		-	-	-
Mississippian	"Michigan Stray Ss."	-	1	-
	"Berea Sandstone"	-	-	-
Devonian	Antrim Shale (Gas)	-	-	3
	"Traverse Lime"	1	2	1
	Dundee	1	1	-
	"Reed City"	-	-	-
	Detroit River	-	-	-
Silurian	"Sour Zone"	-	-	-
	Richfield	1	-	1
	Salina E Zone	1**	-	-
	Salina A-1 or A-2	3	-	1
Ordovician	Niagaran reef*	68	62	65
	Trenton-Black River	-	-	-
Cambrian	Prairie du Chien	-	-	-
	(Gas Shows reported in past years)			

*Most reefs also have associated Salina A-1 oil or gas pays.

**This well was a dual discovery in both the Salina E Zone and the Niagaran.

DRILLING OBJECTIVES IN MICHIGAN

System	Formation or Pay	Percentage		
		1975	1976	1977
Pennsylvanian		-	-	-
Mississippian	"Michigan Stray Ss."	5.1	4.1	7.7
	"Berea Sandstone"	.2	.5	-
Devonian	Antrim Shale (Gas)	-	-	.7
	"Traverse Lime"	2.6	5.2	4.2
	Dundee	4.2	9.2	6.7
	"Reed City"	1.8	.5	.2
	Detroit River	-	-	-
Silurian	"Sour Zone" & Richfield	3.9	4.0	2.7
	Salina-Niagaran	77.0	72.5	70.5
Ordovician	Trenton-Black River	3.2	2.9	5.9
	St.Peter Ss. or Prairie du Chien	1.6	.9	1.1
Cambrian or Precambrian	Undifferentiated	.7	.2	.3

*** STATE OIL AND GAS REVENUE ***

Total State revenue credited to 1977 and derived from royalty, rental, bonus from lease sales, and application-assignment fees amounted to \$14,878,602.78. This figure is derived from these components.

Hydrocarbon royalties	
Oil and Condensate	\$ 8,918,556.86
Gas, Casinghead gas, LPG and Shut-in royalty	4,409,351.58
Subtotal	\$13,327,908.44
Rentals	\$ 1,190,619.60
Bonus	357,005.74
Application-Assignment fees	3,069.00
Subtotal	\$ 1,550,694.34
Total Revenue	\$14,878,602.78

Oil and gas revenue figures according to year and source are found in Part 3.

*** WELL RECORDS AND OIL AND GAS MAPS ***

OIL AND GAS WELL RECORDS. Descriptive geological logs and driller's logs are available for over 31,700 tests, including exploratory, development, facility and other types of wells. Individual well records may be purchased at a nominal cost from the Geological Survey Division. Electric or radiation logs of any type are not available for distribution or sale.

OIL AND GAS FIELD MAPS. Blueprint copies of oil and gas field maps are available for every county in the Southern Peninsula. The maps show locations of oil and gas test but do not show geological data or structural contour lines. County map scales are 1" = 1 mile. Blueprint field maps are available for many oil and gas fields. These maps show well locations, well permit numbers, operators and lease names. They do not show geological data or structural contour lines. Field map scales are mainly 4" = 1 mile. All manuscript maps or tracings from which blueprint copies are made are posted on a regular basis. An oil and gas field maps list may be obtained from the Geological Survey Division upon request.

TABLE 1 DRILLING PERMITS, WELL COMPLETIONS, DRILLED FOOTAGE BY COUNTY, 1977

COUNTY	OIL/GAS PERMITS ISSUED	Classification of New Hole Completions											Average Well Depth
		Does not include reworked wells or old wells drilled deeper.						TOTAL DRILLED FOOTAGE					
		OIL AND GAS TESTS		RESULTS		SERVICE WELLS		TOTAL WELLS DRILLED			TOTAL DRILLED FOOTAGE		
Completed	Oil Wells	Gas Wells	Dry Holes	Completed	G.S. B.D.W.	Explor.	Devel.	Fac.	Explor.	Devel.	Fac.		
Allegan	11	7	6	0	0	13	0	0	13	20,667	11,985	0	2,512
Alpena	2	1	1	0	0	2	0	0	2	3,895	4,263	0	4,079
Antrim	4	3	2	1	0	4	0	0	5	20,624***	13,536	0	6,832
Arenac	6	2	0	0	0	2	0	1	3	6,215	0	3,101	3,105
Bay	3	1	2	0	0	3	0	0	3	3,375	11,016	0	4,797
Benzie	5	4	1	1	0	4	0	0	5	22,173	5,976	0	5,630
Branch	1	4	0	0	0	4	0	0	4	14,690	0	0	3,673
Calhoun	35	15	10	9	2	14	0	1(1)	26	50,272	31,088	1,986	3,206
Cass	13	0	9	8	0	1	0	0	9	0	6,265	247*	724
Cheboygan	3	1	1	0	0	2	0	0	2	4,368	3,950	0	4,159
Chippewa	1	1	0	0	0	1	0	0	1	1,204	0	0	1,204
Clare	7	1	2	2	0	1	2	0	5	3,994	12,245	3,397*	3,927
Crawford	9	2	9	6	2	3	0	1(1)	12	15,018	59,246	4,361	6,552
Eaton	15	8	5	5	2	6	0	0	13	30,592	19,214	0	3,831
Gladwin	2	0	0	0	0	0	0	0	0	0	0	163*	0
Grand Traverse	115	62	45	16	15	76	0	0	107	371,292	254,298	0	5,847
Gratiot	4	1	0	0	0	1	3	0	4	3,248	0	3,336	1,646
Hillsdale	35	1	21	14	0	8	0	0	22	4,206	85,136	0	4,061
Huron	0	1	0	0	0	1	0	0	1	4,900	0	0	4,900
Ingham	16	2	3	2	0	3	0	0	5	7,802	12,549	0	4,070
Isabella	6	2	0	0	0	2	1	0	3	7,799	0	1,219*	3,006
Jackson	2	1	1	0	0	2	0	0	2	4,786	4,420	0	4,603
Kalkaska	45	28	13	10	8	23	0	0	41	191,159	75,079	0	6,494
Kent	1	0	0	0	0	0	1	0	1	0	0	3,988	3,988
Lake	0	0	0	0	0	0	1	0	1	0	0	3,910	3,910
Lenawee	9	3	0	0	0	3	0	0	3	11,802	0	0	3,934
Livingston	8	6	0	0	0	6	0	0	6	31,661	0	0	5,277
Macomb	28	13	11	0	11	13	5	0	29	44,456	40,951	13,852	3,423
Manistee	94	45	38	24	10	49	0	2	85	210,527	166,834	3,025	4,475
Mason	7	3	4	0	1	6	0	0	7	13,514	15,189	0	4,100
Mecosta	26	2	1	1	0	2	22	0	25	7,551	2,778	31,166*	1,660
Midland	3	1	0	0	0	1	0	0	1	4,075	0	0	4,075
Missaukee	18	4	4	5	1	2	0	1	9	15,199	17,018	4,118	4,037
Montcalm	6	1	0	0	0	1	6	0	7	3,251	0	8,268*	1,646
Montmorency	4	5	0	0	0	5	0	0	5	26,123	0	0	5,225
Muskegon	0	0	0	0	0	0	0	0	0	0	5**	0	0
Newaygo	5	0	3	1	1	1	2	0	5	0	8,063	2,672	2,147
Oakland	7	9	2	0	3	8	0	0	11	33,452	7,834	0	3,753
Oceana	4	1	3	1	0	3	0	0	4	1,339	8,744	0	2,521
Ogemaw	9	3	8	8	0	3	0	0	11	17,483	21,918	0	3,582
Osceola	4	2	3	0	1	4	0	0	5	7,719	7,056	569*	3,069
Otsego	46	24	15	9	7	23	0	0	39	142,295	75,552	0	5,586
Ottawa	2	0	0	0	0	0	0	0	0	56***	0	0	0
Presque Isle	27	20	4	3	2	19	0	0	24	68,370	12,742	0	3,380
Roscommon	4	1	3	3	0	1	0	0	4	4,435	13,145	0	4,395
St. Clair	22	4	2	0	1	5	1	0	7	12,432	6,149	2,114	2,956
St. Joseph	3	3	0	0	0	3	0	0	3	11,347	0	0	3,782
Tuscola	6	0	6	6	0	0	0	0	6	0	21,654	0	3,609
VanBuren	1	0	2	1	0	1	0	0	2	0	2,386	0	1,193
Wexford	8	3	6	0	3	6	0	0	9	15,448	30,145	0	5,066
TOTAL	692	301	246	136	70	341	44	6	597	1,474,814	1,068,429	91,492	

*Includes some facility footage credited to old wells drilled deeper.
 **Includes some development footage credited to old wells drilled deeper.
 ***Includes some exploratory footage credited to old wells drilled deeper.
 (1) Water injection wells involved in secondary recovery operations.

PART 2
EXPLANATION

Part 2 brings together general information on Michigan's oil and gas fields, gas storage reservoirs, LPG storage facilities, gas plant operations, refinery facilities and other items.

TABLES 2, 3 and 4 list Michigan's oil and gas fields and gas storage reservoirs. The symbol on the left margin of the table indicates the official classification of fields and pools at the end of the year. Classifications may be changed as warranted. Official field names are listed alphabetically in the first column and the producing pool, or pools, are shown under the heading Producing Formation or Pool. Most fields consist of one pool with oil or gas production coming from a single reservoir within a formation. Some fields have two or more separate pools, each producing from a different formation or stratigraphic interval and at a different depth. Most multi-pool fields are associated with a common structural feature. Salina-Niagaran reef oil or gas accumulations are mostly single-pool fields. Some, however, have several separate reef reservoirs designated as Pool A, Pool B and so on. Most have been so designated by administrative action following public hearings. Also, a few of the listed fields actually consist of two or more hydrocarbon accumulations which for administrative purposes have been consolidated under one field name.

Location of fields according to township, range and sections are found at the bottom of the field block. The listed sections are those which have, or have had, producing wells assigned to the field or pool. The geographic location of fields and pools can be found by township and range on the center-spread oil and gas field map. Due to space limitations, all field names are not shown on the map.

The Pay Zone part of the table generally refers to data for the discovery well for the field or pool. The indicated pay thickness relates to the amount of pay opened or perforated in the discovery well and does not necessarily indicate total net or gross pay for the reservoir.

The Deepest Formation or Pool Tested column indicates the stratigraphically oldest formation penetrated and the deepest total depth reached beneath the field area. Data in these columns are updated periodically.

The Number of Wells column indicates the number of successful field wells drilled in the field to the end of the specified year, the number completed as producing wells during the specified year, the number abandoned during the year and the number of active wells at the end of the specified year.

The Drilled Acres column indicates the total number of acres assigned to the field or pool according to individual well drilling units assigned to each producing well completed in the field or pool. Except as provided by special orders covering drilling units, rules promulgated under Act No. 61, P.A. of 1939, as amended, call for a minimum 40-acre unit consisting of a governmental quarter-quarter section of land. Special Order No. 1-73 calls for basic 80-acre drilling units for Salina-Niagaran or deeper tests in specified areas of the state. These 80-acre units are formed by two governmental quarter-quarter sections of land having a common boundary of approximately 1320 feet. In past years drilling units have been 10, 20 or 40 acres for oil wells. A field may have had a 10 or 20-acre drilling unit for one pool and a 40-acre unit for a deeper formation pool. During the development of a field or pool the drilling unit size may change. Subsequent wells are assigned acreage values in accordance with the new unit size. Gas well units, especially for Michigan Stray Sandstone reservoirs, have generally been 160-acre units. Other sizes currently in use for gas wells are 40, 80, 320 and 640-acre units, or a unit size based on seismic and reservoir data. Reef reservoirs, especially in the northern reef trend, have been assigned 80, 160, 640, or a

unit based on seismic data. Changes in drilling units, off-pattern wells, etc., complicate the maintenance of accurate figures during the lifetime of a given field or pool.

Recovery Per Acre Drilled figures for oil pools are derived by dividing the cumulative production figure by the drilled acres figure.

Gas Fields, Gas-Condensate Fields. Some fields are listed as "shut-in" and show no production figures. In the case of Niagaran reef fields classified as gas-condensate reservoirs, virtually all those listed as shut-in at the end of 1977 were waiting pipeline construction or gas-handling facilities. Others, mainly small dry-gas reservoirs in shallower formations, are listed as shut-in because of slow field development, small reserves or lack of marketing facilities. Other fields, not considered to have commercial-size gas accumulations, produce small quantities of unmetered gas which is used for domestic purposes and in some cases, lease fuel.

GAS STORAGE RESERVOIRS. Most gas storage reservoirs were originally classified as gas fields or pools. Upon depletion or near depletion of native gas they were converted to storage reservoirs. The producing sections listed on gas storage reservoir tables do not necessarily relate to current gas storage area or boundaries. The sections or parts of sections listed are those which contained at least one producible oil or gas well assigned to the field or pool prior to conversion to gas storage operations. Further, the listed sections do not necessarily relate to potential or future gas storage area or boundary. The table listing undeveloped gas storage reservoirs has been discontinued.

LPG STORAGE. Surface and underground storage facilities for liquified petroleum gas.

OIL WELL GAS. This is casinghead gas produced incidental to the production of oil from pools or fields generally classified as oil accumulations.

NATURAL GAS LIQUIDS (CONDENSATE). Natural gas liquids are those portions of reservoir gas which are liquified at the surface in lease separators, field facilities, or gas processing plants. These liquids include but are not limited to: ethane, propane, butanes, pentanes, natural gasoline and condensate. On Tables 2 and 3 of this report, condensates from Michigan gas-condensate fields are shown under the oil production column.

WELL SAMPLE SETS. Well cuttings for over 9,000 wells are available for inspection at the Geological Survey Division, Michigan Department of Natural Resources, Lansing. Samples are contained in glass vials arranged in open trays. In addition, several thousand shallow geological test samples are also available for inspection. The Division does not maintain a core collection. Other sample and core repositories, not connected with the Division, are located at:

Subsurface Laboratory, Department of Geology, The University of Michigan, Ann Arbor, Michigan.

Department of Geology, Wayne State University, Detroit, Michigan.

Department of Geology, Western Michigan University, Kalamazoo, Michigan.

Department of Geology, Michigan State University, East Lansing, Michigan.

Department of Geology, Central Michigan University, Mt. Pleasant, Michigan.

TABLE 2 NORTHERN MICHIGAN SALINA-NIAGARAN OIL AND GAS FIELDS

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL				OF ACTIVE GAS FIELD OR POOL				G-C GAS-CONDENSATE FIELD OR POOL				GS GAS STORAGE RESERVOIR	
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC	COUNTY TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS TO ECYP % ABANDONED AT END	DRILLED ACRES	OIL PRODUCTION - BBL'S PRODUCED IN 1977	CUMULATIVE THROUGH 1977	GAS PRODUCTION - Mcf PRODUCED IN 1977	CUMULATIVE THROUGH 1977	RECOVERY PER ACRES DRILLED (BBL'S)	TOTAL BARRELS BROKE PER DAY	
															ABANDONED OIL FIELD OR POOL
ALPENA COUNTY															
ALPENA 15-26N-11W	NIAGARAN REEF	1973	ALPENA	3,895	22	4	1	160							
ALPENA TWP., 26N-11W, SECTION 12															
ANTRIM COUNTY															
MANCELONA 25-29N-5W	NIAGARAN REEF	1973	ANTRIM	6,449	8	33.6	1	80	48,274	192,685	3,003	29,334	2,289	30	
MANCELONA TWP., 29N-5W, SECTION 25															
MANCELONA 26-29N-5W	NIAGARAN REEF	1972	ANTRIM	6,489	61	40.7	1	90	38,197	141,679	1,810	34,104	1,771	150	
MANCELONA TWP., 29N-5W, SECTION 26															
MANCELONA 33-29N-5W	NIAGARAN REEF	1974	ANTRIM	6,536	10	44.6	1	80	18,946	20,110	103,314	103,314	251		
MANCELONA TWP., 29N-5W, SECTION 33															
MANCELONA 34-29N-5W	NIAGARAN REEF	1974	ANTRIM	6,560	20	54	1	80	188,796	370,506	1,314,584	3,841,835	4,631		
MANCELONA TWP., 29N-5W, SECTION 34															
BENZIE COUNTY															
COLFAX 36-25N-13W	NIAGARAN REEF	1976	BENZIE	5,842	10	39.5	1	80	28,175	28,430	28,827	28,827	355	4	
COLFAX TWP., 25N-13W, SECTION 36															
CHEBOYGAN COUNTY															
FOREST 14-33N-1E	NIAGARAN REEF	1976	CHEBOYGAN	3,671	13	42.9	1	80	0	174				2	
FOREST TWP., 33N-1E, SECTION 14															
CRAWFORD COUNTY															
FREDERIC 1-28N-4W	NIAGARAN REEF	1975	CRAWFORD	6,604	30	49.8	1	160	0	588	0	169	4		
FREDERIC TWP., 28N-4W, SECTION 1															
FREDERIC 2-28N-4W	NIAGARAN REEF	1973	CRAWFORD	6,390	92	47.0	1	160	109,805	343,405	92,639	349,488	2,146		
FREDERIC TWP., 28N-4W, SECTION 2															
FREDERIC 4-28N-4W	NIAGARAN REEF	1974	CRAWFORD	6,923	20	45.0	1	160	71,671	180,349	59,143	190,436	1,127		
FREDERIC TWP., 28N-4W, SECTION 4															
FREDERIC 7-28N-4W	NIAGARAN REEF	1973	CRAWFORD	7,000	10	45.6	1	80	25,911	63,217	87,062	156,107	790		
FREDERIC TWP., 28N-4W, SECTION 7															
FREDERIC 8-28N-4W	NIAGARAN REEF	1974	CRAWFORD	6,740	30	43.4	1	160	163,454	357,210	311,242	680,804	2,232		
FREDERIC TWP., 28N-4W, SECTION 8															
FREDERIC 10-28N-4W	NIAGARAN REEF	1971	CRAWFORD	6,964	99	45.0	1	240	114,838	974,890	321,953	1,338,526	4,062		
FREDERIC TWP., 28N-4W, SECTION 10															
FREDERIC 11-28N-4W	NIAGARAN REEF	1976	CRAWFORD	6,963	75	47.4	1	240	173,293	185,239	213,061	227,118	772		
FREDERIC TWP., 28N-4W, SECTION 11															
FREDERIC 13-28N-4W	NIAGARAN REEF	1972	CRAWFORD	6,789	427	68.4	1	160	210	22	22	22	1		
FREDERIC TWP., 28N-4W, SECTION 13															
FREDERIC 16-28N-4W	NIAGARAN REEF	1976	CRAWFORD	7,254	19	46.1	1	80	4,409	4,792	45,466	45,466	60		
FREDERIC TWP., 28N-4W, SECTION 16															
FREDERIC 22-28N-4W	SALINA-NIAGARAN REEF	1973	CRAWFORD	6,950	289	65.5	1	160	1,007	1,196	14,476	14,476	7		
FREDERIC TWP., 28N-4W, SECTION 22															
FREDERIC 24-28N-4W	NIAGARAN REEF	1977	CRAWFORD	6,991	293	0	1	80	160	160			2		
FREDERIC TWP., 28N-4W, SECTION 24															
FREDERIC 27-28N-4W	SALINA-NIAGARAN REEF	1977	CRAWFORD	6,912	108	0	1	160	125	125			1		
FREDERIC TWP., 28N-4W, SECTION 27															
FREDERIC 29-28N-4W	NIAGARAN REEF	1972	CRAWFORD	7,420	71	50.0	1	160	8,121	9,303	89,658	89,658	58		
FREDERIC TWP., 28N-4W, SECTION 29															
FREDERIC 29-28N-4W POOL A	NIAGARAN REEF	1973	CRAWFORD	6,907	260	65.0	1	160					SHUT-IN		
FREDERIC TWP., 28N-4W, SECTION 20 APP. C SW NE															
MARLE FOREST 3-28N-3W	NIAGARAN REEF	1976	CRAWFORD	6,710	12	0	1	160	0	348			2		
MARLE FOREST TWP., 28N-3W, SECTION 3															
GRAND TRAVERSE COUNTY															
BLAIR 21-26N-11W	NIAGARAN REEF	1976	GRAND TRAVERSE	5,567	42	67.3	1	160	2,414	2,414	67,016	67,016	15		
BLAIR TWP., 26N-11W, SECTION 21															
BLAIR 22-26N-11W	NIAGARAN REEF	1977	GRAND TRAVERSE	5,592	100	68.3	1	80	7,338	7,338	176,662	176,662	92		
BLAIR TWP., 26N-11W, SECTION 22															
BLAIR 25-26N-11W	NIAGARAN REEF	1974	GRAND TRAVERSE	5,863	41	47.2	1	160	54,953	132,149	257,542	545,425	826	2	
BLAIR TWP., 26N-11W, SECTIONS 24, 25															
BLAIR 25-26N-11W POOL A	NIAGARAN REEF	1974	GRAND TRAVERSE	6,225	6	46.2	1	160	14,986	48,170	350,266	733,049	301	2	
BLAIR TWP., 26N-11W, SECTIONS 25, 26															
BLAIR 26-26N-11W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,804	76	53.0	1	80	2,834	3,010	106,725	106,725	38		
BLAIR TWP., 26N-11W, SECTION 26															
BLAIR 26-26N-11W POOL A	NIAGARAN REEF	1977	GRAND TRAVERSE	5,930	10	55	1	80	128	128			2		
BLAIR TWP., 26N-11W, SECTION 26															
BLAIR 27-26N-11W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,563	125	61.5	1	80	6,848	7,761	112,474	125,330	97		
BLAIR TWP., 26N-11W, SECTION 27															
BLAIR 33-26N-11W	NIAGARAN REEF	1973	GRAND TRAVERSE	5,844	11	0	3	240	163,870	495,211	406,263	1,130,195	2,063	23	
BLAIR TWP., 26N-11W, SECTIONS 28, 33															
BLAIR 34-26N-11W	NIAGARAN REEF	1970	GRAND TRAVERSE	5,826	124	60	2	320	9,161	38,100	499,202	1,779,885	119		
BLAIR TWP., 26N-11W, SECTION 34															

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL				OF ACTIVE GAS FIELD OR POOL				G-C GAS-CONDENSATE FIELD OR POOL				GS GAS STORAGE RESERVOIR	
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC	COUNTY TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS TO ECYP % ABANDONED AT END	DRILLED ACRES	OIL PRODUCTION - BBL'S PRODUCED IN 1977	CUMULATIVE THROUGH 1977	GAS PRODUCTION - Mcf PRODUCED IN 1977	CUMULATIVE THROUGH 1977	RECOVERY PER ACRES DRILLED (BBL'S)	TOTAL BARRELS BROKE PER DAY	
															ABANDONED OIL FIELD OR POOL
BLAIR 35-26N-11W	NIAGARAN REEF	1975	GRAND TRAVERSE	6,126	58	45.0	1	80							
BLAIR TWP., 26N-11W, SECTION 35															
BLAIR 36-26N-11W	NIAGARAN REEF	1972	GRAND TRAVERSE	6,205	14	52.0	1	80	5,546	286,354	783,615	10,752,723	596		
BLAIR TWP., 26N-11W, SECTION 36															
EAST BAY 11-25N-10W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,187	11	46.2	1	80	47,244	45,464	96,440	103,094	612	15	
EAST BAY TWP., 26N-10W, SECTION 11															
EAST BAY 17-26N-10W	NIAGARAN REEF	1977	GRAND TRAVERSE	5,716	18	42.7	1	80	895	895			11		
EAST BAY TWP., 26N-10W, SECTION 17															
GRANT 1-25N-12W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,807	32	67.6	1	80					36		
GRANT TWP., 25N-12W, SECTION 1															
GRANT 3-25N-12W	NIAGARAN REEF	1974	GRAND TRAVERSE	5,353	33	0	1	80	72,764	175,677	195	33,871	2,195	320	
GRANT TWP., 25N-12W, SECTION 3															
GRANT 3-25N-12W POOL A	NIAGARAN REEF	1977	GRAND TRAVERSE	5,381	12	37	1	160					19		
GRANT TWP., 25N-12W, SECTION 3															
GRANT 4-25N-12W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,459	18	37.7	1	80	9,544	12,791	146	874	160		
GRANT TWP., 25N-12W, SECTION 4															
GRANT 9-25N-12W	NIAGARAN REEF	1976	GRAND TRAVERSE	5,670	22	40.4	1	160	19,526	21,461	72,084	72,864	134		
GRANT TWP., 25N-12W, SECTION 9															
GRANT 10-25N-12W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,634	119	38.1	1	160	41,694	44,999	60,785	61,695	251	453	
GRANT TWP., 25N-12W, SECTION 10															
GRANT 12-25N-12W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,767	50	67.1	1	240	34,640	98,748	901,020	1,086,787	411	3	
GRANT TWP., 25N-12W, SECTIONS 1, 12															
GRANT 13-25N-12W	NIAGARAN REEF	1974	GRAND TRAVERSE	5,943	54	65.0	1	640	103,482	483,958	7,746,141	21,877,232	756	38	
GRANT TWP., 25N-12W, SECTIONS 13, 14, 23															
GRANT 22-25N-12W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,741	156	0	1	160	59,052	138,945	22,424	54,194	868		
GRANT TWP., 25N-12W, SECTION 22															
GRANT 24-25N-12W	SALINA-NIAGARAN REEF	1973	GRAND TRAVERSE	5,815	103	71.0	1	80	8,904	51,764	386,660	1,587,201	647	5	
GRANT TWP., 25N-12W, SECTION 24															
GRANT 24-25N-12W POOL A	NIAGARAN REEF	1974	GRAND TRAVERSE	6,073	89	48.7	1	80	7,560	24,293	85,614	258,389	304		
GRANT TWP., 25N-12W, SECTION 24															
GRANT 26-25N-12W	NIAGARAN REEF	1971	GRAND TRAVERSE	5,961	80	46.9	1	160	48,033	171,867	75,797	278,234	1,074		
GRANT TWP., 25N-12W, SECTIONS 26, 27															
GRANT 29-25N-12W	NIAGARAN REEF	1973	GRAND TRAVERSE	5,720	82	44.3	1	400	258,613	643,149	600,571	1,087,608	1,609		
GRANT TWP., 25N-12W, SECTIONS 28, 29															
GRANT 31-25N-12W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,772	106	0	1	80	0	0	1,816		23		
GRANT TWP., 25N-12W, SECTION 31															
GRANT 32-25N-12W	NIAGARAN REEF	1976	GRAND TRAVERSE	5,868	194	61	1	80					SHUT-IN		
GRANT TWP., 25N-12W, SECTION 32															
GRANT 34-25N-12W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,252	10	69	1	160	20,639	20,699	262,442	262,442	129		
GRANT TWP., 25N-12W, SECTION 34															
GRANT 34-25N-12W POOL A	NIAGARAN REEF	1976	GRAND TRAVERSE	5,967	218	40.8	1	80	56,112	56,112	38,090	38,090	701		
GRANT TWP., 25N-12W, SECTION 34															
GRANT 35-25N-12W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,052	92	0	1	80	3,350	3,350	160,445	166,215	42		
GRANT TWP., 25N-12W, SECTION 35															
GRANT 36-25N-12W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,129	131	64.8	1	80	0	89			1		
GRANT TWP., 25N-12W, SECTION 36															
MAYFIELD 1-25N-11W	NIAGARAN REEF	1974	GRAND TRAVERSE	6,319	14	46.0	1	160	81,867	200,554	264,878	538,564	1,253	2	
MAYFIELD TWP., 25N-11W, SECTIONS 1, 2															
MAYFIELD 1-25N-11W POOL A	NIAGARAN REEF	1974	GRAND TRAVERSE	6,474	16	45.2	1	160	84,006	97,864	175,465	208,156	612		
MAYFIELD TWP., 25N-11W, SECTION 1															
MAYFIELD 3-25N-11W	NIAGARAN REEF	1973	GRAND TRAVERSE	5,940	230	68.0	1	160	2,909	34,657	127,569	2,135,910	217		
MAYFIELD TWP., 25N-11W, SECTION 3															
MAYFIELD 3-25N-11W POOL A	NIAGARAN REEF	1975	GRAND TRAVERSE	6,019	18	49.0	1	80	39,280	149,736	32,640				

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL				OF ACTIVE GAS FIELD OR POOL				G-C GAS-CONDENSATE FIELD OR POOL				G-S GAS STORAGE RESERVOIR					
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP PRODUCING SECTIONS	PAY ZONE			DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS				OIL PRODUCTION - BBLs		GAS PRODUCTION - Mcf		RECOVERY PER ACRE DRILLED (BBLs)	TOTAL BARRELS BRINE PER DAY	
				DEPTH IN FEET	THICKNESS AND LITHOLOGY	G.C. GRAVITY			COMPL. ENCL.	PROD. IN 1977	CUMULATIVE THROUGH 1977	PRODUCED IN 1977	CUMULATIVE THROUGH 1977						
PARADISE 12-26N-10W	NIAGARAN REEF	1976	GRAND TRAVERSE	5,177	325	0	50.4	NIAGARAN	6,277	1	0	0	1	140	40,878	4,830	2,262,440	2,444,631	275
			MAYFIELD TWP., 25N-11W, SECTION 12																
PARADISE 12-26N-10W	NIAGARAN REEF	1975	GRAND TRAVERSE	6,444	43	0	61.0	NIAGARAN	6,586	1	0	0	1	50	11,372	14,319	1,104,256	1,272,472	175
			MAYFIELD TWP., 25N-11W, SECTION 12																
PARADISE 12-26N-10W	NIAGARAN REEF	1977	GRAND TRAVERSE	6,441	127	0	67.2	NIAGARAN	6,714	1	0	0	1	80	57	57	0	0	0
			MAYFIELD TWP., 25N-11W, SECTION 13																
PARADISE 12-26N-10W	NIAGARAN REEF	1975	GRAND TRAVERSE	6,446	134	0		NIAGARAN	6,571	1	0	0	1	80	80,226	80,226	1,249,699	1,249,699	1,003
			MAYFIELD TWP., 25N-11W, SECTION 15																
PARADISE 14-25N-11W	NIAGARAN REEF	1972	GRAND TRAVERSE	4,347	66	0	47.5	NIAGARAN	6,580	3	0	0	3	240	233,048	767,415	305,651	866,791	3,197
			MAYFIELD TWP., 25N-11W, SECTION 16																
PARADISE 16-25N-11W POOL A	NIAGARAN REEF	1974	GRAND TRAVERSE	6,228	29	0	43.5	NIAGARAN	6,525	2	0	0	2	160	152,341	528,455	84,549	312,125	3,303
			MAYFIELD TWP., 25N-11W, SECTIONS 16, 17																
PARADISE 17-25N-11W	SALINA-NIAGARAN REEF	1974	GRAND TRAVERSE	5,855	178	0	42.7	NIAGARAN	6,504	2	0	0	2	160	221,254	730,228	135,502	449,915	4,564
			MAYFIELD TWP., 25N-11W, SECTION 17																
PARADISE 18-25N-11W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,874	17	0	45.0	NIAGARAN	5,969	3	2	0	1	240	142,432	234,983	126,477	210,352	979
			MAYFIELD TWP., 25N-11W, SECTION 18																
PARADISE 18-25N-11W POOL A	NIAGARAN REEF	1975	GRAND TRAVERSE	6,198	5	0	42.2	NIAGARAN	6,330	1	0	0	1	80	0	399	0	67	3
			MAYFIELD TWP., 25N-11W, SECTION 18																
PARADISE 19-25N-11W	SALINA-NIAGARAN REEF	1973	GRAND TRAVERSE	5,829	183	0	53.6	NIAGARAN	6,535	1	0	0	1	160	29,313	89,613	278,859	682,046	560
			MAYFIELD TWP., 25N-11W, SECTION 19																
PARADISE 19-25N-11W POOL A	NIAGARAN REEF	1974	GRAND TRAVERSE	6,093	96	0	45.8	NIAGARAN	6,265	1	0	0	1	80	13,489	60,021	171,496	410,053	750
			MAYFIELD TWP., 25N-11W, SECTION 19																
PARADISE 19-25N-11W POOL B	SALINA-NIAGARAN REEF	1976	GRAND TRAVERSE	6,029	137	0	61.4	NIAGARAN	6,357	1	0	0	1	80	551	790	12,875	18,591	10
			MAYFIELD TWP., 25N-11W, SECTION 19																
PARADISE 20-25N-11W	NIAGARAN REEF	1974	GRAND TRAVERSE	6,241	51	0	45.0	NIAGARAN	6,365	3	0	0	3	240	160,990	574,152	415,226	1,014,475	2,392
			MAYFIELD TWP., 25N-11W, SECTION 20																
PARADISE 21-25N-11W	SALINA-NIAGARAN REEF	1974	GRAND TRAVERSE	6,112	428	0	66.5	NIAGARAN	6,608	2	0	0	2	320	81,786	458,329	808,452	7,455,434	1,432
			MAYFIELD TWP., 25N-11W, SECTION 21																
PARADISE 24-25N-11W	NIAGARAN REEF	1973	GRAND TRAVERSE	6,508	153	0	65.7	NIAGARAN	6,783	2	0	0	2	360	93,424	119,360	2,615,814	2,873,037	331
			MAYFIELD TWP., 25N-11W, SECTIONS 23, 24																
PARADISE 26-25N-11W	NIAGARAN REEF	1974	GRAND TRAVERSE	6,323	169	0	65.0	NIAGARAN	6,756	1	0	0	1	160	103				1
			MAYFIELD TWP., 25N-11W, SECTION 26																
PARADISE 28-25N-11W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,430	19	0	49.4	NIAGARAN	6,580	1	0	0	1	160	33,671	33,948	65,368	65,368	212
			MAYFIELD TWP., 25N-11W, SECTION 28																
PARADISE 29-25N-11W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,012	119	0	70.2	NIAGARAN	6,621	1	0	0	1	160	61				1
			MAYFIELD TWP., 25N-11W, SECTION 29																
PARADISE 29-25N-11W POOL A	NIAGARAN REEF	1977	GRAND TRAVERSE	6,391	16	0		NIAGARAN	6,610	2	2	0	2	160	37,233	37,233	67,665	67,665	233
			MAYFIELD TWP., 25N-11W, SECTION 29																
PARADISE 30-25N-11W	NIAGARAN REEF	1973	GRAND TRAVERSE	6,329	45	0	45.5	NIAGARAN	6,630	2	0	0	2	160	13,339	41,659	173,562	499,030	260
			MAYFIELD TWP., 25N-11W, SECTION 30																
PARADISE 31-25N-11W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,051	101	0		NIAGARAN	6,696	1	0	0	1	80					SHUT-IN
			MAYFIELD TWP., 25N-11W, SECTION 31																
PARADISE 33-25N-11W	NIAGARAN REEF	1977	GRAND TRAVERSE	6,478	54	0	63.6	NIAGARAN	6,671	1	1	0	1	80	31	31			1
			MAYFIELD TWP., 25N-11W, SECTION 33																
PARADISE 18-25N-10W	NIAGARAN REEF	1975	GRAND TRAVERSE	6,519	183	0	67	NIAGARAN	6,890	1	0	0	1	160	1,093	1,194	15,532	15,532	7
			PARADISE TWP., 25N-10W, SECTION 3																
PARADISE 18-25N-10W	NIAGARAN REEF	1973	GRAND TRAVERSE	6,455	102	0	65.8	NIAGARAN	6,841	2	1	0	2	160	1,619	1,641	30,646	37,444	10
			PARADISE TWP., 25N-10W, SECTION 18																
PARADISE 19-26N-10W	SALINA-NIAGARAN REEF	1975	GRAND TRAVERSE	5,750	102	0	43.8	NIAGARAN	6,034	2	1	0	2	160	28,339	34,120	61,617	131,615	213
			PARADISE TWP., 26N-10W, SECTION 19																
PARADISE 20-26N-10W	NIAGARAN REEF	1975	GRAND TRAVERSE	6,027	25	0	57	NIAGARAN	6,252	1	0	0	1	80	9,495	17,532	119,610	230,858	219
			PARADISE TWP., 26N-10W, SECTION 20																
PARADISE 21-26N-10W	NIAGARAN REEF	1975	GRAND TRAVERSE	5,848	6	0	40	NIAGARAN	6,198	3	0	0	3	240	298,089	405,808	312,290	404,092	1,691
			PARADISE TWP., 26N-10W, SECTION 21																
PARADISE 23-26N-10W	NIAGARAN REEF	1974	GRAND TRAVERSE	6,310	27	0	70.5	NIAGARAN	6,588	2	0	0	2	160	40,096	155,534	1,034,943	3,606,280	972
			PARADISE TWP., 26N-10W, SECTIONS 23, 24																
PARADISE 25-26N-10W	NIAGARAN REEF	1977	GRAND TRAVERSE	6,554	46	0	63.1	NIAGARAN	6,751	1	1	0	1	80	2,145	2,145	37,235	37,235	27
			PARADISE TWP., 26N-10W, SECTION 25																
PARADISE 26-26N-10W	NIAGARAN REEF	1976	GRAND TRAVERSE	6,422	55	0	61.4	NIAGARAN	6,585	1	0	0	1	160	10,772	10,937	428,573	428,573	68
			PARADISE TWP., 26N-10W, SECTION 26																
PARADISE 27-26N-10W	SALINA-NIAGARAN REEF	1976	GRAND TRAVERSE	6,060	230	0	46.3	SALINA-NIAGARAN	6,448	3	1	0	3	240	10,905	11,601	15,992	15,992	48
			PARADISE TWP., 26N-10W, SECTION 27																
PARADISE 31-26N-10W	SALINA-NIAGARAN REEF	1974	GRAND TRAVERSE	6,257	97	0	68.4	NIAGARAN	6,534	1	0	0	1	80	37,260	100,563	727,869	1,253,052	1,257
			PARADISE TWP., 26N-10W, SECTION 31																
PARADISE 32-26N-10W	NIAGARAN REEF	1974	GRAND TRAVERSE	6,087	231	0	60.0	NIAGARAN	6,582	2	1	0	2	160	500	3,259	3,989	41,010	20
			PARADISE TWP., 26N-10W, SECTION 32																
PARADISE 33-26N-10W	NIAGARAN REEF	1975	GRAND TRAVERSE	6,093	202	0	66.5	NIAGARAN	6,627	1	0	0	1	80	755	855	3,735	3,735	10
			PARADISE TWP., 26N-10W, SECTION 33																
PARADISE 33-26N-10W POOL A	SALINA-NIAGARAN REEF	1976	GRAND TRAVERSE	6,000	158	0	50.3	SALINA-NIAGARAN	6,595	1	0	0	1	80	50	207	15	15	2
			PARADISE TWP., 26N-10W, SECTION 33																

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL				OF ACTIVE GAS FIELD OR POOL				G-C GAS-CONDENSATE FIELD OR POOL				G-S GAS STORAGE RESERVOIR			
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP PRODUCING SECTIONS	PAY ZONE			DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS</								

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL		OF ACTIVE GAS FIELD OR POOL		G-C GAS CONDENSATE FIELD OR POOL		G-S GAS STORAGE RESERVOIR											
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	MILES ACRES	GAS PRODUCTION - MCF	RECOVERY PER CENT	TOTAL BARRELS SHUT-IN PER DAY	OF ABANDONED OIL FIELD OR POOL		OF ABANDONED GAS FIELD OR POOL		G-C ABANDONED GAS CONDENSATE FIELD OR POOL		G-S GAS STORAGE RESERVOIR	
												DEPT. IN FEET	NO. OF WELLS	ACRES	NO. OF WELLS	ACRES	NO. OF WELLS	ACRES	NO. OF WELLS
KALKASKA 7-27N-7W	NIAGARAN REEF	1972	KALKASKA	3,305 3 D	NIAGARAN	6,652	1	0	0	1	80	13,677	101,043	5,054	68,358	1,243	110		
KALKASKA 9-27N-7W	NIAGARAN REEF	1972	KALKASKA	2,492 89 D	NIAGARAN	6,530	1	0	0	1	160	4,184	31,923	140,615	611,479	194	60		
KALKASKA 10-27N-7W	NIAGARAN REEF	1972	KALKASKA	15,478 198 D	NIAGARAN	6,959	1	0	0	1	320	13,255	104,823	535,037	3,471,939	327			
KALKASKA 12-27N-7W	NIAGARAN REEF	1972	KALKASKA	6,883 19 D	NIAGARAN	7,009	1	0	0	1	80	2,758	20,536	0	10,755	257			
KALKASKA 13-27N-7W	NIAGARAN REEF	1972	KALKASKA	6,894 60 D	NIAGARAN	7,225	1	0	0	1	240	14,601	80,374	701,283	3,043,363	335			
KALKASKA 16-27N-7W	NIAGARAN REEF	1973	KALKASKA	6,572 158 D	NIAGARAN	7,077	2	1	0	2	40	4,972	6,754	29,456	31,268	169	201		
KALKASKA 16-27N-7W POOL A	NIAGARAN REEF	1973	KALKASKA	7,014 98 D	NIAGARAN	7,405	2	0	0	2	160	36,149	56,529	741,869	297,134	352			
KALKASKA 19-27N-7W	NIAGARAN REEF	1974	KALKASKA	6,626 10 D	NIAGARAN	7,003	2	1	0	2	320	7,735	21,485	0	6,444	67	128		
KALKASKA 23-27N-7W	NIAGARAN REEF	1977	KALKASKA	7,027 34 D	NIAGARAN	7,166	1	1	0	1	160	101	101	0	0	0	1		
KALKASKA 24-27N-7W	SALINA-NIAGARAN REEF	1974	KALKASKA	6,726 469 D	NIAGARAN	7,317	1	0	0	1	80	0	436	SHUT-IN	0	5			
KALKASKA 28-27N-7W	NIAGARAN REEF	1970	KALKASKA	7,124 28 D	CLINTON	7,408	1	0	0	1	160	907	20,100	128,020	878,033	126			
KALKASKA 28-27N-7W POOL A	NIAGARAN REEF	1972	KALKASKA	6,977 192 D	NIAGARAN	7,205	1	0	0	1	160	18,552	50,490	546,685	935,218	315			
KALKASKA 28-27N-7W POOL B	NIAGARAN REEF	1975	KALKASKA	7,088 40 D	NIAGARAN	7,205	1	0	0	1	80	12,729	24,462	89,102	292,770	306			
KALKASKA 32-27N-7W	NIAGARAN REEF	1971	KALKASKA	6,828 309 D	NIAGARAN	7,369	1	0	0	1	160	6,192	45,860	341,129	1,505,928	287			
KALKASKA 32-27N-7W POOL A	NIAGARAN REEF	1975	KALKASKA	7,074 22 D	NIAGARAN	7,255	1	0	0	1	80	756	25,344	379,666	1,109,614	317			
KALKASKA 11-27N-8W	NIAGARAN REEF	1973	KALKASKA	6,449 17 D	NIAGARAN	6,776	1	0	0	1	80	15,510	81,786	0	27,884	1,022	38		
KALKASKA 13-27N-8W	NIAGARAN REEF	1972	KALKASKA	6,950 10 D	NIAGARAN	7,365	2	0	0	2	240	57,025	290,822	300,110	1,075,345	1,212			
KALKASKA 14-27N-8W	NIAGARAN REEF	1974	KALKASKA	6,551 43 D	NIAGARAN	6,790	1	0	0	1	160	5,046	55,096	463,488	1,955,562	344			
KALKASKA 20-27N-8W	NIAGARAN REEF	1975	KALKASKA	6,493 5 D	NIAGARAN	6,750	2	0	0	2	160	85,868	96,793	54,968	60,336	605	90		
KALKASKA 21-27N-8W	NIAGARAN REEF	1971	KALKASKA	6,562 77 D	NIAGARAN	6,856	7	0	1	6	400	PRODUCTION COMBINED WITH A-1 CARBONATE PRODUCTION	0	0	0	0	0		
KALKASKA 21-27N-8W	A-1 CARBONATE	1972	KALKASKA	6,591 31 D	NIAGARAN	6,856	7	0	1	6	400	519,927	3,227,634	635,996	5,265,083	6,724			
KALKASKA 24-27N-8W	SALINA-NIAGARAN REEF	1973	KALKASKA	6,380 220 D	NIAGARAN	6,852	1	0	0	1	40	103,673	366,724	96,537	743,867	9,160			
KALKASKA 25-27N-8W	NIAGARAN REEF	1972	KALKASKA	6,491 114 D	NIAGARAN	7,000	2	0	0	2	220	13,845	155,896	204,995	4,806,375	487			
KALKASKA 25-27N-8W POOL A	NIAGARAN REEF	1974	KALKASKA	6,798 40 D	NIAGARAN	6,980	1	0	0	1	160	12,481	71,836	283,382	909,839	449			
KALKASKA 26-27N-8W	SALINA-NIAGARAN REEF	1973	KALKASKA	6,372 397 D	NIAGARAN	6,968	1	0	0	1	160	26,747	154,464	330,099	1,358,814	965	6		
KALKASKA 28-27N-8W	NIAGARAN REEF	1971	KALKASKA	6,717 6 D	NIAGARAN	6,838	1	0	0	1	160	4,316	30,921	0	0	193	40		
KALKASKA 30-27N-8W	NIAGARAN REEF	1974	KALKASKA	6,496 22 D	NIAGARAN	6,692	1	0	0	1	480	28,650	164,479	1,017,983	4,439,884	343			
KALKASKA 32-27N-8W	NIAGARAN REEF	1975	KALKASKA	6,585 7 D	NIAGARAN	6,890	2	0	1	1	160	35,978	88,502	49,361	104,834	553	1		
KALKASKA 33-27N-8W	NIAGARAN REEF	1972	KALKASKA	6,620 15 D	NIAGARAN	6,754	1	0	0	1	160	50	25,823	10,138	1,269,105	161			
RAPID RIVER 5-28N-7W	NIAGARAN REEF	1976	KALKASKA	5,915 10 D	NIAGARAN	6,197	2	1	0	2	120	0	0	0	0	0	1,505		
RAPID RIVER 24-28N-7W	NIAGARAN REEF	1970	KALKASKA	6,590 44 D	NIAGARAN	6,810	7	0	1	6	560	124,168	842,681	1,689,237	8,927,587	1,505	199		
RAPID RIVER 24-28N-7W POOL A	NIAGARAN REEF	1972	KALKASKA	6,407 20 D	NIAGARAN	6,805	1	0	0	1	80	8,209	49,822	5,221	42,501	623	70		
RAPID RIVER 27-28N-7W	NIAGARAN REEF	1972	KALKASKA	6,487 29 D	NIAGARAN	6,850	4	0	0	4	160	26,581	175,992	261,618	1,324,124	1,100	28		
RAPID RIVER 27-28N-7W POOL A	NIAGARAN REEF	1972	KALKASKA	6,552 8 D	NIAGARAN	6,773	4	0	0	4	240	49,515	270,559	312,277	1,516,827	1,127	128		
RAPID RIVER 32-28N-7W	NIAGARAN REEF	1973	KALKASKA	6,413 20 D	NIAGARAN	6,550	6	0	0	6	440	342,232	1,250,856	558,232	1,614,855	2,843	198		
RAPID RIVER 32-28N-7W	NIAGARAN REEF	1971	KALKASKA	6,522 14 D	NIAGARAN	6,764	3	0	0	3	200	63,886	203,612	1,182,706	3,159,501	1,016			
RAPID RIVER 33-28N-7W POOL A	NIAGARAN REEF	1972	KALKASKA	6,516 9 D	CLINTON	6,695	2	0	0	2	160	274	52,889	27,548	767,692	330			

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL		OF ACTIVE GAS FIELD OR POOL		G-C GAS CONDENSATE FIELD OR POOL		G-S GAS STORAGE RESERVOIR											
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	MILES ACRES	GAS PRODUCTION - MCF	RECOVERY PER CENT	TOTAL BARRELS SHUT-IN PER DAY	OF ABANDONED OIL FIELD OR POOL		OF ABANDONED GAS FIELD OR POOL		G-C ABANDONED GAS CONDENSATE FIELD OR POOL		G-S GAS STORAGE RESERVOIR	
												DEPT. IN FEET	NO. OF WELLS	ACRES	NO. OF WELLS	ACRES	NO. OF WELLS	ACRES	NO. OF WELLS
KALKASKA 7-27N-7W	NIAGARAN REEF	1972	KALKASKA	3,305 3 D	NIAGARAN	6,652	1	0	0	1	80	13,677	101,043	5,054	68,358	1,243	110		
KALKASKA 9-27N-7W	NIAGARAN REEF	1972	KALKASKA	2,492 89 D	NIAGARAN	6,530	1	0	0	1	160	4,184	31,923	140,615	611,479	194	60		
KALKASKA 10-27N-7W	NIAGARAN REEF	1972	KALKASKA	15,478 198 D	NIAGARAN	6,959	1	0	0	1	320	13,255	104,823	535,037	3,471,939	327			
KALKASKA 12-27N-7W	NIAGARAN REEF	1972	KALKASKA	6,883 19 D	NIAGARAN	7,009	1	0	0	1	80	2,758	20,536	0	10,755	257			
KALKASKA 13-27N-7W	NIAGARAN REEF	1972	KALKASKA	6,894 60 D	NIAGARAN	7,225	1	0	0	1	240	14,601	80,374	701,283	3,043,363	335			
KALKASKA 16-27N-7W	NIAGARAN REEF	1973	KALKASKA	6,572 158 D	NIAGARAN	7,077	2	1	0	2	40	4,972	6,754	29,456	31,268	169	201		
KALKASKA 16-27N-7W POOL A	NIAGARAN REEF	1973	KALKASKA	7,014 98 D	NIAGARAN	7,405	2	0	0	2	160	36,149	56,529	741,869	297,134	352			
KALKASKA 19-27N-7W	NIAGARAN REEF	1974	KALKASKA	6,626 10 D	NIAGARAN	7,003	2	1	0	2	320	7,735	21,485	0	6,444	67	128		
KALKASKA 23-27N-7W	NIAGARAN REEF	1977	KALKASKA	7,027 34 D	NIAGARAN	7,166	1	1	0	1	160	101	101	0	0	0	1		
KALKASKA 24-27N-7W	SALINA-NIAGARAN REEF	1974	KALKASKA	6,726 469 D	NIAGARAN	7,317	1	0	0	1	80	0	436	SHUT-IN	0	5			
KALKASKA 28-27N-7W	NIAGARAN REEF	1970	KALKASKA	7,124 28 D	CLINTON	7,408	1	0	0	1	160	907	20,100	128,020	878,033	126			
KALKASKA 28-27N-7W POOL A	NIAGARAN REEF	1972	KALKASKA	6,977 192 D	NIAGARAN	7,205	1	0	0	1	160	18,552	50,490	546,685	935,218	315			
KALKASKA 28-27N-7W POOL B	NIAGARAN REEF	1975	KALKASKA	7,088 40 D	NIAGARAN	7,205	1	0	0	1	80	12,729	24,462	89,102	292,770	306			
KALKASKA 32-27N-7W	NIAGARAN REEF	1971	KALKASKA	6,828 309 D	NIAGARAN	7,369	1	0	0	1	160	6,192	45,860	341,129	1,505,928	287			
KALKASKA 32-27N-7W POOL A	NIAGARAN REEF	1975	KALKASKA	7,074 22 D	NIAGARAN	7,255	1	0	0	1	80	756	25,344	379,666	1,109,614	317			
KALKASKA 11-27N-8W	NIAGARAN REEF	1973	KALKASKA	6,449 17 D	NIAGARAN	6,776	1	0	0	1	80	15,510	81,786	0	27,884	1,022	38		
KALKASKA 13-27N-8W	NIAGARAN REEF	1972	KALKASKA	6,950 10 D	NIAGARAN	7,365	2	0	0	2	240	57,025	290,822	300,110	1,075,345	1,212			
KALKASKA 14-27N-8W	NIAGARAN REEF	1974	KALKASKA	6,551 43 D	NIAGARAN	6,790	1	0	0	1	160	5,046	55,096	463,488	1,955,562	344			
KALKASKA 20-27N-8W	NIAGARAN REEF	1975	KALKASKA	6,493 5 D	NIAGARAN	6,750	2	0	0	2	160	85,868	96,793	54,968	60,336	605	90		
KALKASKA 21-27N-8W	NIAGARAN REEF	1971	KALKASKA	6,562 77 D	NIAGARAN	6,856													

POOL CLASSIFICATION				OF ACTIVE OIL FIELD OR POOL				GF ACTIVE GAS FIELD OR POOL				G-C GAS-CONDENSATE FIELD OR POOL				GS GAS STORAGE RESERVOIR			
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC	COUNTY TOWNSHIP PRODUCING SECTIONS	DEPTH - FEET	THICKNESS - FEET	OIL GRAVITY @ 60 F	DEEPEST FORMATION OR POOL TESTED	DEPTH - FEET	NO. OF WELLS	ABANDONED	ACREAGE	DRILLED ACRES	OIL PRODUCTION - BBLs		GAS PRODUCTION - Mcf		RECOVERY PER ACRE DRILLED (BBLs)	TOTAL BARRELS BRINE PER DAY	
													PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PRODUCED IN 1977	CUMULATIVE THROUGH 1977			
G-C BEAR LAKE 23-23N-15W	NIAGARAN REEF	1973	MANISTEE	4,538	28 0	40.4	NIAGARAN	4,790	1	0	1	80							
MANISTEE COUNTY																			
G-C BEAR LAKE 23-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,457	120 0	64.0	NIAGARAN	4,758	2	1	0	2	140	5,728	5,907	279,756	279,756	37	
OF BEAR LAKE 11-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,688	36 0	43.3	NIAGARAN	4,922	4	0	0	4	320	411,183	786,038	318,560	654,740	2,456	1
OF BEAR LAKE 11-23N-15W POOL A	NIAGARAN REEF	1975	MANISTEE	4,668	11 0	40.8	NIAGARAN	4,740	2	0	0	2	160	125,775	263,765	78,127	167,919	1,648	108
OF BEAR LAKE 13-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,591	16 0		NIAGARAN	5,030	4	1	0	4	320	338,424	845,095	271,099	695,370	2,641	
G-C BEAR LAKE 15-23N-15W	NIAGARAN REEF	1976	MANISTEE	4,410	137 0	67.5	NIAGARAN	4,740	1	0	0	1	80			21	21		
OF BEAR LAKE 17-23N-15W	NIAGARAN REEF	1977	MANISTEE	4,429	13 0	41.9	NIAGARAN	4,528	1	1	0	1	120	147	147				1
G-C BEAR LAKE 18-23N-15W	NIAGARAN REEF	1977	MANISTEE	4,361	44 0	52.6	NIAGARAN	4,547	1	1	0	1	160						
OF BEAR LAKE 19-23N-15W	NIAGARAN REEF	1975	MANISTEE	4,262	11 0	36.7	NIAGARAN	4,556	2	0	0	2	240	17,887	26,524	21,177	25,304	110	250
OF BEAR LAKE 20-23N-15W	SALINA-NIAGARAN REEF	1975	MANISTEE	4,338	32 0	38.4	NIAGARAN	4,722	2	0	0	2	160	44,724	102,586	60	14,328	641	78
OF BEAR LAKE 22-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,541	10 0	44.5	NIAGARAN	4,885	8	1	0	8	640	373,214	722,115	881,569	1,353,632	1,128	24
OF BEAR LAKE 23-23N-15W	NIAGARAN REEF	1973	MANISTEE	4,786	7 0	49.6	NIAGARAN	5,035	4	0	0	4	320	100,323	244,614	592,715	1,229,232	764	
GS BEAR LAKE 24-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,808	58 0	69.0	NIAGARAN	5,070	1	0	0	1	80	59,722	105,510	1,749,466	2,761,179	1,319	
G-C BEAR LAKE 25-23N-15W	NIAGARAN REEF	1976	MANISTEE	4,714	118 0	63.3	NIAGARAN	5,061	1	0	0	1	80		38	0			1
OF BEAR LAKE 26-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,828	34 0	45.0	NIAGARAN	4,933	4	0	0	4	320	47,561	118,684	443,754	909,060	371	1
OF BEAR LAKE 26-23N-15W POOL A	NIAGARAN REEF	1975	MANISTEE	4,861	10 0	43.5	NIAGARAN	5,036	3	0	0	3	240	294,069	574,347	340,959	669,153	2,393	1
OF BEAR LAKE 27-23N-15W	NIAGARAN REEF	1975	MANISTEE	4,673	64 0	44.2	NIAGARAN	4,870	2	0	0	2	160	87,075	164,625	267,085	493,821	1,029	
OF BEAR LAKE 31-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,168	59 0	40.0	NIAGARAN	4,580	1	0	0	1	80	48,268	173,170	30,482	104,877	2,165	78
OF BEAR LAKE 32-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,592	62 0	45.3	NIAGARAN	4,860	3	1	0	3	240	232,010	512,593	195,791	425,552	2,136	
OF BEAR LAKE 33-23N-15W	NIAGARAN REEF	1974	MANISTEE	4,621	21 0	42.6	NIAGARAN	4,806	5	0	0	5	400	524,672	1,064,013	506,192	1,025,232	2,660	12
OF BEAR LAKE 34-23N-15W	NIAGARAN REEF	1975	MANISTEE	4,783	18 0	44.6	NIAGARAN	4,957	3	0	0	3	240	260,069	459,134	311,745	539,681	1,913	
G-C BROWN 4-22N-15W	NIAGARAN REEF	1974	MANISTEE	4,397	331 0	69.5	NIAGARAN	4,907	2	0	0	2	320	59,294	59,440	2,481,767	2,547,849	186	
G-C BROWN 4-22N-15W POOL A	NIAGARAN REEF	1975	MANISTEE	4,419	306 0	64.2	NIAGARAN	4,926	1	0	0	1	120	4,460	4,475	280,739	280,739	37	
OF BROWN 5-22N-15W	NIAGARAN REEF	1976	MANISTEE	4,649	12 0	45.3	NIAGARAN	4,762	1	0	0	1	80	94,737	113,526	154,379	167,670	1,419	
G-C BROWN 6-22N-15W	SALINA-NIAGARAN REEF	1974	MANISTEE	4,207	415 0	57.3	NIAGARAN	4,809	1	0	0	1	120	12,019	12,069	560,545	560,545	100	
G-C BROWN 7-22N-15W	NIAGARAN REEF	1974	MANISTEE	4,378	292 0	65.0	NIAGARAN	4,780	1	0	0	1	160	6,372	17,001	828,620	1,742,290	106	
G-C BROWN 8-22N-15W	NIAGARAN REEF	1974	MANISTEE	4,692	27 0	66.0	NIAGARAN	4,888	1	0	0	1	80	8,695	8,797	647,332	647,332	109	
GF BROWN 19-22N-15W	SALINA-NIAGARAN REEF	1977	MANISTEE	4,456	8 0		NIAGARAN	4,575	1	1	0	1	80						
OF CLEON 11-24N-13W	NIAGARAN REEF	1973	MANISTEE	5,624	121 0	43.5	NIAGARAN	6,167	3	1	0	3	240	80,656	82,675	83,064	84,420	364	
OF CLEON 12-24N-13W	NIAGARAN REEF	1974	MANISTEE	5,851	35 0	39.3	NIAGARAN	6,119	1	0	0	1	80	73,092	93,547	35,770	45,922	1,169	10
OF CLEON 12-24N-13W POOL A	NIAGARAN REEF	1975	MANISTEE	5,702	238 0	41.1	NIAGARAN	6,043	1	0	0	1	80	108,092	180,686	48,983	84,572	2,258	
OF CLEON 14-24N-13W	NIAGARAN REEF	1973	MANISTEE	5,655	69 0	44.3	NIAGARAN	5,928	2	0	0	2	160	92,291	97,295	85,320	88,957	608	

POOL CLASSIFICATION				OF ABANDONED OIL FIELD OR POOL				GF ABANDONED GAS FIELD OR POOL				G-C ABANDONED GAS-CONDENSATE FIELD OR POOL				GS GAS STORAGE RESERVOIR			
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC	COUNTY TOWNSHIP PRODUCING SECTIONS	DEPTH - FEET	THICKNESS - FEET	OIL GRAVITY @ 60 F	DEEPEST FORMATION OR POOL TESTED	DEPTH - FEET	NO. OF WELLS	ABANDONED	ACREAGE	DRILLED ACRES	OIL PRODUCTION - BBLs		GAS PRODUCTION - Mcf		RECOVERY PER ACRE DRILLED (BBLs)	TOTAL BARRELS BRINE PER DAY	
													PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PRODUCED IN 1977	CUMULATIVE THROUGH 1977			
OF CLEON 14-24N-13W POOL 1	NIAGARAN REEF	1976	MANISTEE	5,728	53 0		NIAGARAN	5,887	2	1	0	2	240	15,856	20,812	0	1,728	81	
G-C CLEON 15-24N-13W	NIAGARAN REEF	1974	MANISTEE	5,464	40 0		NIAGARAN	5,770	1	0	0	1	80	7,367	27,991	510,845	1,380,858	350	
G-C CLEON 19-24N-13W	NIAGARAN REEF	1976	MANISTEE	5,073	129 0	72.25	NIAGARAN	5,453	1	0	0	1	80	6,542	6,542	245,128	215,165	92	
OF CLEON 19-24N-13W POOL A	NIAGARAN REEF	1977	MANISTEE	5,007	133 0	30.9	NIAGARAN	5,450	1	1	0	1	80	143	143				2
G-C CLEON 20-24N-13W	NIAGARAN REEF	1974	MANISTEE	5,145	202 0		NIAGARAN	5,534	1	0	0	1	80	395	394	20,955	57,000	12	
G-C CLEON 22-24N-13W	NIAGARAN REEF	1975	MANISTEE	5,436	73.5 0	65.5	NIAGARAN	5,701	2	0	0	2	200	45,121	104,384	2,743,754	5,109,895	522	1
G-C CLEON 24-24N-13W	NIAGARAN REEF	1977	MANISTEE	5,857	76 0		NIAGARAN	6,052	1	1	0	1	80						
G-C CLEON 26-24N-13W	NIAGARAN REEF	1976	MANISTEE	5,616	154 0	74.8	NIAGARAN	5,901	1	0	0	1	160	0	140	0			1
G-C CLEON 27-24N-13W	NIAGARAN REEF	1976	MANISTEE	5,653	36 0		NIAGARAN	5,937	1	ABANDONED 1976		80					SHUT-IN		
G-C CLEON 27-24N-13W POOL A	NIAGARAN REEF	1977	MANISTEE	5,724	10 0		NIAGARAN	5,860	1	1	0	1	160						
G-C CLEON 31-24N-13W	NIAGARAN	1977	MANISTEE	5,220	119 0		NIAGARAN	5,543	1	1	0	1	80	30	30				1
G-C CLEON 32-24N-13W	NIAGARAN	1977	MANISTEE	5,418	44 0	51.5	NIAGARAN	5,683	1	1	0	1	160	55	55				1
AGF MANISTEE	SALINA	1959	MANISTEE	3,616	94 0		NIAGARAN	4,165	1	ABANDONED 1961		160							
OF MANISTEE 1-22N-16W	NIAGARAN REEF	1973	MANISTEE	4,283	254 0	58.6	NIAGARAN	4,807	2	0	0	2	320	151,665	290,584	25,188	30,670	908	
OF MANISTEE 1-22N-16W POOL A	NIAGARAN REEF	1975	MANISTEE	4,408	81 0	47.5	NIAGARAN	4,630	3	1	0	3	240	60,984	70,873	340,149	433,124	295	
OF MANISTEE 2-22N-16W	NIAGARAN REEF	1975	MANISTEE	4,245	15 0		NIAGARAN	4,558	1	0	0	1	80	75,139	130,040	27,997	43,427	1,625	
OF MANISTEE 3-22N-16W	NIAGARAN REEF	1976	MANISTEE	4,135	46 0		SALINA-NIAGARAN	4,365	2	1	0	2	160	3,449	3,766	940	940	23	
OF MANISTEE 12-22N-16W	NIAGARAN REEF	1974	MANISTEE	4,701	17 0	45.0	NIAGARAN	4,844	2	0	0	2	160	82,002	82,328	54,177	54,177	514	30
G-C MANISTEE 13-22N-16W	SALINA-NIAGARAN REEF	1976	MANISTEE	4,511	201 0		SALINA-NIAGARAN	4,832	1	0	0	1	160					SHUT-IN	
GF MANISTEE 13-22N-16W POOL A	NIAGARAN REEF	1976	MANISTEE	4,604	62 0		NIAGARAN	4,837	1	0	0	1	80					SHUT-IN	
OF MANISTEE 14-22N-16W	NIAGARAN	1977	MANISTEE	4,342	258 0	42.6	NIAGARAN	4,881	1	1	0	1	80	497	497				6
OF MANISTEE 15-22N-16W	NIAGARAN REEF	1974	MANISTEE	4,467	15 0	42.8	NIAGARAN	4,725	3	0	0	3	240	98,903	195,505	352,196	637,303	815	115
OF MANISTEE 16-22N-16W	NIAGARAN REEF	1975	MANISTEE	4,049	34 0	43.2	NIAGARAN	4,228	2	0	0	2	160	99,759	225,034	50,643	129,265	1,406	31
OF MANISTEE 17-22N-16W	NIAGARAN REEF	1976	MANISTEE	3,930	10 0		NIAGARAN	4,230	2	1	0	2	160	129,201	136,389	89,458	89,458	852	2
OF MANISTEE 17-22N-16W POOL A	NIAGARAN REEF	1977	MANISTEE	4,116	69 0	47	NIAGARAN	4,285	1										

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL				OF ACTIVE GAS FIELD OR POOL				G-C GAS-CONDENSATE FIELD OR POOL				G-S GAS STORAGE RESERVOIR								
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY	TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	G-C PRODUCTION - EBLB	G-S PRODUCTION - Mcf	RECOVERY PERCENTAGE (DRILLED)	TOTAL BARRELS BRINE PER DAY	G-C PRODUCTION - EBLB	G-S PRODUCTION - Mcf	RECOVERY PERCENTAGE (DRILLED)	TOTAL BARRELS BRINE PER DAY						
																	ABANDONED OIL FIELD OR POOL	ABANDONED GAS FIELD OR POOL	ABANDONED GAS-CONDENSATE FIELD OR POOL	ABANDONED GAS STORAGE RESERVOIR		
MONTMORENCY COUNTY																						
G-C	MONTMORENCY 25-32N-1E	1975	NIAGARAN	REEF	4,754	24	D	72	3	NIAGARAN	14,939	1	0	0	1	50	47					
MONTMORENCY TWP., 32N-1E, SECTION 29																						
OTSEGO COUNTY																						
OF	BAGLEY 21-30N-3W	1975	OTSEGO	REEF	5,952	28	D	36	0	NIAGARAN	6,219	1	0	0	1	80	6,654	14,637	1,602	3,177	193	15
BAGLEY TWP., 30N-3W, SECTION 21																						
OF	BAGLEY 23-30N-3W	1973	OTSEGO	REEF	5,860	13	D	43	3	NIAGARAN	6,134	2	0	0	2	120	63,133	157,064	66,479	135,766	1,309	150
BAGLEY TWP., 30N-3W, SECTIONS 22, 23																						
OF	BAGLEY 25-30N-3W	1972	OTSEGO	REEF	6,090	55	D	44	9	NIAGARAN	6,372	1	0	0	1	62	43,657	377,224	132,040	627,431	6,384	15
BAGLEY TWP., 30N-3W, SECTION 25																						
OF	BAGLEY 25-30N-3W POOL A	1972	OTSEGO	REEF	6,070	30	D	41	8	NIAGARAN	6,451	3	0	0	3	240	132,500	720,494	281,627	1,237,152	3,002	52
BAGLEY TWP., 30N-3W, SECTION 25																						
OF	BAGLEY 31-30N-3W	1977	OTSEGO	REEF	6,121	7	D	46	3	NIAGARAN	6,385	2	2	0	2	160	490	490				3
BAGLEY TWP., 30N-3W, SECTION 31																						
OF	BAGLEY 35-30N-3W	1974	OTSEGO	REEF	6,110	50	D	43	0	NIAGARAN	6,365	2	1	0	2	240	150,431	344,902	108,899	369,025	1,437	110
BAGLEY TWP., 30N-3W, SECTION 35																						
G-C	CHARLTON 1-30N-1W	1975	OTSEGO	REEF	5,885	6	D	58	1	NIAGARAN	6,165	2	1	0	2	200	81,291	158,334	1,881,498	2,950,302	792	
CHARLTON TWP., 30N-1W, SECTION 1																						
OF	CHARLTON 9-30N-1W	1972	OTSEGO	REEF	5,832	226	D	46	4	NIAGARAN	6,216	1	0	0	1	80	66,066	360,956	140,920	363,352	4,512	
CHARLTON TWP., 30N-1W, SECTION 9																						
OF	CHARLTON 10-30N-1W	1974	OTSEGO	REEF	6,093	96	D	45	8	NIAGARAN	6,265	1	0	0	1	80	107,216	259,899	65,286	196,988	3,249	
CHARLTON TWP., 30N-1W, SECTION 10																						
OF	CHARLTON 12-30N-1W	1973	OTSEGO	REEF	5,936	129	D	50	3	NIAGARAN	6,330	2	0	0	2	160	36,518	95,907	334,479	484,884	599	
CHARLTON TWP., 30N-1W, SECTIONS 12, 13																						
OF	CHARLTON 24-30N-1W	1973	OTSEGO	REEF	6,234	26	D			NIAGARAN	6,390	1	0	0	1	80	26,704	103,788	132,201	561,890	1,297	
CHARLTON TWP., 30N-1W, SECTION 24																						
G-C	CHARLTON 31-30N-1W	1972	OTSEGO	REEF	5,674	13	D	51	8	NIAGARAN	6,400	2	0	0	2	430	28,712	198,165	539,160	3,314,277	461	
CHARLTON TWP., 30N-1W, SECTION 31																						
OF	CHARLTON 4-31N-1W	1970	OTSEGO	REEF	4,766	116	D	55		CLINTON	5,270	2	0	0	2	480	249,610	1,833,681	411,710	1,709,442	3,820	6
CHARLTON TWP., 31N-1W, SECTION 4																						
OF	CHARLTON 4-31N-1W POOL A	1973	OTSEGO	REEF	4,780	15	D	44	3	NIAGARAN	4,860	1	0	0	1	320						3
DETERMINED A SEPARATE POOL IN 1974. CHARLTON TWP., 31N-1W, SECTION 5. DIRECTIONAL HOLE IN WHICH THE SURFACE LOCATION IS 4-31N-1W AND THE SUBSURFACE LOCATION IS 5-31N-1W																						
OF	CHARLTON 7-31N-1W	1974	OTSEGO	REEF	4,897	16	D	46	1	NIAGARAN	5,184	3	0	0	3	240	213,745	214,793	461,748	461,748	895	1
CHARLTON TWP., 31N-1W, SECTION 7																						
OF	CHARLTON 9-31N-1W	1972	OTSEGO	REEF	6,843	3	D	44	2	NIAGARAN	5,045	2	0	0	2	160	218,715	967,648	194,275	848,124	6,048	8
CHARLTON TWP., 31N-1W, SECTION 9																						
OF	CHARLTON 27-31N-1W	1972	OTSEGO	REEF	5,202	26	D	45	4	NIAGARAN	5,228	5	0	0	5	360	270,465	1,221,171	534,516	1,570,599	3,392	1
CHARLTON TWP., 31N-1W, SECTIONS 27, 28																						
G-C	CHARLTON 28-31N-1W	1974	OTSEGO	REEF	4,923	45	D	44	8	NIAGARAN	5,421	2	0	0	2	80	133,651	349,660	781,345	1,747,840	4,371	
CHARLTON TWP., 31N-1W, SECTION 28. INCLUDES 1 WELL WHICH MAY BE ASSIGNED TO CHARLTON 28-31N-1W, POOL A																						
OF	CHARLTON 30-31N-1W	1975	OTSEGO	REEF	5,435	11	D	43	4	NIAGARAN	5,650	3	1	0	3	160	170,548	481,153	95,894	242,105	3,007	75
CHARLTON TWP., 31N-1W, SECTION 30																						
OF	CHARLTON 31-31N-1W	1973	OTSEGO	REEF	5,391	54	D	41	9	NIAGARAN	5,770	2	0	0	2	240	204,324	542,439	121,601	262,444	2,260	
CHARLTON TWP., 31N-1W, SECTIONS 30, 31																						
OF	CHARLTON 34-31N-1W	1974	OTSEGO	REEF	5,492	10	D	44	5	NIAGARAN	5,830	2	0	0	2	160	162,644	317,353	107,542	199,658	1,983	35
CHARLTON TWP., 31N-1W, SECTION 34																						
OF	CHESTER 10-29N-2W	1975	OTSEGO	REEF	6,145	47	D	68	5	NIAGARAN	6,644	1	0	0	1	240	48,447	174,344	1,029,868	2,448,886	726	
CHESTER TWP., 29N-2W, SECTION 10																						
OF	CHESTER, SEC. 15	1951	OTSEGO	REEF	6,610	5	D	41	0	NIAGARAN	6,870	2	0	0	1	80	2,161	39,752	114,566	449,674	497	1
CHESTER TWP., 29N-2W, SECTIONS 15, 22																						
G-C	CHESTER, SEC. 15	1970	OTSEGO	REEF	5,930	348	D	CONO.		CLINTON	6,697	1	0	0	1	160	6,486	271,081	1,069,232	10,995,011	1,694	
CHESTER TWP., 29N-2W, SECTION 15																						
G-C	CHESTER 21-29N-2W	1973	OTSEGO	REEF	6,273	29	D			NIAGARAN	6,770	1	0	0	1	160	5,017	132,658	920,785	4,923,976	829	
CHESTER TWP., 29N-2W, SECTION 21																						
OF	CHESTER 2-30N-2W	1971	OTSEGO	REEF	5,653	247	D	43	2	NIAGARAN	6,051	4	0	0	4	320	94,496	404,787	43,230	107,942	1,265	4
CHESTER TWP., 30N-2W, SECTIONS 2, 3, 10, 11																						
OF	CHESTER 5-30N-2W	1972	OTSEGO	REEF	5,538	10	D			NIAGARAN	5,750	1	0	0	1	40				3,985		100
OF	CHESTER 5-30N-2W POOL A	1975	OTSEGO	REEF	5,634	10	D	44	8	NIAGARAN	5,938	1	0	0	1	80	74,231	29,067	7,565	7,573	363	220
CHESTER TWP., 30N-2W, SECTION 5																						
OF	CHESTER 6-30N-2W	1973	OTSEGO	REEF	5,659	21	D	43	0	NIAGARAN	6,022	3	1	0	3	240	182,922	552,279	165,742	393,271	2,301	11
CHESTER TWP., 30N-2W, SECTIONS 5, 6																						
OF	CHESTER 10-30N-2W	1972	OTSEGO	REEF	5,966	28	D			NIAGARAN	6,200	1	0	0	1	80	40,443	442,603	65,556	284,296	5,532	5
CHESTER TWP., 30N-2W, SECTION 10																						
OF	CHESTER 10-30N-2W POOL A	1973	OTSEGO	REEF	5,898	66	D	42	6	NIAGARAN	6,240	2	0	0	2	160	184,156	565,444	125,923	290,849	3,534	125
CHESTER TWP., 30N-2W, SECTION 10																						
OF	CHESTER 16-30N-2W	1971	OTSEGO	REEF	5,760	300	D			NIAGARAN	6,350	5	0	0	5	360	205,536	1,467,321	216,119	1,021,185	4,076	13
CHESTER TWP., 30N-2W, SECTIONS 16, 21																						
OF	CHESTER 18-30N-2W	1971	OTSEGO	REEF	5,930	20	D	45		NIAGARAN	6,330	12	0	0	12	840	884,273	4,881,977	787,656	3,062,649	5,811	17
CHESTER TWP., 30N-2W, SECTIONS 18, 19, 19																						
OF	CHESTER 19-30N-2W	1971	OTSEGO	REEF	6,054	30	D	44	4	NIAGARAN	6,512	2	0	0	2	120	161,912	786,643	93,965	469,190	6,555	1
CHESTER TWP., 30N-2W, SECTION 19. BAGLEY TWP., 30N-3W, SECTION 24																						

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL				OF ACTIVE GAS FIELD OR POOL				G-C GAS-CONDENSATE FIELD OR POOL				G-S GAS STORAGE RESERVOIR								
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY	TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	G-C PRODUCTION - EBLB	G-S PRODUCTION - Mcf	RECOVERY PERCENTAGE (DRILLED)	TOTAL BARRELS BRINE PER DAY	G-C PRODUCTION - EBLB	G-S PRODUCTION - Mcf	RECOVERY PERCENTAGE (DRILLED)	TOTAL BARRELS BRINE PER DAY						
																	ABANDONED OIL FIELD OR POOL	ABANDONED GAS FIELD OR POOL	ABANDONED GAS-CONDENSATE FIELD OR POOL	ABANDONED GAS STORAGE RESERVOIR		
MONTMORENCY COUNTY																						
G-C	MONTMORENCY 25-32N-1E	1975	NIAGARAN	REEF	4,754	24	D	72	3	NIAGARAN	14,939	1	0	0	1	50	47					
MONTMORENCY TWP., 32N-1E, SECTION 29																						
OTSEGO COUNTY																						
OF	BAGLEY 21-30N-3W	1975	OTSEGO	REEF	5,952	28	D	36	0	NIAGARAN	6,219	1	0	0	1	80	6,654	14,637	1,602	3,177	193	15
BAGLEY TWP., 30N-3W, SECTION 21																						
OF	BAGLEY 23-30N-3W	1973	OTSEGO	REEF	5,860	13	D	43	3	NIAGARAN	6,134	2	0	0	2	120	63,133	157,064	66,479	135,766	1,309	150
BAGLEY TWP., 30N-3W, SECTIONS 22, 23																						
OF	BAGLEY 25-30N-3W	1972	OTSEGO	REEF	6,090	55	D	44	9	NIAGARAN	6,372	1	0	0	1	62	43,657	377,224	132,040	627,431	6,384	15
BAGLEY TWP., 30N-3W, SECTION 25																						
OF	BAGLEY 25-30N-3W POOL A	1972	OTSEGO	REEF	6,070	30	D	41	8	NIAGARAN	6,451	3	0	0	3	240	132,500	720,494	281,627	1,237,152	3,002	52
BAGLEY TWP., 30N-3W, SECTION 25																						
OF	BAGLEY 31-30N-3W	1977	OTSEGO	REEF	6,121	7	D	46	3	NIAGARAN	6,385	2	2	0	2	160	490	490				3
BAGLEY TWP., 30N-3W, SECTION 31																						
OF	BAGLEY 35-30N-3W	1974	OTSEGO	REEF	6,110	50	D	43	0	NIAGARAN	6,365	2	1	0	2	240	150,431	344,902	108,899	369,025	1,437	110
BAGLEY TWP., 30N-3W, SECTION 35																						
G-C	CHARLTON 1-30N-1W	1975	OTSEGO	REEF	5,885	6	D	58	1	NIAGARAN	6,165	2	1	0	2	200	81,291	158,334	1,881,498	2,950,302	792	
CHARLTON TWP., 30N-1W, SECTION 1																						
OF	CHARLTON 9-30N-1W	1972	OTSEGO	REEF	5,832	226	D	46	4	NIAGARAN	6,216	1	0	0	1	80	66,066	360,956	140,920	363,352	4,512	
CHARLTON TWP., 30N-1W, SECTION 9																						
OF	CHARLTON 10-30N-1W	1974	OTSEGO	REEF	6,093																	

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL		OF ACTIVE GAS FIELD OR POOL		G-C GAS-CONDENSATE FIELD OR POOL		G5 GAS STORAGE RESERVOIR														
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPT. IN FEET	NO. OF WELLS	OIL PRODUCT ON - BBLs	GAS PRODUCTION - Mcf	RECOVERY PERCENT DRILLED (BBLs)	TOTAL BARRELS BRINE PER DAY	OF ABANDONED OIL FIELD OR POOL		OF ABANDONED GAS FIELD OR POOL		G-C ABANDONED GAS-CONDENSATE FIELD OR POOL		G5 GAS STORAGE RESERVOIR				
												AGF	AGC	AGC	AGC	AGC	AGC	AGC	AGC			
CHESTER 21-30N-2W	NIAGARAN REEF	1977	OTSEGO	5,172	2F 0	43.0	NIAGARAN	6,143	1	0	0	1	80	221,133	1,056,446	254,623	1,156,107	7,997	9			
CENTRAL FACILITY - PRODUCTION PIG FLS INCLUDE CHESTER 14 1-12																						
CHESTER 30-30N-2W	NIAGARAN REEF	1973	OTSEGO	6,122	30 0	37.7	NIAGARAN	6,350	1	0	0	1	80	81,000	300,277	67,048	191,104	5,816				
DOVER TWP., 30N-2W, SECTION 31																						
DOVER TWP., 30N-2W, SECTION 30																						
DOVER 12-31N-2W	SALINA-NIAGARAN REEF	1974	OTSEGO	5,932	5 0	43.4	NIAGARAN	5,044	1	0	0	1	80	96,831	97,048	135,214	135,214	1,211	1			
DOVER TWP., 31N-2W, SECTION 12																						
DOVER 21-31N-2W	SALINA-NIAGARAN REEF	1975	OTSEGO	6,210	10 0	41.2	NIAGARAN	5,527	1	0	0	1	80	17,952	25,292	531	2,082	354	250			
DOVER TWP., 31N-2W, SECTION 21																						
DIRECTIONAL WELL IN HOLE THE SURFACE LOCATION IS IN OTSEGO COUNTY DOVER TOWNSHIP SECTION 22-31N-2W AND THE SUBSURFACE LOCATION IS IN OTSEGO COUNTY DOVER TOWNSHIP SECTION 21-31N-2W																						
DOVER 22-31N-2W	SALINA-NIAGARAN REEF	1975	OTSEGO	5,223	10 0	41.1	NIAGARAN	5,521	1	0	0	1	80	14,015	34,777	324	2,421	435	20			
DOVER TWP., 31N-2W, SECTION 22																						
DOVER 22-31N-2W POOL A	NIAGARAN REEF	1977	OTSEGO	5,119	0 0		NIAGARAN	5,534	1	1	0	1	80									
DOVER TWP., 31N-2W, SECTION 22																						
DOVER 27-31N-2W	A-1 CARBONATE	1975	OTSEGO	5,179	49 0		NIAGARAN	5,564	1	0	0	1	80	4,264	13,413			168	20			
DOVER TWP., 31N-2W, SECTION 27																						
DOVER 33-31N-2W	NIAGARAN REEF	1974	OTSEGO	5,413	9 0	43.6	NIAGARAN	5,678	3	0	0	3	240	146,174	552,441	128,827	361,566	2,302	375			
DOVER TWP., 31N-2W, SECTIONS 28, 33																						
DOVER 35-31N-2W	NIAGARAN REEF	1973	OTSEGO	5,475	41 0	42.3	NIAGARAN	5,810	3	0	0	3	240	84,955	311,817	88,243	229,812	1,299	2			
DOVER TWP., 31N-2W, SECTION 35																						
DOVER 36-31N-2W	NIAGARAN REEF	1973	OTSEGO	5,485	135 0	42.7	NIAGARAN	5,835	3	0	0	3	240	128,554	615,762	132,301	453,851	2,566	13			
DOVER TWP., 31N-2W, SECTIONS 35, 36																						
HAYES 11-29N-4W	NIAGARAN REEF	1969	OTSEGO	6,180	57 0	47.0	NIAGARAN	6,515	5	0	0	4	800	51,342	781,485	1	292,116	977	170			
HAYES TWP., 29N-4W, SECTIONS 2, 11, 12, 14																						
HAYES 15-29N-4W	NIAGARAN REEF	1973	OTSEGO	6,350	39 0	42.6	NIAGARAN	6,615	2	0	0	2	160	209,772	1,098,972	106,434	596,416	6,868	9			
HAYES TWP., 29N-4W, SECTION 15																						
HAYES 21-29N-4W	NIAGARAN REEF	1972	OTSEGO	6,581	6 0	44.9	NIAGARAN	6,972	3	0	0	3	240	298,225	1,248,999	176,566	811,154	5,204				
HAYES TWP., 29N-4W, SECTION 21																						
HAYES 29-29N-4W	SALINA-NIAGARAN REEF	1973	OTSEGO	6,474	53 0	42.7	NIAGARAN	6,982	2	0	0	2	160	214,852	504,282	130,649	315,415	3,152				
HAYES TWP., 29N-4W, SECTION 29																						
HAYES 32-29N-4W	NIAGARAN REEF	1972	OTSEGO	6,462	5 0	42.7	NIAGARAN	6,873	3	0	0	3	320	177,835	614,572	77,688	319,323	1,920	230			
HAYES TWP., 29N-4W, SECTIONS 29, 31, 32																						
HAYES 34-29N-4W	NIAGARAN REEF	1974	OTSEGO	6,836	25 0	42.4	NIAGARAN	7,050	2	0	0	2	160	112,523	406,056	62,174	221,549	2,538	5			
HAYES TWP., 29N-4W, SECTIONS 27, 34																						
HAYES 36-29N-4W	NIAGARAN REEF	1976	OTSEGO	6,464	65 0	47.5	NIAGARAN	6,875	1	0	0	1	80	68,376	68,707	79,222	79,222	859				
HAYES TWP., 29N-4W, SECTION 36																						
OTSEGO LAKE 3-29N-3W	SALINA-NIAGARAN REEF	1971	OTSEGO	6,272	122 0	44.2	NIAGARAN	6,860	2	0	0	2	120	57,373	622,788	255,543	1,021,116	5,190				
OTSEGO LAKE TWP., 29N-3W, SECTIONS 3, 10																						
OTSEGO LAKE 11-29N-3W	NIAGARAN REEF	1977	OTSEGO	6,628	10 0	44.1	NIAGARAN	6,725	1	1	0	1	80	57,005	57,005	64,395	64,395	712	2			
OTSEGO LAKE TWP., 29N-3W, SECTION 11																						
OTSEGO LAKE 24-29N-3W	NIAGARAN REEF	1977	OTSEGO	6,561	36 0	49.8	NIAGARAN	6,803	1	1	0	1	160	107	107				1			
OTSEGO LAKE TWP., 29N-3W, SECTION 24																						
OTSEGO LAKE 26-29N-3W	NIAGARAN REEF	1975	OTSEGO	6,810	12 0	52.7	NIAGARAN	6,968	1	0	0	1	80	0	3,716				46			
OTSEGO LAKE TWP., 29N-3W, SECTION 26																						
OTSEGO LAKE 31-29N-3W	NIAGARAN REEF	1977	OTSEGO	6,392	148 0	42.2	NIAGARAN	6,848	1	1	0	1	114	350	350				3			
OTSEGO LAKE TWP., 29N-3W, SECTION 31																						
OTSEGO LAKE 35-29N-3W	SALINA-NIAGARAN REEF	1977	OTSEGO	6,412	368 0	64.2	NIAGARAN	7,115	1	1	0	1	80	164	164				2			
OTSEGO LAKE TWP., 29N-3W, SECTION 35																						
PRESQUE ISLE COUNTY																						
BELKNAP 10-34N-5E	NIAGARAN REEF	1977	PRESQUE ISLE	2,560	20 0		NIAGARAN	3,087	1	1	0	1	80									
BELKNAP TWP., 34N-5E, SECTION 10																						
BELKNAP 21-34N-5E	NIAGARAN REEF	1977	PRESQUE ISLE	2,978	24 0	39.8	NIAGARAN	3,340	1	1	0	1	160	3,544	3,544					22		
BELKNAP TWP., 34N-5E, SECTION 21																						
BELKNAP 34-34N-5E	NIAGARAN REEF	1977	PRESQUE ISLE	3,153	10 0	51.9	NIAGARAN	3,410	1	1	0	1	80	418	418					5		
BELKNAP TWP., 34N-5E, SECTION 34																						
BISMARCK 12-34N-4E	NIAGARAN REEF	1977	PRESQUE ISLE	3,017	23 0	38.9	NIAGARAN	3,237	1	1	0	1	80	121	121					1		
BISMARCK TWP., 34N-4E, SECTION 12																						
BISMARCK 26-34N-4E	NIAGARAN REEF	1976	PRESQUE ISLE	3,302	65 0		NIAGARAN	3,589	1	0	0	1	80							SHUT-IN		
BISMARCK TWP., 34N-4E, SECTION 26																						
NORTH ALLIS 29-35N-2E	NIAGARAN REEF	1969	PRESQUE ISLE	2,727	10 0		PELLEPORIAN	5,940	1	0	0	1	40	279	5,027					126		
NORTH ALLIS TWP., 35N-2E, SECTION 29																						
PULAWSKI 12-34N-6E	SALINA-NIAGARAN REEF	1976	PRESQUE ISLE	2,369	76 0		NIAGARAN	2,840	2	1	0	2	160							SHUT-IN		
PULAWSKI TWP., 34N-6E, SECTION 12																						
WEXFORD COUNTY																						
WEXFORD 1-24N-12W	NIAGARAN REEF	1977	WEXFORD	6,231	91 0	43.4	NIAGARAN	6,640	1	1	0	1	80	65	65					1		
WEXFORD TWP., 24N-12W, SECTION 1																						
WEXFORD 2-24N-12W	NIAGARAN REEF	1977	WEXFORD	6,156	49 0		NIAGARAN	6,267	1	1	0	1	80									
WEXFORD TWP., 24N-12W, SECTION 2																						
WEXFORD 3-24N-12W	NIAGARAN REEF	1977	WEXFORD	6,077	26 0	65.2	NIAGARAN	6,324	1	1	0	1	80	6,376	6,376	72,833	72,833		80			
WEXFORD TWP., 24N-12W, SECTION 3																						
WEXFORD 5-24N-12W	NIAGARAN REEF	1974	WEXFORD	5,820	127 0		NIAGARAN	6,119	3	0	0	3	80	70,779	113,311	43,932	65,135	1,416	5			
WEXFORD TWP., 24N-12W, SECTION 5																						
TOTALS												64,246	22,098	032	70,897	979	108,599	819	348,066	545		9,634

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL		OF ACTIVE GAS FIELD OR POOL		G-C GAS-CONDENSATE FIELD OR POOL		G5 GAS STORAGE RESERVOIR														
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPT. IN FEET	NO. OF WELLS	OIL PRODUCTION - BBLs	GAS PRODUCTION - Mcf	RECOVERY PERCENT DRILLED (BBLs)	TOTAL BARRELS BRINE PER DAY	OF ABANDONED OIL FIELD OR POOL		OF ABANDONED GAS FIELD OR POOL		G-C ABANDONED GAS-CONDENSATE FIELD OR POOL		G5 GAS STORAGE RESERVOIR				
												AGF	AGC	AGC	AGC	AGC	AGC	AGC				
WEXFORD 1-24N-12W POOL B	NIAGARAN REEF	1976	WEXFORD	6,231	91 0	43.4	NIAGARAN	6,640	1	1	0	1	80	65	65					1		
WEXFORD 2-24N-12W POOL A	NIAGARAN REEF	1977	WEXFORD	6,156	49 0		NIAGARAN	6,267	1	1	0	1	80									
WEXFORD 3-24N-12W POOL A	NIAGARAN REEF	1977	WEXFORD	6,077	26 0	65.2	NIAGARAN	6,324	1	1	0	1	80	6,376	6,376	72,833	72,833		80			
WEXFORD 5-24N-12W POOL A	NIAGARAN REEF	1974	WEXFORD	5,820	127 0		NIAGARAN	6,119	3	0	0	3	80	70,779	113,311	43,932	65,135	1,416	5			
TOTALS												64,246	22,098	032	70,897	979	108,599	819	348,066	545		9,634

LISTING OF A SECTION OR PART OF A SECTION DOES NOT NECESSARILY MEAN THE ENTIRE SECTION TO BE PRODUCTIVE OF OIL OR GAS IN ANY OR ALL POTENTIALLY PRODUCTIVE FORMATIONS. ONLY THOSE SECTIONS OR PARTS OF SECTIONS WHICH HAVE HAD AT LEAST ONE WELL COMPLETED AS AN OIL OR GAS WELL ARE LISTED.

CHANGES IN FIELD NAMES
 HISTORICALLY, WITH FEW EXCEPTIONS, MICHIGAN OIL AND GAS FIELDS HAVE BEEN NAMED AFTER NEARBY GEOGRAPHIC ENTITIES SUCH AS TOWNS, VILLAGES, LAKES AND TOWNSHIP NAMES. DUE TO NUMEROUS NIAGARAN REEF DISCOVERIES WITHIN RELATIVELY SMALL AREAS AND A LACK OF SUITABLE IDENTIFYING NAMES FOR THOSE IN NORTHERN MICHIGAN AND POSSIBLY THOSE IN SOUTHERN MICHIGAN IN FUTURE YEARS, THE NAMING SYSTEM HAS BEEN MODIFIED. STARTING IN 1971, MOST NEW NIAGARAN REEF FIELDS WERE NAMED ACCORDING TO TOWNSHIP NAME, FOLLOWED BY THE SECTION NUMBER FOR THE DISCOVERY WELL, AND THEN BY NUMERICAL TOWN AND RANGE. SEPARATE POOLS OR RESERVOIRS OCCURRING IN THE SAME FIELD ARE DESIGNATED POOL A, B, C AS NECESSARY.

POOL CLASSIFICATION				ACTIVE OIL FIELD OR POOL				ACTIVE GAS FIELD OR POOL				GAS-CONDENSATE FIELD OR POOL				GAS STORAGE RESERVOIR				
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY	TOWNSHIP	RANGE	SECTION	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	ABANDONED	GAS PRODUCTION - MCF	GAS PRODUCTION - MCF	GAS PRODUCTION - MCF	GAS PRODUCTION - MCF	RECOVERY PERCENTAGE	TOTAL OIL PRODUCTION - BBL				
																				RECOVERED
1	CLARE	DUNDEE	1936	ASHTABURGA	2-45E	12	DL	34.2	SYLVANIA	4,163	0	0	0	0	47	1,000	25,157			
2	CLARE	DECATUR	1913																	
3	CLARE	RICHFIELD	1947																	
4	CLARE	TRAVERSE	1950	WAD BUREN	1-150	1	L		TRAVERSE	1,359	14	ABANDONED 1953	140							
5	CLARE	TRAVERSE	1951	WASHTEGAR	3-6A	2	D		TRENTON	1,806	2	ABANDONED 1962	20							
6	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
7	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
8	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
9	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
10	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
11	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
12	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
13	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
14	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
15	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
16	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
17	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
18	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
19	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
20	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
21	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
22	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
23	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
24	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
25	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
26	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
27	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
28	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
29	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
30	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
31	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
32	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
33	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
34	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
35	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
36	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
37	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
38	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
39	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
40	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
41	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
42	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
43	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
44	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
45	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
46	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
47	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
48	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
49	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
50	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
51	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
52	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
53	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
54	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
55	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
56	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
57	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
58	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
59	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
60	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
61	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
62	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
63	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
64	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
65	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
66	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
67	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
68	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
69	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
70	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
71	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
72	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
73	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
74	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
75	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
76	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L		TRAVERSE	1,130	1									
77	CLARE	TRAVERSE	1946	WAD BUREN	1-128	1	L													

MICHIGAN OIL AND GAS FIELDS

SOUTHERN PENINSULA

OIL FIELDS
SINGLE POOL
2 OR MORE POOLS
2 OR MORE OIL AND GAS POOLS

GAS FIELDS
SINGLE POOL
2 OR MORE POOLS

COMBINATION OIL AND GAS FIELDS
2 OR MORE OIL AND GAS POOLS

EMPLOYED GAS STORAGE AREA

All oil and gas fields are confined to the southern peninsula of Michigan.
All field names are not shown.
Shape and outline of all fields are generalized. Includes abandoned fields.



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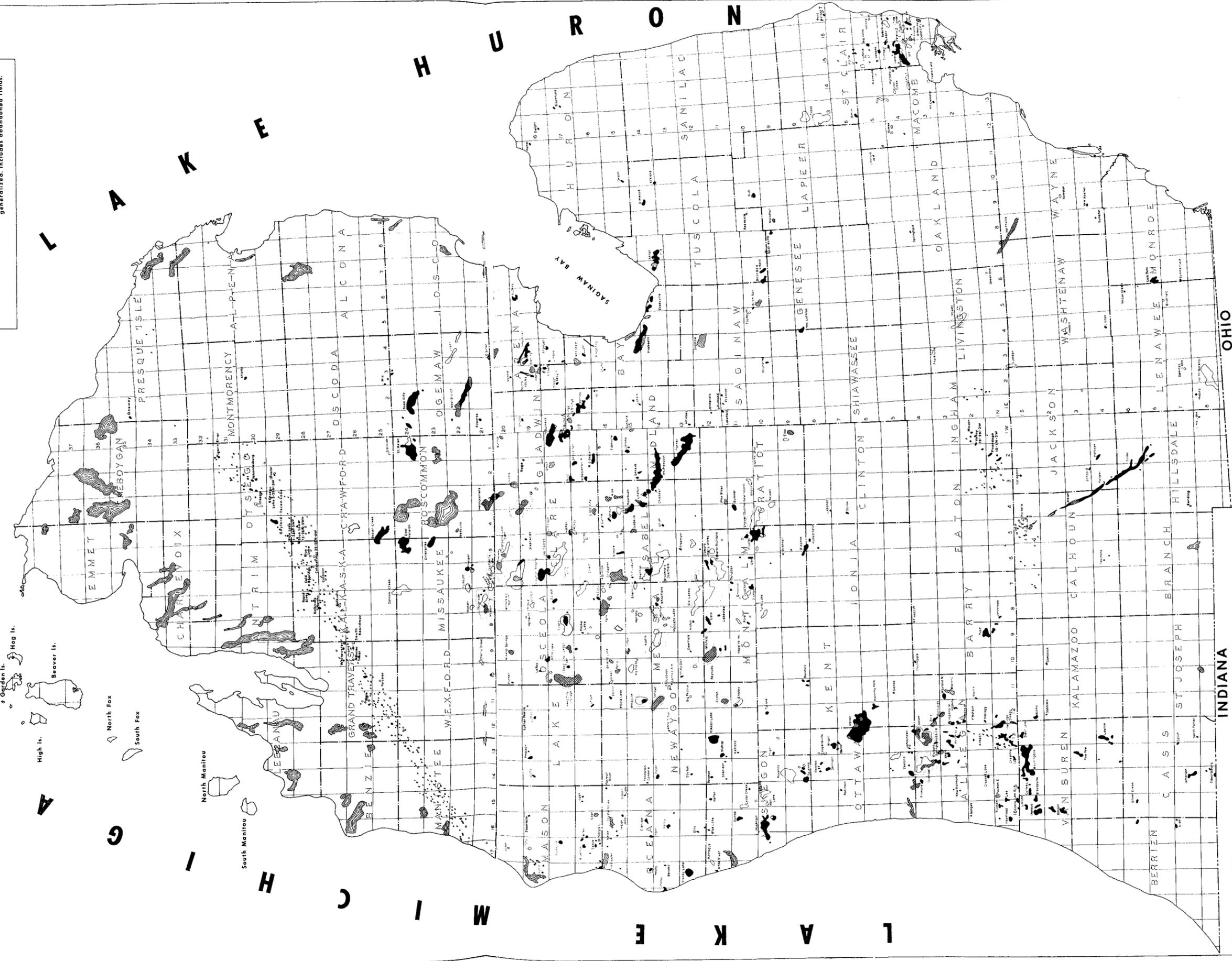
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POOL CLASSIFICATION			OF ACTIVE OIL FIELD OR POOL	OF ACTIVE GAS FIELD OR POOL	G-C GAS-CONDENSATE FIELD OR POOL	GS GAS STORAGE RESERVOIR													
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP	PAY ZONE		DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	DRILLED ACRES	OIL PRODUCTION - BBLs		GAS PRODUCTION - Mcf		RECOVERY PER CENT DRILLED	TOTAL BARRELS PER DAY				
				DEPTH IN FEET	THICKNESS IN FEET					PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PRODUCED IN 1977	CUMULATIVE THROUGH 1977						
28	LINDSEY, SEC. 31	DUNDEE	1974	ISABELLA	1	0	DUNDEE	13,771	0	0	0	85	1,266	12,295	154	46			
LINDSEY TWP., 13N-4W, SECTIONS 29, 31																			
29P	LINDSEY, SEC. 31	DUNDEE	1963	ISABELLA	1	0	DUNDEE	3,986	1	0	0	10	ABANDONED 1968	10	COMBINED WITH SECTION 16 PRODUCTION				
LINDSEY TWP., 13N-4W, SECTION 31																			
35P	LOGAN	RICHFIELD	1941	MASON	2	0	RICHFIELD	3,330	2	0	0	80		13,983					
LOGAN TWP., 17N-15W, SECTIONS 9, 16																			
36P	LOGAN	WEIR	1969	OSWEGO	1	0	RICHFIELD	5,537	0	0	0	0							
LOGAN TWP., 17N-15W, SECTIONS 9, 16																			
37P	LOGAN	BEREA	1944		6	5	RICHFIELD	1,420	6	5	0	14	2,240						
LOGAN TWP., 17N-15W, SECTIONS 9, 16																			
38P	LUCY	TRAVERSE	1949	BAY	3	L	37.2	DUNDEE	3,240	5	0	0	1	50	477	136,749	3,935		
LUCY TWP., 17N-24E, SECTION 29																			
39P	LUTHER	TRAVERSE	1965	LARK	2	L	42.0	REED CITY	3,362	1	0	0	0	20		28,117	1,406		
LUTHER TWP., 19N-12W, SECTION 14																			
40P	LUTHER, NORTH	REED CITY	1970	LARK	17	0	REED CITY	3,556	4	0	0	4	160	537	13,064		82		
LUTHER TWP., 19N-12W, SECTION 14																			
41P	LYNDON	TRAVERSE	1958	WASHTENAW-LIVINGSTON	1	0	TRENTON	1,311	6	0	0	6	960		375,600		DOMESTIC USE		
LYNDON TWP., 15-3E, SECTIONS 6, 7 UNADILLA TWP., 1N-3E, SECTION 31																			
42P	LYNDON	DETROIT RIVER	1959		11	0		1,233											
LYNDON TWP., 15-3E, SECTIONS 6, 7 UNADILLA TWP., 1N-3E, SECTION 31																			
43P	MACON CREEK	TRENTON-BLK. RIVER	1961	LENAAE	36	0	TRENTON-BLK. RIVER	3,303	1	0	0	1	40		1,062		SHUT-IN		
MACON TWP., 5S-5E, SECTION 23																			
44P	MAPLE VALLEY, SEC. 16	MICHIGAN STRAY	1958	MONTCALM	1	0	REED CITY	1,120	5	5	0	1	160				DOMESTIC USE		
MAPLE VALLEY TWP., 11N-9W, SECTION 16																			
45P	MARATHON	BEREA	1955	LAFAYETTE	18	5	RICHFIELD	1,409	18	5	0	4	40		34,773		DE DESIGNATED AS GAS RESERVOIR IN 1970		
46P	MARATHON	DETROIT RIVER	1969		47	0		3,013											
MARATHON TWP., 9N-9E, SECTIONS 16, 17, 18, 21 (DETROIT RIVER S2) SECTION 16 (BEREA) SECTION 18 (RICHFIELD)																			
47P	MARATHON	RICHFIELD	1971		8	0		3,102											
MARATHON TWP., 9N-9E, SECTIONS 16, 17, 18, 21 (DETROIT RIVER S2) SECTION 16 (BEREA) SECTION 18 (RICHFIELD)																			
48P	MARINE CITY	SALINA-NIAGARAN	1955	ST. CLAIR	2	0	CLINTON	2,176	21	0	0	13	660	12,131	454,516	5,619,436	689	73	
MARINE CITY TWP., 3N-16E, SECTIONS 2, 3, 10, 11, 15																			
49P	MARINE CITY	SALINA-NIAGARAN	1962	ST. CLAIR	4	0	38.7	NIAGARAN	2,100	4	0	0	13	600	4,876	151,571		253	
MARINE CITY TWP., 3N-16E, SECTIONS 2, 3, 10, 11, 15																			
50P	MARINE CITY	SALINA A-1 CARB	1962		4	0		2,100											
MARINE CITY TWP., 3N-16E, SECTIONS 2, 3, 10, 11, 15																			
51P	MARTON (WINTERFIELD)																		
REFER TO TABLE 4 DEVELOPED GAS STORAGE RESERVOIRS																			
52P	MARNI	"BEREA"	1940	OTTAWA	1	0	TRAVERSE	1,170	3	L						6,253		313	
MARNI TWP., 7N-13W, SECTION 5																			
53P	MARSAC CREEK	SALINA-NIAGARAN REEF	1965	ST. CLAIR	2,450	190	0	CLINTON	2,903	5	0	0	5	200	1,681	13,531	3,936,089	8	20
CASED TWP., 4N-15E, SECTIONS 29, 30																			
54P	MARTIN	TRAVERSE	1948	ALLEGAN	1,617	1	36.0	ST. PETER SS.	4,290	2	0	0	20		2,188			109	
MARTIN TWP., 2N-11W, SECTION 18																			
55P	MARTINY	MICHIGAN STRAY	1934	MECOSTA	1,270	2	S		3,807	5	0	0	4	680		13,639	1,277,518		
MARTINY TWP., 15N-8W, SECTIONS 12, 22, 23																			
56P	MAYFIELD 33-25N-11W ANTRIM GAS POOL A	ANTRIM	1977	GO. TRAVERSE	1,804	50	SH		6,746	1	1	0	1	80					
MAYFIELD TWP., 25N-13W, SECTION 33																			
57P	MCBAIN	DUNDEE	1959	MISSAUKEE	3,969	15	L	45.0	DUNDEE	3,973	24	0	0	22	920	48,985	3,208,604	3,488	7,095
RIVERSIDE TWP., 21N-7W, SECTIONS 19, 20, 30 RICHLAND TWP., 21N-8W, SECTION 24																			
58P	MCKAY	MICHIGAN STRAY	1929	CLARE	1,400	3	S		4,055	9	0	0	2	360		712,626		SHUT-IN	
GRANT TWP., 17N-4W, SECTION 6 SURREY TWP., 17N-5W, SECTION 1 HATTON TWP., 18N-4W, SECTION 31																			
59P	MEARS	TRAVERSE	1951	OCEANA	1,745	2.5	DL	36.1	REED CITY	2,347	11	0	0	110		105,807		962	
MILLS TWP., 15N-18W, SECTIONS 34, 35																			
60P	MCCOSTA	MICHIGAN STRAY	1966	MCCOSTA	1,245	10	S		3,709	2	0	0	2	320		115,571			
MORTON TWP., 14N-8W, SECTION 10																			
61P	MCCOSTA LAKE	MICHIGAN STRAY	1953	MCCOSTA	1,314	12	S		3,690	2	0	0	320		84,071				
MORTON TWP., 14N-8W, SECTIONS 17, 20																			
62P	MEDINA	TRENTON-BLK. RIVER	1961	LENAAE	2,921	18	0	40	PRAIRIE DU CHIEN	3,487	1	0	0	1	40		4,324		108
MORTON TWP., 14N-8W, SECTION 10																			
63P	MIDDLE BRANCH	MICHIGAN STRAY	1964	OSCEOLA	1,630	10	S		4,283	4	0	0	640		256,756				
MORTON TWP., 14N-8W, SECTION 10																			
64P	MILLS, SEC. 1	DUNDEE	1957	MIDLAND	3,450	2	0	DUNDEE	3,463	1	0	0	1	10		8,363		836	
MILLS TWP., 16N-2E, SECTION 1																			
65P	MINERAL SPRINGS	MICHIGAN STRAY	1952	OSCEOLA	1,397	3	S		3,963	4	0	0	480		228,762				
MILLS TWP., 16N-2E, SECTION 1																			
66P	MONTAGUE	DUNDEE	1951		3,854	7	D	44.5		12	0	0	1	240	1,153	308,580		1,286	
SHERMAN TWP., 20N-9W, SECTIONS 16, 20, 21																			
67P	MIO	RICHFIELD	1946	OSWEGO-OSCODA	4,219	6	0	32.9	CLINTON	8,544	4	0	0	2	160	858	61,385		384
MORTON TWP., 25N-3E, SECTIONS 30, 32 ROSE TWP., 24N-3E, SECTIONS 3, 4																			
68P	HOFFATT, SEC. 34	TRAVERSE	1964	AREWAC	2,100	4	0	DUNDEE	3,027	1	0	0	1	10		403		40	
HOFFATT TWP., 20N-3E, SECTION 34																			
69P	MONTAGUE	SALINA-NIAGARAN REEF	1953	MUSKEGON	3,797	80	0	TRENTON	4,517	3	0	0	480		41,482				
HOFFATT TWP., 20N-3E, SECTION 34																			
70P	MONTEREY	TRAVERSE	1938	ALLEGAN	1,618	3	L	37.6	CINCINNATI	3,266	99	0	0	6	1,030	1,809	1,021,399		992
MONTEREY TWP., 3N-13W, SECTIONS 2, 4, 8, 9, 10, 11, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 27, 32, 36																			

POOL CLASSIFICATION			OF ACTIVE OIL FIELD OR POOL	OF ACTIVE GAS FIELD OR POOL	G-C GAS-CONDENSATE FIELD OR POOL	GS GAS STORAGE RESERVOIR											
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP	PAY ZONE		DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	DRILLED ACRES	OIL PRODUCTION - BBLs		GAS PRODUCTION - Mcf		RECOVERY PER CENT DRILLED	TOTAL BARRELS PER DAY		
				DEPTH IN FEET	THICKNESS IN FEET					PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PRODUCED IN 1977	CUMULATIVE THROUGH 1977				
71P	MORTON	DETROIT RIVER	1946	OTTAWA	1,274	2	0	DUNDEE	3,461	2	0	0	2	240		116,377	
MORTON TWP., 14N-8W, SECTION 10																	
72P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
73P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
74P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
75P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
76P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
77P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
78P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
79P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
80P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
81P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
82P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
83P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
84P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
85P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
86P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
87P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
88P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
89P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
90P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	
91P	MOUNTAIN	SALINA	1940	MACOMB	2,536	1	0	COMBINED	5,458	1	0	0	1	40			
MOUNTAIN TWP., 14N-8W, SECTION 10																	

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL		OF ACTIVE GAS FIELD OR POOL		OF GAS-CONDENSATE FIELD OR POOL		GS GAS STORAGE RESERVOIR						
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH FEET	NUMBER OF WELLS	DRIILLED ACRES	OIL PRODUCTION - BBLs		GAS PRODUCTION - Mcf		RECOVERY PER ACRE DRIILLED (BBLs)	TOTAL BARRELS DRIILLED PER DAY
									1977	CUMULATIVE THROUGH 1977	1977	CUMULATIVE THROUGH 1977		
GF	WALKER	1950	WENTWORTH	1,111	31	31	2	270	430	68,811	220	220	220	220
GF	WALKER	1950	WENTWORTH	1,111	31	31	2	270	430	68,811	220	220	220	220
GF	TRAVELSE	1933		1,574	8	28.0	78	1	341	8,560	110,173	17,152,401	3,678,731	2,501
THE 341 WELLS INCLUDE 332 TRAVELSE AND 9 SEPERA														
GF	DETROIT RIVER	1957		3,132	12	0	1	0	1	10				1
GF	BEREA, TRAVELSE & DETROIT RIVER						14	0	5		751	1,327,032		DOMESTIC USE & LEASE FUEL
THE 5 WELLS INCLUDE 3 BEREA, 1 DETROIT RIVER & 1 TRAVELSE														
GF	WASHINGTON, SEC. 10	1974	SALINA-NIAGARAN REEF	3,304	179	0	1	0	11	480	29,217	29,217		
GF	WASHINGTON, SEC. 10 POOL A	1976	MACOMB	3,352	234	0	2	2	5	240	2,983	2,983		
WASHINGTON TWP., 4N-12E, SECTION 10														
GF	WASHINGTON, SEC. 11	1965	MACOMB	3,290	180	0	1	0	1	40	18,105	5,291,205		
WASHINGTON TWP., 4N-12E, SECTION 11														
GF	WASHINGTON, SEC. 28	1975	SALINA A-1 CARBONATE	3,357	18	0	9	320	3,228	9,739	23,587	62,991	30	5
WASHINGTON TWP., 4N-12E, SECTION 11														
GF	WAYLAND	1944	ALLEGAN	1,799	6	36.0	4	0	2	530	700	266,929		504
GF	WAYLAND	1950	SALINA	3,132	12	28.0	34	0	31	1,360	55,701	1,475,253		1,085
WAYLAND TWP., 3N-11W, SECTIONS E 8, 9, 16, 17, 18, 20, 21														
GF	WAYLAND, NORTH	1957	ALLEGAN	1,696	7	0	5	150	1,050	113,300			755	33
WAYLAND TWP., 3N-11W, SECTIONS 6, 7, NW 8														
ADF	WEARE	1961	OCEANA	1,681	2	0	0	0	1	30	6,919			231
WEARE TWP., 16N-17W, SECTIONS 12, 13														
ADF	WEARE, SEC. 14	1952	OCEANA	1,674	1	41.4	1	10		1,096				110
WEARE TWP., 16N-17W, SECTION 14														
GF	WEST BRANCH	1933	OGLIMA	1,796	2	0	1	160					3,381	2,120
GF	WEST BRANCH	1933	DUNDEE	2,650	20	36.8	299	8	172	2,890	245,799	9,771,879		
GF	WEST BRANCH	1951	DETROIT RIVER	3,585	9	36.9	63	0	0	60	2,520	67,804	3,232,572	2,550
GF	WEST BRANCH	1952	RICHFIELD	4,127	33.0								63,980	1,283
THE 60 WELLS INCLUDE 29 RICHFIELD, 25 SOUR ZONE, AND 6 RICHFIELD & SOUR ZONE														
WEST BRANCH TWP., 22N-2E, SECTIONS 18, 19, 20, 21, 26, 27, 28, 29, 34, 35, 36 DEERMAN TWP., 22N-1E, SECTIONS 10, 13, 14, 23, 24														
CHURCHILL TWP., 22N-3E, SECTION 31														
GF	WHEATLAND	1947	MELCOSTA	1,399	3	5	4	0	1	160			506,369	DOMESTIC USE
ADF	WHEATLAND	1945	DUNDEE	3,690	2	43.0	6	100		141,631			1,416	
WHEATLAND TWP., 14N-7W, SECTIONS 7, 8, 9														
AGF	WHITE CLOUD	1963	NEWAYGO	2,537	1	0	1	40		1,295				32
WILCOX TWP., 14N-12W, SECTION 19														
GF	WHITE OAK 32-2N-2E	1973	SALINA-NIAGARAN REEF	3,970	8	0	5	400	29,608	93,048	4,028	14,058	233	407
WHITE OAK TWP., 2N-2E, SECTIONS 29, 31, 32 WELLS IN SECTION 29 ARE PROBABLY IN A SEPARATE RESERVOIR														
ADF	WHITE RIVER	1950	MUSKEGON	2,053	2	28.0	2	20		7,061				353
WHITE RIVER TWP., 12N-18W, SECTION 15														
GF	WILEY	1962	MASON	1,663	5	39.9	18	0	4	380	212	426,108		1,121
EDEN TWP., 17N-16W, SECTION 18 RIVERTON TWP., 17N-17W, SECTION 12														
GF	WINFIELD	1936	MONTCALM	3,340	1	43.2	5	0	2	120	246	119,215		994
WINFIELD TWP., 12N-9W, SECTIONS 20, 28, 29														
GS	WINFIELD (STRAY)	REFER TO TABLE 4 DEVELOPED GAS STORAGE RESERVOIRS												
GF	WINTERFIELD	1940	CLARE	3,105	1	0	1	260	6,394	304,115	0	256,596	1,170	4
GF	WINTERFIELD	1940	DUNDEE	3,794	3	44.2	740	15,874	4,842,323				6,544	1,845
GF	WINTERFIELD	1942	RICHFIELD	5,015	15	0	53	3	16	100	5,753	189,163		1,892
WINTERFIELD TWP., 20N-6W, SECTIONS 28 THROUGH 32, 35, 36 REDDING TWP., 19W-6W, SECTIONS 1, 5 THE 16 WELLS INCLUDE 9 TRAVELSE, 4 DUNDEE, 2 RICHFIELD & 1 TRAVELSE & RICHFIELD														
GF	WISL	1940	HIGHWAY STRAY	1,250	5	5	1	0	6	1,280			1,705,130	DOMESTIC USE & LEASE FUEL
GF	WISL	1953	TRAVELSE	3,090	31	43.0			1,545	51,965				
GF	WISL	1938	DUNDEE	3,709	11	45.2	79	0	21	1,640	14,987	3,981,610		2,447
GF	WISL	1955	DETROIT RIVER	4,415	48	42.6	2	0	0	80	1,685	57,442		843
THE 21 WELLS INCLUDE 17 DUNDEE, 4 TRAVELSE AND DUNDEE														
DUNDEE AND DETROIT RIVER														
AGF	WOLF LAKE	1949	MUSKEGON	1,050	7	0	2	320					99,750	
GF	WOLF LAKE	1963	TRAVELSE	1,741	23	0	4	0	2	60	4,614			77
EGELSTON TWP., 10N-15W, SECTIONS 7, 8, 18 MUSKEGON TWP., 10N-16W, SECTION 12														
GF	WOODSTOCK	1969	LENAH	1,465	2	0	1	80						SHUT-IN FOR MARKET
WOODSTOCK TWP., 55-1E, SECTION 8														
GF	WOODVILLE	1943	NEWAYGO	2,820	5	43.5	10	0	10	350	3,349	579,395		1,655
NORMICH TWP., 15N-11W, SECTIONS 20, 28, 29														
GS	WOODVILLE (NORMICH)	REFER TO TABLE 4 DEVELOPED GAS STORAGE RESERVOIRS												
GF	WRIGHT	1954	OTTAWA	1,175	5	0	7	0	4	60			47,195	SPUT-IN -- LACK OF STORAGE
GF	WRIGHT	1953	TRAVELSE	1,920	1	0	7	0	2	70			18,498	264
WRIGHT TWP., 5N-13W, SECTIONS 28, 32, 33 TALLYHIDE TWP., 7N-13W, SECTION 4														
AGF	WYOMING PARK	1935	KENT	1,870	6	33.0	2	300		157,873				508
WYOMING TWP., 6N-12W, SECTIONS 13, 14, 23														
GF	YAW-EE	1963	ST. CLAIR	2,620	20	0	2	80		1,619			357,989	
ST. CLAIR TWP., 5N-16E, SECTION 25														
AGF	ZEELEND	1945	OTTAWA	945	5	0	7	20						DOMESTIC USE
ZEELEND TWP., 5N-14W, SECTIONS 11, 12, 13, 14														

POOL CLASSIFICATION		OF ACTIVE OIL FIELD OR POOL		OF ACTIVE GAS FIELD OR POOL		OF GAS-CONDENSATE FIELD OR POOL		GS GAS STORAGE RESERVOIR							
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH FEET	NUMBER OF WELLS	DRIILLED ACRES	OIL PRODUCTION - BBLs		GAS PRODUCTION - Mcf		RECOVERY PER ACRE DRIILLED (BBLs)	TOTAL BARRELS DRIILLED PER DAY	
									1977	CUMULATIVE THROUGH 1977	1977	CUMULATIVE THROUGH 1977			
GF	ZEELEND	1945	OTTAWA	1,431	1	0	1	10						148	
ZEELEND TWP., 5N-14W, SECTIONS 21, 28															
									1977 TOTALS		136,690 16,866,471		565,349,581 23,215,156 557,270,676		136,194

LISTING OF A SECTION OR PART OF A SECTION DOES NOT NECESSARILY MEAN THE ENTIRE SECTION TO BE PRODUCTIVE OF OIL OR GAS IN ANY OR ALL POTENTIALLY PRODUCTIVE FORMATIONS. ONLY THOSE SECTIONS OR PARTS OF SECTIONS WHICH HAVE HAD AT LEAST ONE WELL COMPLETED AS AN OIL OR GAS WELL ARE LISTED

1977 OIL AND CONDENSATE PRODUCTION FROM TABLE 2 22,098,032 BARRELS
 1977 OIL PRODUCTION FROM TABLE 3 AND 4 10,866,471
 TOTAL 1977 OIL PRODUCTION 32,964,503
 CUMULATIVE OIL AND CONDENSATE PRODUCTION FROM TABLE 2 70,897,979
 CUMULATIVE OIL PRODUCTION FROM TABLE 3 AND 4 663,475,012
 TOTAL STATE CUMULATIVE OIL PRODUCTION THROUGH 1977 734,372,991*

*CUMULATIVE FIGURE INCLUDES 11,779 BARRELS OF OIL FROM MISCELLANEOUS OIL WELLS DRIILLED FROM 1925 THROUGH 1977 AND SUBSEQUENTLY COMPLETED AS DRY HOLES
 1977 GAS PRODUCTION FROM TABLE 2 108,599,819 Mcf
 1977 GAS PRODUCTION FROM TABLE 3 AND 4 24,626,733
 TOTAL 1977 GAS PRODUCTION 133,226,552
 CUMULATIVE GAS PRODUCTION FROM TABLE 2 358,066,545 Mcf
 CUMULATIVE GAS PRODUCTION FROM TABLE 3 AND 4 878,979,522
 TOTAL CUMULATIVE GAS PRODUCTION THROUGH 1977 1,227,046,067

CHANGES IN FIELD NAMES
 HISTORICALLY, WITH FEW EXCEPTIONS, MICHIGAN OIL AND GAS FIELDS HAVE BEEN NAMED AFTER NEARBY GEOGRAPHIC ENTITIES SUCH AS TOWNS, VILLAGES, LAKES AND TOWNSHIP NAMES. DUE TO NUMEROUS NIAGARAN REEF DISCOVERIES WITHIN RELATIVELY SMALL AREAS AND A LACK OF SUITABLE IDENTIFYING NAMES FOR THOSE IN NORTHERN MICHIGAN AND POSSIBLY THOSE IN SOUTHERN MICHIGAN IN FUTURE YEARS, THE NAMING SYSTEM HAS BEEN MODIFIED. STARTING IN 1971, MOST NEW NIAGARAN REEF FIELDS WERE NAMED ACCORDING TO TOWNSHIP NAME, FOLLOWED BY THE SECTION NUMBER FOR THE DISCOVERY WELL, AND THEN BY NUMERICAL TOWN AND RANGE. SEPARATE POOLS OR RESERVOIRS OCCURRING IN THE SAME FIELD ARE DESIGNATED POOL A, B, C AS NECESSARY.

TABLE 4 GAS STORAGE RESERVOIRS

POOL CLASSIFICATION			OF ACTIVE OIL FIELD OR POOL	GF ACTIVE GAS FIELD OR POOL	G-C GAS-CONDENSATE FIELD OR POOL	GS GAS STORAGE RESERVOIR	GAS PRODUCTION - BbLS		GAS PRODUCTION - Mcf		RECOVERY PER ACRE DRILLED (BbLS)	TOTAL BARRELS BRINE PER DAY
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	OIL PRODUCTION - BbLS	GAS PRODUCTION - Mcf	RECOVERY PER ACRE DRILLED (BbLS)	TOTAL BARRELS BRINE PER DAY	
PRODUCING SECTIONS	DEPTH IN FEET	THICKNESS AND LITHOLOGY	OIL GRAVITY & API	DEPTH IN FEET	TO COMP IN	ABAND IN	ACTIVE AT END	PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PER ACRE DRILLED (BbLS)
GS AUSTIN	MICHIGAN STRAY	1933	MEDOSTA	1,380 14 S	DETROIT RIVER	4,043	0 0 91	3,970			6,109,033	
AUSTIN TWP., 14N-9W, SECTIONS 2, 3, 4, 9, 10, 11, 12, 13, 14 COLFAX TWP., 15N-9W, SECTIONS 32, 33 MORTON TWP., 14N-8W, SECTIONS 6, 7												
GS BELLE RIVER HILLS	SALINA-NIAGARAN	1961	ST. CLAIR	2,215 305 D	CLINTON	2,694	0 0 43	840	1,212		23,977,840	
CHINA TWP., 4N-16E, SECTIONS 11, 14, 15												
GS CLARENCE 19-15-4W	NIAGARAN REEF	1971	CALHOUN	3,154 24 D	NIAGARAN	3,240	1 0 0	1 160			1,057,656	
CLARENCE TWP., 15-4W, SECTION 19												
GS COLDWATER	MICHIGAN STRAY	1945	ISABELLA	1,390 10 S	SYLVANIA	5,090	8 0 72	2,400			7,382,794	
COLDWATER TWP., 16N-6W, SECTIONS 28 THROUGH 33 SHERMAN TWP., 15N-6W, SECTION 6												
GS COLUMBUS	SALINA-NIAGARAN	1964	ST. CLAIR	2,738 190 D	CLINTON	3,232	0 0 20	320			13,331,738	
COLUMBUS TWP., 5N-15E, SECTIONS 15, 16, 21, 22												
GS COLUMBUS, WEST	SALINA-NIAGARAN REEF	1967	ST. CLAIR	3,183 14+ D	CLINTON	3,447	29 0 0	25 520			16,287,759	
COLUMBUS TWP., 5N-15E, SECTIONS 7, 17, 18												
GS CRANBERRY LAKE	MICHIGAN STRAY	1943	CLARE-MISSAUKEE	1,321 10 S	RICHFIELD	5,201	0 0 171	7,000			7,537,451	
SUMMERFIELD TWP., 20N-5W, SECTIONS 4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 22, 23 WINTERFIELD TWP., 20N-6W, SECTIONS 1, 2, 3, 10, 11, 12 CLAM UNION TWP., 21N-6W, SECTIONS 25, 34, 35												
GS CROTON	MARSHALL	1951	NEMAYGO	917 4 S	SALINA	3,993	0 0 60	860			1,320,835	
CROTON TWP., 12N-11W, SECTIONS 29, 32												
GS FOUR CORNERS	SALINA-NIAGARAN	1966	ST. CLAIR	2,205 212 D	CLINTON	2,638	0 0 5	80			1,102,328	
CASCO TWP., 4N-15E, SECTION 36 IRA TWP., 3N-15E, SECTION 1												
GS FREEMAN-LINCOLN	MICHIGAN STRAY	1938	CLARE	1,500 10 S	DETROIT RIVER	3,957	24 0 169	6,600			18,099,490	
LINCOLN TWP., 18N-5W, SECTIONS 7, 16, 17, 18, 19, 20, 21, 27, 28, 29 FREEMAN TWP., 18N-6W, SECTIONS 2, 3, 4, 9, 10, 11, 13, 14, 15, 23, 24												
GS GOODWELL	MICHIGAN STRAY	1943	NEMAYGO	1,142 20 S	DETROIT RIVER	3,562	11 0 101	3,020			5,875,670	
GOODWELL TWP., 14N-11W, SECTIONS 5, 6, 7, 8, 9, 16, 17 WILCOX TWP., 14N-12W, SECTION 1 NORWICH TWP., 15N-11W, SECTION 31 MONROE TWP., 15N-12W, SECTION 36												
GS HAMILTON, NORTH	MICHIGAN STRAY-MARSHALL	1952	CLARE	1,487 8 S	RICHFIELD	5,395	1 0 63	3,040			5,450,065	
HAMILTON TWP., 19N-3W, SECTIONS 5, 6, 7, 8 HAYES TWP., 19N-4W, SECTION 1 FROST TWP., 20N-4W, SECTIONS 35, 36												
GS HESSEN	NIAGARAN REEF	1965	ST. CLAIR	2,499 261 D	NIAGARAN	2,887	3 0 21	640	0 117,492	0	11,516,867	
CASCO TWP., 4N-15E, SECTIONS 2, 3, 10, 11 COLUMBUS TWP., 5N-15E, SECTIONS 34, 35												
GS HOWELL	SALINA-NIAGARAN	1935	LIVINGSTON	3,920 9 D	ST. PETER SS.	5,958	0 0 69	2,400			23,678,120	
GENOA TWP., 2N-5E, SECTIONS 5, 6, 7, 8, 17 MARION TWP., 2N-4E, SECTIONS 1, 2, 12 HOWELL TWP., 3N-4E, SECTION 35												
GS IRA	SALINA-NIAGARAN	1953	ST. CLAIR	2,276 33 D	CLINTON	2,632	0 0 15	680			3,498,666	
IRA TWP., 3N-15E, SECTIONS 1, 2, 11												
GS LACEY STATION	A-2 SALT SOLUTION CAVERN	1971	BARRY		CAMBRIAN		2 0 0	2				
JOHNSTOWN TWP., 1N-8W, SECTION 14												
GS LEE 16	SALINA-NIAGARAN		CALHOUN	3,200			1 0 0	1				
LEE 16 STORAGE AREA CREATED BY SPACING ORDER OF MARCH 30, 1973. INCLUDES SE 1/4 AND SW 1/4 NE SECTION 16, NW OF SW 1/4 AND W 1/2 SW 1/4 OF SECTION 15, T-15, R-5W.												
GS LENOX	SALINA-NIAGARAN	1960	MACOMB	2,734 46 D	CLINTON	3,018	0 0 11	300	2,565		2,152,679	
LENOX TWP., 4N-14E, SECTION 32 CHESTERFIELD TWP., 3N-14E, SECTION 5												
GS MARION (WINTERFIELD)	MICHIGAN STRAY	1940	CLARE-OSCEOLA	1,344 15 S	SYLVANIA	5,100	0 0 284	10,720			20,084,934	
WINTERFIELD TWP., 20N-6W, SECTIONS 17 THROUGH 21, 27 THROUGH 35 REDDING TWP., 19N-6W, SECTIONS 1, 2, 3, 4, 6 MARION TWP., 20N-7W, SECTIONS 24, 25, 36 MIDDLE BRANCH TWP., 19N-7W, SECTION 1												
GS MARYSVILLE-MORTON	SEE FOOTNOTE FOR GAS STORAGE FIELDS ON NEXT PAGE											
GS MUTTONVILLE	SALINA-NIAGARAN REEF	1966	MACOMB	2,576 194 D	CLINTON	3,039	0 0 13	280			1,413,547	10,300,194
LENOX TWP., 4N-14E, SECTION 13												
GS NORTHVILLE	TRENTON-BLK. RIVER	1954	WAYNE-WASHTENAW	4,395 70 D	CAMBRO-ORDOVICIAN	5,850	0 0 69	2,825+			18,126,876	
FOR LOCATION SEE NORTHVILLE, TABLE 2 INCLUDES BOTH SALINA-NIAGARAN AND TRENTON GAS												
GS ORIENT	MICHIGAN STRAY	1945	OSCEOLA-CLARE	1,508 11 S	SYLVANIA	5,307	0 0 75	2,600			5,350,856	
ORIENT TWP., 17N-7W, SECTIONS 2, 3, 10, 11, 12, 13, 14 GARFIELD TWP., 17N-6W, SECTIONS 18, 19												
GS OVERISEL	SALINA	1956	ALLEGAN	2,650 12 D	TRENTON	4,060	0 0 186	6,660			14,645,048	
OVERISEL TWP., 4N-14W, SECTIONS 4, 5, 8, 9, 10, 14, 15, 16, 21, 22, 23, 27, 28												
GS PARTELLO	SALINA A-1 CARB.	1959	CALHOUN	3,192 30 D	TRENTON-BLK. RIVER	4,905	0 0 5	200			1,695,320	
LEE TWP., 15-5W, SECTIONS 12, 13												
GS PUTTYGUT	SALINA-NIAGARAN	1960	ST. CLAIR	2,423 60 D	NIAGARAN	2,774	0 0 25	440	OIL PRODUCTION COMBINED WITH ADAIR		11,260,480	
CASCO TWP., 4N-15E, SECTIONS 11, 14, 15												
GS RAY	SALINA-NIAGARAN	1961	MACOMB	2,945 101 D	NIAGARAN	3,273	0 0 47	660	1,689		35,203,228	
RAY TWP., 4N-13E, SECTIONS 1, 2, 11 ARMADA TWP., 5N-13E, SECTION 36												
GS REED CITY	MICHIGAN STRAY	1940	OSCEOLA-LAKE	1,217 12 S	ST. PETER SS.	8,960	0 0 105	4,880			7,642,246	
GS REED CITY	REED CITY	1941		3,585 7 D			0 0 247		COMBINATION GAS STORAGE AND SECONDARY RECOVERY PROJECT - REFER TO TABLE 5 FOR ADDITIONAL DETAILS			
LINCOLN TWP., 18N-10W, SECTIONS 8, 9, 16, 17, 18, 19, 20, 21, 29, 30, 31, 32 PINORA TWP., 18N-11W, SECTIONS 24, 25												
GS RIVERSIDE	MICHIGAN STRAY	1940	MISSAUKEE	1,435 7 S	DUNDEE	3,953	0 0 99	3,680			5,188,481	
RIVERSIDE TWP., 21N-7W, SECTIONS 15, 16, 17, 19, 20, 21, 22, 23												
GS SALEM	SALINA	1937	ALLEGAN	2,725 2 D	TRENTON	3,792	0 0 87	4,960	2,973		11,310,698	
SALEM TWP., 4N-13W, SECTIONS 2, 3, 9, 10, 11, 12, 14, 15, 16, 17, 21, 22, 23 JAMESTOWN TWP., 5N-13W, SECTIONS 34, 35												
GS SHAYER (SUMNER-NEW HAVEN)	MICHIGAN STRAY	1935	GRATIOT-MONTCALM	1,020 11 S	DUNDEE	3,536	0 1 48	3,920			11,114,906	
NEW HAVEN TWP., 10N-4W, SECTIONS 2, 3, 4, 5, 8, 9, 10, 11 SUMNER TWP., 11N-4W, SECTIONS 31, 32, 33, 34 CRYSTAL TWP., 10N-5W, SECTIONS 1, 2, 3, 5, 6 FERREIS TWP., 11N-5W, SECTIONS 22, 36												
GS SIX LAKES	MICHIGAN STRAY	1934	ISABELLA-MECOSTA	1,270 25 S	DETROIT RIVER	3,790	4 0 250	11,480			51,604,719	
ROLLAND TWP., 13N-6W, SECTIONS 29, 30 HINTON TWP., 13N-8W, SECTIONS 23, 24, 25 MILLBROOK TWP., 13N-7W, SECTIONS 27 THROUGH 36 BELVIDERE TWP., 12N-7W, SECTIONS 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 20, 21												
GS SWAN CREEK	SALINA-NIAGARAN	1967	ST. CLAIR	2,256 245 D	CLINTON	2,638	0 0 1	40			409,352	
CASCO TWP., 4N-15E, SECTION 36												
GS WINFIELD	MICHIGAN STRAY	1935	MONTCALM	1,125 8 S	DETROIT RIVER	3,405	2 0 127	3,240			4,836,132	
WINFIELD TWP., 12N-9W, SECTIONS 6, 7, 8, 16, 17, 18 REYNOLDS TWP., 12N-10W, SECTIONS 1, 12												

POOL CLASSIFICATION			OF ACTIVE OIL FIELD OR POOL	GF ACTIVE GAS FIELD OR POOL	G-C GAS-CONDENSATE FIELD OR POOL	GS GAS STORAGE RESERVOIR	GAS PRODUCTION - BbLS		GAS PRODUCTION - Mcf		RECOVERY PER ACRE DRILLED (BbLS)	TOTAL BARRELS BRINE PER DAY	
FIELD NAME	PRODUCING FORMATION OR POOL	YEAR OF DISC.	COUNTY TOWNSHIP	PAY ZONE	DEEPEST FORMATION OR POOL TESTED	DEPTH IN FEET	NUMBER OF WELLS	OIL PRODUCTION - BbLS	GAS PRODUCTION - Mcf	RECOVERY PER ACRE DRILLED (BbLS)	TOTAL BARRELS BRINE PER DAY		
PRODUCING SECTIONS	DEPTH IN FEET	THICKNESS AND LITHOLOGY	OIL GRAVITY & API	DEPTH IN FEET	TO COMP IN	ABAND IN	ACTIVE AT END	PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PRODUCED IN 1977	CUMULATIVE THROUGH 1977	PER ACRE DRILLED (BbLS)	
GS WOODVILLE(NORWICH)	MICHIGAN STRAY	1943	NEMAYGO	1,185 13 S	DETROIT RIVER	3,405	0 0 46	2,240			2,683,259		
NORWICH TWP., 15N-11W, SECTIONS 16, 17, 20, 21, 28, 29													
TOTALS:								91,655	0	125,931	1,413,547	359,835,720	

WELL COUNTS IN THESE COLUMNS ARE AS PROVIDED BY FIELD OFFICE PERSONNEL

MARYSVILLE-MORTON: THIS STORAGE OPERATION, OPERATED BY SOUTHEASTERN MICHIGAN GAS COMPANY, UTILIZES WELLS PREVIOUSLY USED IN SALT SOLUTION-EXTRACTION OPERATIONS. THE OPERATIONS IS SO NAMED TO DISTINGUISH IT FROM THE MARYSVILLE SYNTHETIC GAS MANUFACTURING FACILITIES.

LACEY STATION. THIS IS A DRY-GAS STORAGE PROJECT FOR THE BATTLE CREEK GAS COMPANY. GAS IS STORED IN A CAVITY WASHED FROM SALINA A-2 SALT BEDS AT A DEPTH OF ABOUT 3100 FEET BELOW THE SURFACE.

MARYSVILLE: THIS IS AN UNDERGROUND STORAGE PROJECT FOR LPG'S USED IN THE MANUFACTURE OF SYNTHETIC NATURAL GAS. LPG STORAGE IS IN MAN-MADE CAVERNS IN SALINA SALT BEDS, PROJECT AREA IS IN SECTION 7, T.5N., R.17E.

THE PRODUCING SECTIONS LISTED IN GAS STORAGE RESERVOIR TABLES DO NOT NECESSARILY RELATE TO CURRENT GAS STORAGE AREA OR BOUNDARIES. ALSO, THE SECTIONS DO NOT NECESSARILY RELATE TO POTENTIAL OR FUTURE GAS STORAGE AREA OR BOUNDARIES. THE SECTIONS, OR PARTS OF SECTIONS LISTED ARE THOSE WHICH CONTAINED AT LEAST ONE PRODUCIBLE OIL OR GAS WELL ASSIGNED TO THE FIELD OR POOL PRIOR TO CONVERSION OR DESIGNATION AS GAS STORAGE.

GAS STORAGE RESERVOIR OPERATORS

BATTLE CREEK GAS COMPANY	ORIENT
LACEY STATION	REED CITY
CONSUMERS POWER COMPANY	SIX LAKES
FOUR CORNERS	SHAYER (SUMNER-NEW HAVEN)
HESSEN	WOODVILLE
IRA	MICHIGAN GAS STORAGE COMPANY
LENOX	CRANBERRY LAKE
NORTHVILLE	MARION
PUTTYGUT	MICHIGAN GAS UTILITIES COMPANY
RAY	LEE 16
SALEM	PARTELLO
SWAN CREEK	MICHIGAN-WISCONSIN PIPELINE COMPANY
HGU DEVELOPMENT COMPANY	CAPAC
CLARENCE 19-15-4W	COLDWATER
MICHIGAN CONSOLIDATED GAS COMPANY	CROTON
AUSTIN	MUTTONVILLE
BELLE RIVER HILLS	WINFIELD
COLUMBUS, WEST	PANHANDLE EASTERN PIPELINE
FREEMAN-LINCOLN	HOWELL
GOODWELL	SOUTHEASTERN MICHIGAN GAS COMPANY
HAMILTON, NORTH	MARYSVILLE-MORTON

TABLE 5 PRESSURE MAINTENANCE AND SECONDARY RECOVERY OPERATIONS

FIELD AND COUNTY	OPERATOR	DISC. YEAR PROJECT BEGAN	PAY ZONE	TOTAL UNIT ACRES		INJECTION FLUIDS		VOLUME OF INJECTED FLUID 1977		CUMULATIVE VOLUME OF INJECTED FLUID		UNIT PRODUCTION IN 1977		UNIT CUMULATIVE 1-1-78				
				THICK	DEPTH	PSIG	BRINE	MCF GAS	BARRELS WATER	BARRELS OIL	BARRELS WATER	BARRELS OIL	NO. WELLS	WATER USED	SALES MCF GAS	BARRELS OIL	SALES MCF GAS	BARRELS WATER
				FORM.														
AURELIUS 35 UNIT INGHAM CO.	(1)UMF	1974	NIAG.	110	1075	400				718,177		2,334,300	2,334,300	800,000	503,369	748,658	500,790	
BEAVER CREEK	(2)UMF	1947	RICH.	17	4400	480				5,648,142		23,000	167,006	7,750,000	18,962,191	4,409,686	74,479	
BEAVER CREEK WEST	(3)UMF	1943	DD.	2	3876	460				36,762		530,330	NONE	4,173,266	NONE	NONE	76,690	
BEAVER CREEK WEST	(4)UMF	1966	DD.	13	3510	540				1,327,731		709,762	NONE	39,940	NONE	NONE	766,690	
BEAVER CREEK WEST	(12)UMF	1974	NIAG.	30	3800	200				1,658,799		1,426	NONE	382,000	NONE	NONE	766,690	
BEAVER CREEK WEST	(5)UMF	1968	NIAG.	49	3105	860				1,285		1,301,457	NONE	1,117,333	NONE	NONE	280,870	
BEAVER CREEK WEST	(4)UMF	1969	RICH.	15	5048	480				48,903		1,574,455	NONE	3,272,000	NONE	NONE	753,740	
BEAVER CREEK WEST	(5)UMF	1972	RICH.	14	4880	480				3,083,417		20,068,763	451,578	5,049,196	9,930,240	2,350,159	903,791	
BEAVER CREEK WEST	(5)UMF	1972	RICH.	16	4405	1320				4,892,288		3,664,641	109,865	1,926,000	1,439,366	1,071,337	NONE	
BEAVER CREEK WEST	(5)UMF	1976	RICH.	10	5039	480				1,767,733		3,286,445	542,225	2,800,000	4,032,961	1,101,101	NONE	
BEAVER CREEK WEST	(5)UMF	1960	RICH.	12	5115	1800				944,064		16,327,160	479	3,529,950	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(5)UMF	1962	RICH.	11	3984	130				7,585		586,310	479	722,000	NONE	NONE	380,757	
BEAVER CREEK WEST	(6)UMF	1972	RIVER	13	4946	720				204,336		3,171,053	NONE	412,923	1,245,949	NONE	NONE	
BEAVER CREEK WEST	(7)UMF	1969	NIAG.	130	6600	1040				NONE		NONE	NONE	1,779,949	1,804,013	NONE	NONE	
BEAVER CREEK WEST	(10)UMF	1977	NIAG.	170	6590	1040				5,173		NONE	NONE	16,000	1,804,013	NONE	NONE	
BEAVER CREEK WEST	(10)UMF	1971	NIAG.	158	4440	320				392,653A		NONE	NONE	NONE	1,804,013	NONE	NONE	
BEAVER CREEK WEST	(11)UMF	1972	NIAG.	75	3784	1760				715,898B		NONE	NONE	NONE	1,804,013	NONE	NONE	
BEAVER CREEK WEST	(11)UMF	1972	NIAG.	4	2820	1360				NONE		9,940,971	801,852	15	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				2,152,952		738,853	93,388	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				641,594		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				547,314		1,310,000	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	140,983	10	1,110,312	189,279	NONE	
BEAVER CREEK WEST	(11)UMF	1974	NIAG.	4	2820	1360				NONE		310,862	1					

PART 3
CUMULATIVE RECORDS
EXPLANATION

PART 3 contains cumulative statistics principally of oil and gas production, well completions, and oil field brine production and disposal from 1925 through the most recent year-end compilations.

OIL AND GAS PRODUCTION TABLES. Oil and gas production figures for individual years prior to 1960 can be found in issues of "Summary of Operations, Oil and Gas Fields" for 1962 and prior years, and in "Michigan's Oil and Gas Fields" 1963 to present. The tables show the year of the first recorded production from a particular formation, and the yearly and cumulative production totals from 1925 through the most recent year-end compilations. Cumulative oil and gas production by county is shown on a separate table. Refer to Part 1 for county production figures for the past year, and prior issues for previous years.

CUMULATIVE WELL COMPLETIONS. These tables show the cumulative number of yearly completions in a county. Well density figures include field development wells, exploratory wells, and service wells of all types.

DRILLING PERMITS, WELL COMPLETIONS, FIELDS DISCOVERED. These tables show the number of drilling permits issued by year from 1927 through the most recent year-end compilations. Initial classification of well completions by year, the number of new fields or pools discovered, and the number of producible oil or gas wells on a yearly basis are all shown on the same table.

BRINE PRODUCTION AND DISPOSAL. Oil field brine production records other than for individual fields were discontinued in 1968. These tables listed the reported amount of produced brine and the method of disposal from 1937 up to 1967. Most oil field brine is still returned to subsurface formations. Small quantities are used for dust control or ice and snow removal on county roads in local areas. A small amount of brine is also disposed of in burning pits.

SERVICE WELLS. Service wells as listed in this publication are those wells which were drilled to serve some purpose other than the initial production of oil or gas. Oil or gas wells are sometimes converted to salt water disposal, observation, or facility wells in gas storage or pressure maintenance projects. There are several types of service wells:

LPG Wells. These are wells drilled for underground storage of liquified petroleum gas. In Michigan, these storage reservoirs are in man-made cavities in salt beds. The cavities have been made by dissolving the salt with water and then pumping out the brine.

Gas Storage Wells. These are wells drilled in gas storage reservoirs. They are frequently referred to as facility wells, and are generally used to inject gas into or extract gas from the reservoir. Certain facility wells may sometime in the history of the field be used as salt water disposal wells or observation wells.

Observation Wells. Most observation wells are related to gas storage projects. They are used to observe underground movement of gas, brines and other fluids, or to observe pressures.

Brine Disposal Wells. These wells are used in the disposal of oil and gas field brines back into some suitable subsurface formation. Brine disposal well permits are issued for these wells.

Injection and Pressure Maintenance Wells. These are wells used in secondary recovery, or pressure maintenance projects. They may be new wells drilled specifically for injection or pressure maintenance, or they may be converted oil or gas wells; their status can change from time to time.

Oil or gas wells are sometimes converted to salt water disposal, observation, facility wells in gas storage reservoirs, or water injection wells used in secondary recovery or pressure maintenance projects. The types of service wells listed under "Classification of Well Completions" do not include oil or gas wells converted to service wells.

TABLE 7 CUMULATIVE OIL AND GAS PRODUCTION BY COUNTY THROUGH 1977

COUNTY	CUMULATIVE PRODUCTION	
	Barrels Oil	MCF Gas
Allegan	19,971,239	32,862,046
Antrim	714,980	4,008,787
Arenac	46,906,398	6,722,140
Barry	735,919	0
Bay	20,873,265	7,857
Benzie	28,430	28,827
Berrien	29,757	0
Calhoun	36,958,521	75,384,386
Cass	125,772	0
Cheboygan	174	0
Clare	35,258,322	59,125,696
Clinton	4,121	0
Crawford	11,644,823	18,098,872
Eaton	962,475	10,858,336
Genesee	409,825	0
Gladwin	34,933,255	9,834
Grand Traverse	11,014,809	114,040,571
Gratiot	1,164,525	13,905,658
Hillsdale	56,854,745	75,090,432
Huron	61,324	0
Ingham	12,015,262	25,488,703
Ionia	48,479	0
Isabella	52,298,424	35,143,797
Jackson	25,010,835	39,118,924
Kalamazoo	28,519	0
Kalkaska	17,104,203	130,914,532
Kent	10,019,942	3,801,975
Lake	1,391,906	182,438
Lapeer	1,020,236	424,203
Lenawee	7,071	155,983
Livingston	8,421	27,742,190
Macomb	67,225	53,870,543
Manistee	12,853,530	32,231,551
Mason	5,687,325	13,485,075
Mecosta	10,920,207	27,361,697
Midland	69,203,706	9,834,775
Missaukee	19,722,481	19,683,770
Monroe	740,184	0
Montcalm	18,561,934	57,028,265
Montmorency	7,735	0
Muskegon	8,029,102	9,759,137
Newaygo	8,841,740	13,132,198
Oakland	79,034	3,435,840
Oceana	15,490,290	1,132,363
Ogemaw	20,555,473	10,195,435
Osceola	58,402,660	42,328,224
Oscoda	61,385	0
Otsego	27,437,285	49,590,761
Ottawa	9,373,255	2,949,310
Presque Isle	9,110	0
Roscommon	15,791,240	15,345,009
Saginaw	2,586,403	0
Shiawassee	59,651	0
St. Clair	15,196,499	159,523,823
Tuscola	2,872,137	103,517
Van Buren	12,093,979	0
Washtenaw	175,504	7,019,944
Wayne	928,334	11,464,977
Wexford	987,826	7,607,139
59 Counties	**734,372,991	*1,223,995,924

**Includes 11,177 barrels of oil from miscellaneous fields.

*Does not include 3,050,143 MCF of unassigned gas shown on early records.

TABLE 8 OIL PRODUCTION BY GEOLOGIC SYSTEM AND FORMATION - 1977 AND PRIOR YEARS

These data include estimates for multiple pay wells and leases when an accurate breakdown was not available

YEAR	MISSISSIPPIAN		DEVONIAN		SILURIAN	ORDOVICIAN	Total Barrels Oil All Formations	
	Marshall	Berea	Traverse	Dundee- Reed City	Detroit River	Trenton- Black River		
	First Year of Recorded Oil Production by Formation							
	1938	1925	1927	1927	1939	1952	1935	
1925 Through 1929 (Cumulative-5 year interval)		876,559	873,777	4,017,451				5,767,787
1930 Through 1934 (Cumulative-5 year interval)		318,171	995,439	31,870,671				33,184,281
1935 Through 1939 (Cumulative-5 year interval)	7,411	310,313	13,814,816	72,339,293	14,000		43,565	86,529,398
1940 Through 1944 (Cumulative-5 year interval)	22,040	229,262	27,856,377	67,939,211	727,418		348,477	97,122,785
1945 Through 1949 (Cumulative-5 year interval)	17,283	166,687	16,914,771	62,438,443	4,302,309		106,510	83,946,003
1950 Through 1954 (Cumulative-5 year interval)	9,068	125,089	16,974,863	38,058,703	11,878,669	43,091	225,180	67,314,663
1955 Through 1959 (Cumulative-5 year interval)	8,183	110,639	8,788,785	25,618,934	13,716,790	568,085	3,108,341	51,920,757
1960 Through 1964 (Cumulative-5 year interval)	6,090	84,222	6,777,853	15,725,957	8,260,636	4,611,123	48,022,216	83,488,097
1965 Through 1969 (Cumulative-5 year interval)	5,293	113,898	3,831,321	12,186,197	8,387,775	4,195,694	39,132,615	67,852,793
1970 Through 1974 (Cumulative-5 year interval)	4,553	97,444	2,669,026	9,115,667	10,992,939	25,986,136	20,288,822	69,174,372
1975	930	21,702	435,364	1,487,417	2,377,358	17,604,834	2,492,270	24,419,525
1976	892	22,089	414,762	1,425,009	2,339,423	24,115,191	2,103,997	30,421,363
1977	937	22,261	490,336	1,422,637	2,269,774	26,832,419	1,926,139	32,964,503

TRENDS IN MICHIGAN OIL PRODUCTION
PRINCIPAL PRODUCING FORMATIONS

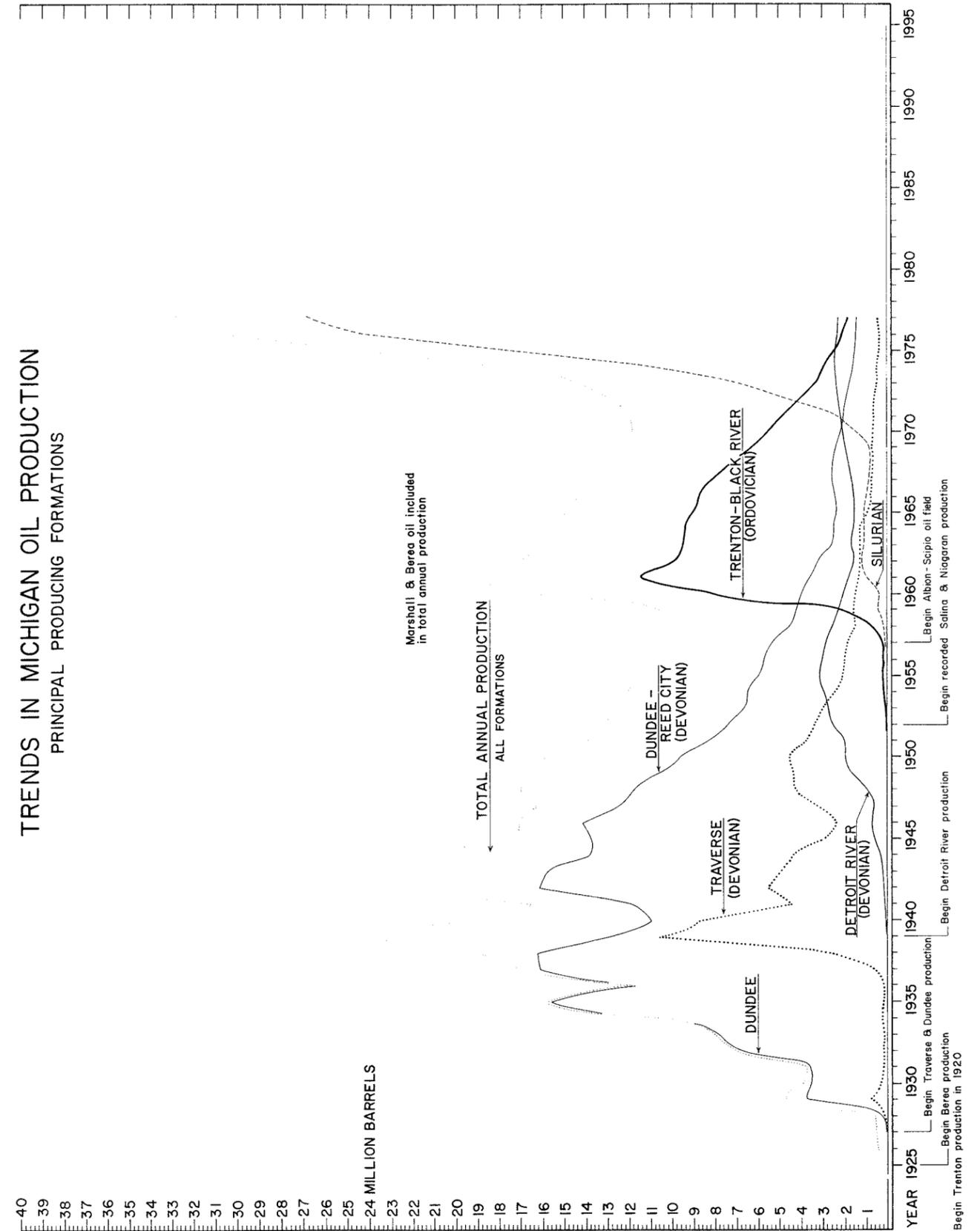


TABLE 9 GAS PRODUCTION BY GEOLOGIC SYSTEM AND FORMATION - 1977 AND PRIOR YEARS

YEAR	CENOZOIC	MISSISSIPPIAN			DEVONIAN			SILURIAN	ORDOVICIAN	Total MCF Gas All Formations			
	Glacial Drift	Stray-Marshall	Berea	Antrim Shale	Traverse	Dundee-Reed City	Detroit River	Salina-Niagaran	Trenton-Black River				
	1949	1931	1936	1947	1934	1929	1946	1929	1954				
1925 Through 1929	(Cumulative-5 year interval)									1,887,732	74,867	1,962,599	
1930 Through 1934	(Cumulative-5 year interval)									3,744 6,034,206	61,578	9,101,491	
1935 Through 1939	(Cumulative-5 year interval)									30,769,471 1,391,076	69,894 8,862,165	6,331	41,098,937
1940 Through 1944	(Cumulative-5 year interval)									70,498,989 5,860,831	3,716,132 7,647,510	79,983	87,803,445
1945 Through 1949	8,020	80,217,680	1,467,460	52,495	1,414,004	15,710,636	793,763	7,393,744	107,057,802			
1950 Through 1954	0	18,033,449	916,202	55,626	1,913,497	5,361,578	6,997,257	11,316,082	10,725	44,604,416			
1955 Through 1959	0	6,834,419	148,085	56,686	266,623	2,287,066	12,539,252	20,117,524	6,609,393	48,859,048			
1960 Through 1964	0	2,874,824	42,020	156,485	876,356	1,117,064	19,252,334	66,799,392	45,443,994	136,562,469			
1965 Through 1969	0	2,636,857	814,223	220,305	454,198	150,659	10,649,603	106,149,601	57,253,914	178,329,360			
1970 Through 1974	0	157,966	391,050	760,309	265,850	219,781	8,342,041	148,999,929	53,573,311	212,710,237			
1975	0	70,370	84,591	136,853	0	2,475	1,457,146	91,142,482	9,784,250	102,678,067			
1976	0	169,433	38,827	83,923	0	64,126	1,306,451	109,681,927	8,905,918	120,250,105			
1977	0	43,051	59,301	170,395	12,826	32,146	1,123,994	123,858,773	7,925,966	133,226,452			

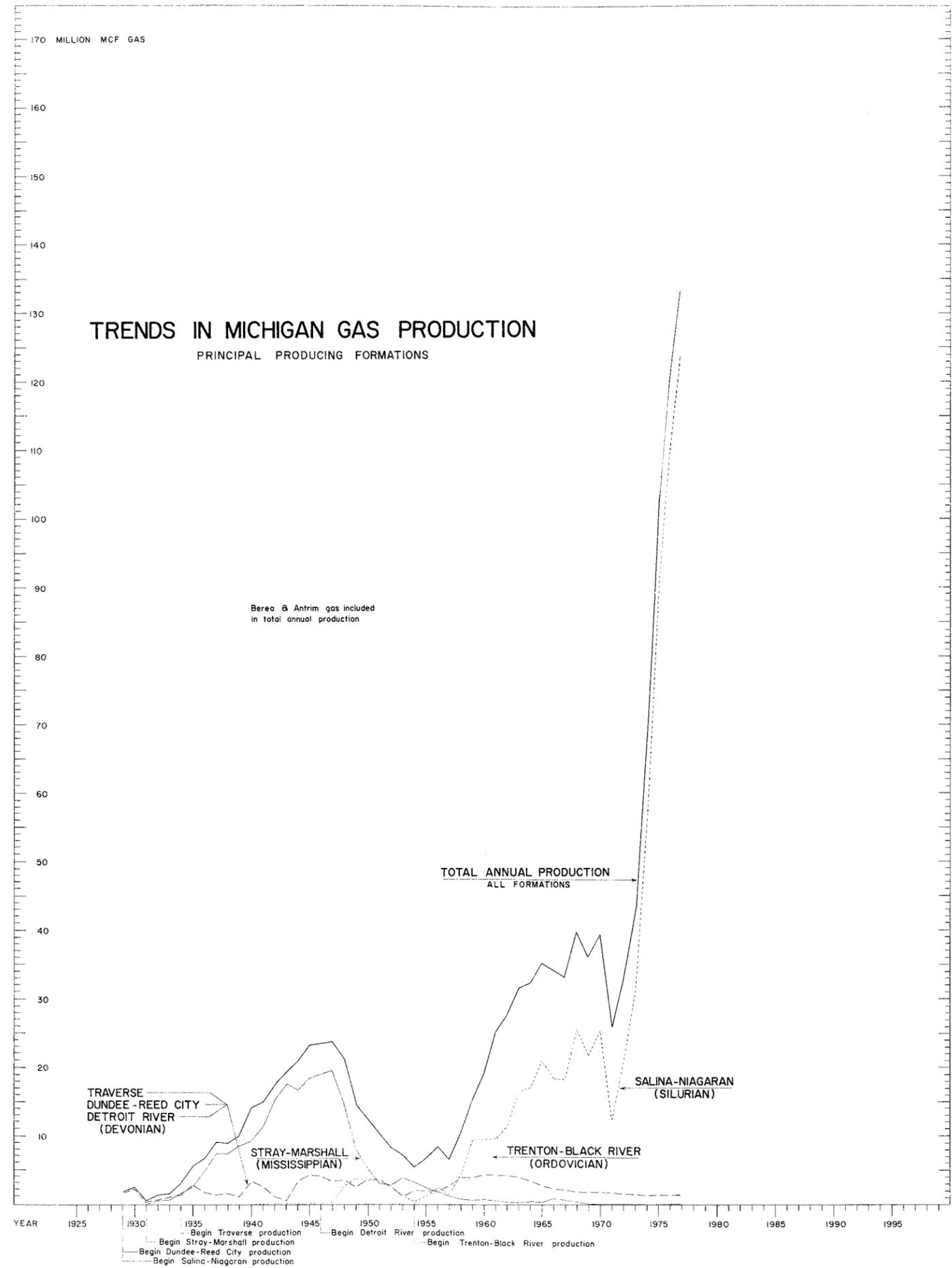


TABLE 10 CUMULATIVE OIL PRODUCTION BY GEOLOGIC SYSTEM AND FORMATION - 1977 AND PRIOR YEARS

These data include estimates for multiple pay wells and leases when an accurate breakdown was not available

Y E A R	MISSISSIPPIAN		DEVONIAN		SILURIAN		ORDOVICIAN	Total Barrels Oil All Formations
	Marshall	Berea	Dundee Reed City	Detroit River	Salina- Niagaran	Trenton- Black River		
	First Year of Recorded Oil Production by Formation							
	1938	1925	1927	1927	1939	1952	1935	
1925 Through 1929		876,559	873,777	4,017,451				5,767,787
	(Cumulative-5 year interval)							
1930 Through 1934		1,194,730	1,869,216	35,888,122				38,952,068
	(Cumulative-5 year interval)							
1935 Through 1939	7,411	1,505,043	15,684,032	108,227,415	14,000		43,565	125,481,466
	(Cumulative-5 year interval)							
1940 Through 1944	29,451	1,734,305	43,540,409	176,166,626	741,418		392,042	222,604,251
	(Cumulative-5 year interval)							
1945 Through 1949	46,734	1,900,992	60,455,180	238,605,069	5,043,727		498,552	306,550,254
	(Cumulative-5 year interval)							
1950 Through 1954	55,802	2,026,081	77,430,043	276,663,772	16,922,396	43,091	723,732	373,864,917
	(Cumulative-5 year interval)							
1955 Through 1959	63,985	2,136,720	86,218,828	302,282,706	30,639,186	611,176	3,832,073	425,784,674
	(Cumulative-5 year interval)							
1960 Through 1964	70,075	2,220,942	92,996,681	318,008,663	38,900,822	5,222,299	51,854,289	509,273,771
	(Cumulative-5 year interval)							
1965 Through 1969	75,368	2,334,840	96,848,002	330,194,860	47,288,597	9,417,993	90,986,904	577,126,564
	(Cumulative-5 year interval)							
1970 Through 1974	79,668	2,077,719	83,788,468	311,232,618	102,632,670	35,417,637	111,307,955	646,555,321
	(Cumulative-5 year interval)							
1975	80,598	2,442,977	104,909,422	335,513,416	61,197,257	53,052,303	113,800,446	671,084,960
1976	81,490	2,465,066	105,324,184	336,938,425	63,536,680	77,167,494	115,904,443	701,426,388
1977	82,427	2,487,327	105,814,520	338,361,062	65,806,454	103,999,913	117,830,582	734,382,285

Some formations show a loss in cumulative production from 1973 to 1975. This is due to recently initiated changes in the method of crediting production to each respective formation in multiple-pool fields.

TABLE 11 CUMULATIVE GAS PRODUCTION BY GEOLOGIC SYSTEM AND FORMATION - 1977 AND PRIOR YEARS

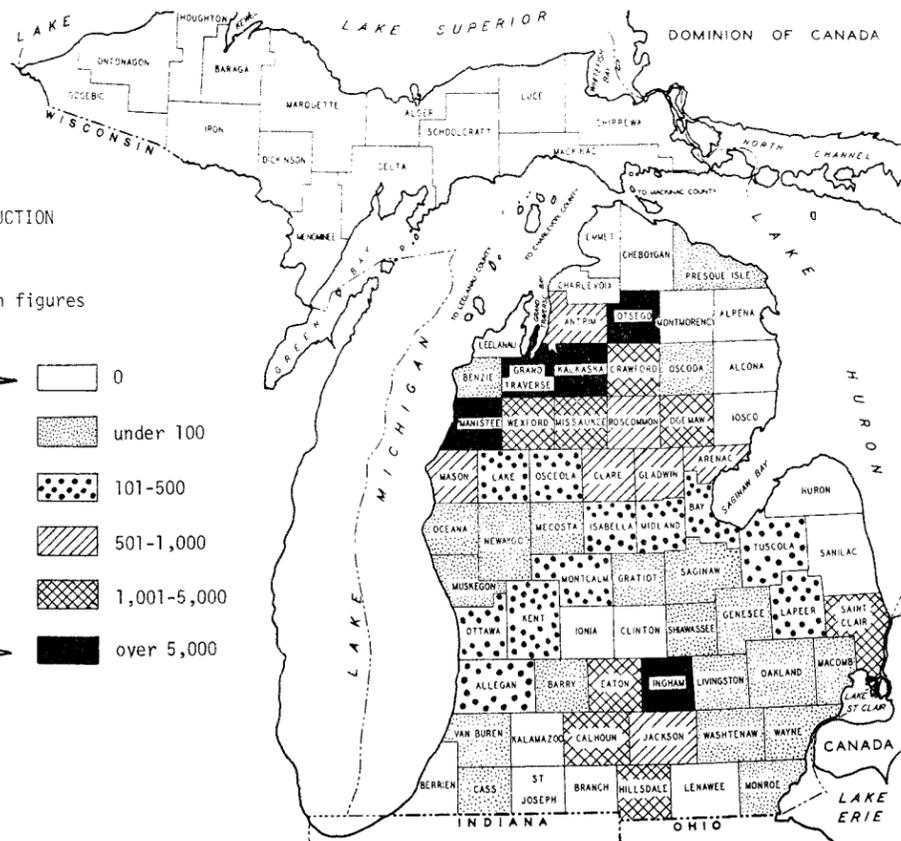
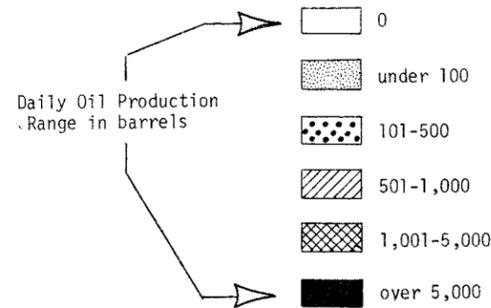
Y E A R	CENOZOIC	MISSISSIPPIAN		DEVONIAN			SILURIAN	ORDOVICIAN	Cumulative MCF All Formations	
	Glacial Drift	Stray- Marshall	Berea	Antrim Shale	Traverse	Dundee- Reed City	Detroit River	Salina- Niagaran		Trenton- Black River
	First Year of Recorded Gas Production by Formation									
	1949	1931	1936	1947	1934	1929	1946	1929		1954
1925 Through 1929						1,887,732		74,867	1,962,599	
	(Cumulative-5 year interval)									
1930 Through 1934		3,001,963			3,744	7,921,938		136,445	11,064,090	
	(Cumulative-5 year interval)									
1935 Through 1939		33,771,434	1,391,076		73,638	16,784,103		142,776	52,163,027	
	(Cumulative-5 year interval)									
1940 Through 1944		104,270,423	7,251,907		3,789,770	24,431,613		222,759	139,966,472	
	(Cumulative-5 year interval)									
1945 Through 1949	8,020	184,488,103	8,719,367	52,495	5,203,774	40,142,249	793,763	7,616,503	247,024,274	
	(Cumulative-5 year interval)									
1950 Through 1954	8,020	202,521,522	9,635,569	108,121	7,117,271	45,503,827	7,791,020	18,932,585	10,725 291,628,690	
	(Cumulative-5 year interval)									
1955 Through 1959	8,020	209,355,971	9,783,654	164,807	7,383,894	47,790,893	20,330,272	39,050,109	6,620,118 340,487,738	
	(Cumulative-5 year interval)									
1960 Through 1964	8,020	212,230,795	9,825,674	321,292	8,260,250	48,907,957	39,582,606	105,849,501	52,064,112 477,050,207	
	(Cumulative-5 year interval)									
1965 Through 1969	8,020	214,867,652	10,639,897	541,597	8,714,448	49,058,616	50,232,209	211,999,102	109,318,026 655,379,567	
	(Cumulative-5 year interval)									
1970 Through 1974	8,020	213,298,888	11,249,818	1,284,841	9,233,011	48,568,150	60,395,689	357,050,974	162,958,467 864,047,858	
	(Cumulative-5 year interval)									
1975	8,020	213,369,158	10,854,319	1,421,694	8,971,034	41,283,187	69,832,340	448,196,030	176,537,235 973,572,058	
1976	8,020	213,538,591	10,893,146	1,505,617	8,971,034	41,347,313	71,138,791	557,877,957	185,443,153 1,093,822,567	
1977	8,020	213,581,642	10,952,447	1,670,012	8,983,860	41,379,459	72,262,785	681,736,730	193,369,119 1,227,049,019	

Some formations show a loss in cumulative production from 1973 to 1975. This is due to recently initiated change in the method of crediting production to each respective formation in multiple-pool fields.

Does not include 3,050,143 Mcf of unassigned gas from early records.

1977 AVERAGE DAILY OIL PRODUCTION BY COUNTY

See page 8 for 1977 production figures



1977 AVERAGE DAILY GAS PRODUCTION BY COUNTY

These figures are actual gas sales in Mcf. See page 8 for 1977 production figures

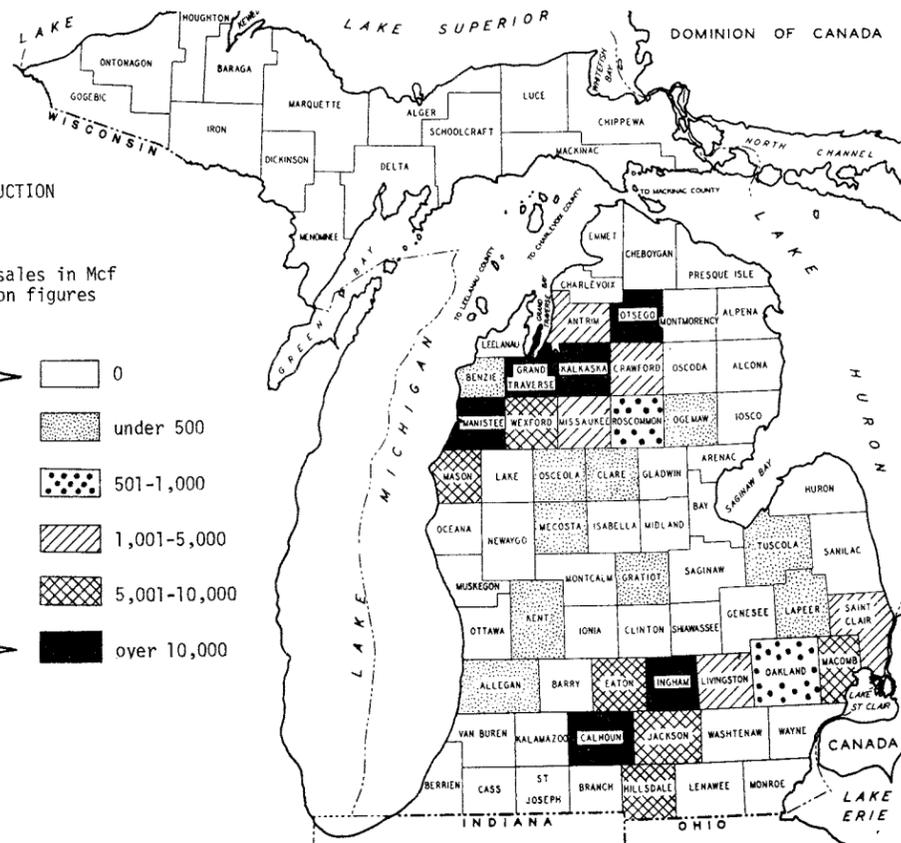
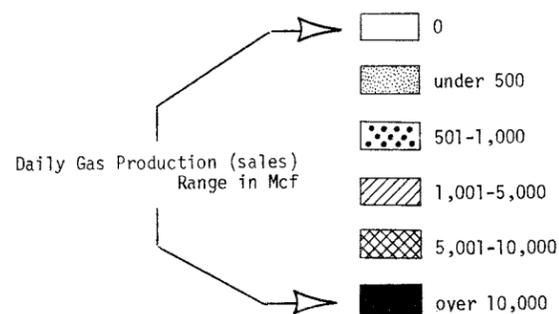


TABLE 12 CUMULATIVE WELL COMPLETIONS BY COUNTY THROUGH 1977

County	Area of County (including inland water)		Classification of Completed Wells (New Hole) (does not include reworked wells)					Total Completions	Approximate Well Density (All Classes) Wells: Sq. Miles
	Square Miles	Acres	Oil Wells	Gas Wells	Service Wells (GS - OBS - BDW - LPG)				
Alcona	694	444,160					21	21	1:33
Allegan	837	535,680	1,310	89	174		1,713	3,286	4:1
Alpena	590	377,600		1			15	16	1:37
Antrim	520	332,800	4	2	1		51	58	1:9
Arenac	369	236,160	406	44	1		409	860	2:1
Barry	571	365,440	74		4		140	218	1:3
Bay	451	288,640	458	1			228	687	2:1
Benzie	342	218,880	2				21	23	1:15
Berrien	584	373,760	9				75	84	1:7
Branch	517	330,880					66	66	1:8
Calhoun	716	458,240	292	44	4		416	756	1:1
Cass	505	323,200	47				130	177	1:3
Charlevoix	451	288,640					15	15	1:30
Cheboygan	798	510,720	1				26	27	1:30
Chippewa	1,651	1,056,640	Northern Peninsula County				6	6	1:275
Clare	577	369,280	389	172	494		370	1,425	2:1
Clinton	573	366,720	4				81	85	1:7
Crawford	566	362,240	102	8	9		39	158	1:4
Delta	1,202	769,280	Northern Peninsula County				1	1	1:1200
Eaton	572	366,080	26	11			83	120	1:5
Emmet	477	305,280					5	5	1:95
Genesee	649	415,360	31	1			45	77	1:8
Gladwin	512	327,680	739				283	1,022	2:1
Grand Traverse	490	313,600	78	81	1		265	425	1:1
Gratiot	566	362,240	46	74	26		279	425	1:1
Hillsdale	604	386,560	299	2			501	802	1:1
Huron	824	527,360	5				80	85	1:10
Ingham	560	358,400	74	13	10		113	209	1:3
Ionia	578	369,920	9				85	94	1:6
Iosco	563	360,320					26	26	1:22
Isabella	573	366,720	659	161	57		493	1,370	2:1
Jackson	717	458,880	136	3			284	423	1:2
Kalamazoo	580	371,200	18				112	130	1:4
Kalkaska	573	366,720	124	58	1		192	375	1:2
Kent	868	555,520	461	6	2	11	349	829	1:1
Lake	577	369,280	51	1	6		159	217	1:3
Lapeer	662	423,680	42	6			65	113	1:6
Leelanau	374	239,360					9	9	1:42
Lenawee	760	486,400	3	72			114	189	1:4
Livingston	583	373,120	1	34	55		98	188	1:3
Luce	929	594,560	Northern Peninsula County				2	2	1:465
Mackinac	1,081	691,840	Northern Peninsula County				2	2	1:541
Macomb	481	307,840	6	71	35		364	476	1:1
Manistee	568	363,520	128	46	8		211	393	1:1
Mason	505	323,200	139	15	1		319	474	1:1
Mecosta	570	364,800	130	198	205		422	955	2:1
Midland	523	334,720	901	2		2	279	1,184	2:1
Missaukee	572	366,080	192	64	104		219	579	1:1
Monroe	564	360,960	45				113	158	1:4
Montcalm	720	460,800	383	221	249		612	1,465	2:1
Montmorency	567	362,880	3	2			43	48	1:12
Muskegon	519	332,160	444	120			390	954	2:1
Newaygo	867	554,880	205	47	155		390	797	1:1
Oakland	899	575,360	6	16	5		83	110	1:8
Oceana	541	346,240	338	9			555	902	2:1
Ogemaw	580	371,200	525	21	24		181	751	1:1
Osceola	585	374,400	346	121	197		381	1,045	2:1
Oscoda	568	363,520	2				12	14	1:41
Otsego	538	344,320	113	40	1		234	388	1:1
Ottawa	572	366,080	474	19	2		500	995	2:1
Presque Isle	678	433,920	4	4			57	65	1:10
Roscommon	573	366,720	187	14			105	306	1:2
Saginaw	814	520,960	378	2			175	555	1:1
Sanilac	961	615,040					54	54	1:18
Schoolcraft	1,229	786,560	Northern Peninsula County				2	2	1:615
Shiawassee	540	345,600	9				57	66	1:8
St. Clair	751	480,640	265	185	61	16	895	1,422	2:1
St. Joseph	518	331,520					21	21	1:25
Tuscola	820	524,800	160	4			107	271	1:3
Van Buren	615	393,600	725				1,004	1,729	3:1
Washtenaw	723	462,720	10	18	5	1	109	143	1:5
Wayne	625	400,000	12	24	18	30	54	138	1:5
Wexford	570	364,800	10	12			82	104	1:5
73 Counties	47,342	Totals:	12,039	2,159	1,915	60	15,497	31,670	

Total includes gas storage, observation, salt water disposal, water injection wells, and brine wells

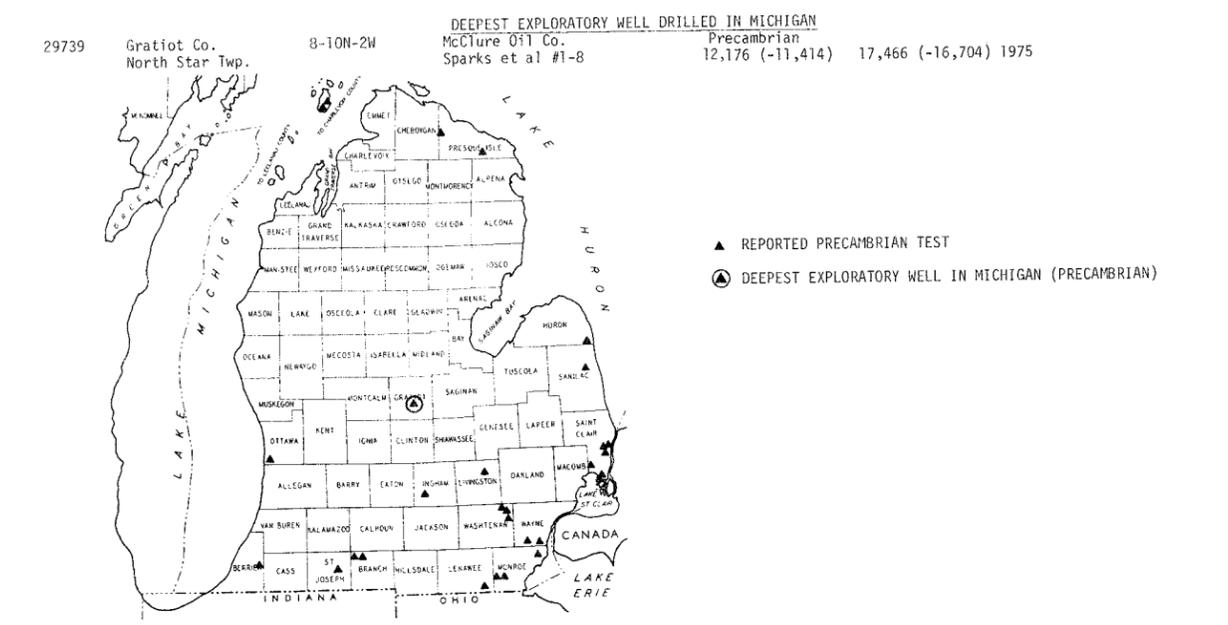
TABLE 13 PERMITS, DISCOVERIES, WELL COMPLETIONS, WELLS AT END OF YEAR, 1977 AND PRIOR YEARS

Year	Permits Issued	Classification of Well Completions					Total Completions	Fields or Pools Discovered		Wells at End of Year				
		Oil Wells	Gas Wells	Service Wells		Dry Holes		Oil	Gas	Oil Wells	Gas Wells	GS OBS	Inj.* P.M.	LPG*
				GS-OBS-SWD	LPG									
1925	0	3				3	1		Incomplete records from 1925 through 1930					
1926	0	89				105	1	1						
1927	16	218	3			267	1	1						
1928	283	79	30			158	1		*LPG injection and extraction wells in LPG storage facilities.					
1929	576	324	22			483								
1930	257	154	19			331	2	3						
1931	111	59	17			128	1	1	634	64				
1932	184	109	10			183	1	1	645	72				
1933	429	223	10			318	3	1	831	70				
1934	444	272	47			469	3	2	977	117				
1935	700	319	101			641	1	5	1,167	212				
1936	777	333	206			807	6	5	1,360	402				
1937	973	622	66			985	6	1	1,778	442				
1938	996	580	27			1,018	17	2	2,141	448				
1939	1,465	845	56			1,479	8	2	2,684	485				
1940	1,121	557	59			1,181	8	13	2,928	510				
1941	1,044	441	97			951	7	8	3,158	577	13			
1942	570	297	74			682	14	4	3,324	631	13			
1943	627	233	47			355	12	8	3,386	639	13			
1944	741	246	64			400	10	2	3,433	651	13			
1945	755	271	57	6		467	11	11	3,536	663	19			
1946	822	223	53	86		461	19	10	3,520	547	226			
1947	886	318	43	148		387	10	4	3,532	534	409			
1948	918	371	32	77		437	10	5	3,554	502	482			
1949	999	439	22	73		473	1,007	21	2	3,818	471	554		
1950	901	336	28	47		473	884	18	4	3,954	471	610		
1951	744	227	20	43	1	466	757	16	6	3,911	417	673		1
1952	694	261	30	51	2	370	714	14	5	3,979	388	732		3
1953	824	258	18	110	1	360	747	11	6	4,089	313	901		4
1954	573	214	15	2	2	338	571	18		4,167	316	903		6
1955	484	204	13	1	1	291	510	12	2	4,223	321	904		7
1956	476	196	12	28		227	463	12	2	4,191	310	932		7
1957	461	176	40	35	3	207	461	12	5	4,233	335	977		10
1958	481	166	20	36	4	227	453	10	7	4,201	345	1,025		14
1959	727	257	47	72	4	272	652	8	7	4,327	323	1,094		18
1960	904	372	19	79	1	441	912	7	4	4,555	249	1,337	242	19
1961	849	207	57	74	3	476	817	13	10	4,619	292	1,420	260	22
1962	711	148	62	53	4	474	741	5	7	4,603	300	1,531	287	26
1963	704	135	72	56	2	384	650	7		4,598	367	1,601	287	28
1964	583	82	48	126		376	632	6	4	4,588	404	1,632	288	28
1965	494	53	34	107		291	485	6	7	4,368	424	1,859	341	28
1966	430	56	45	11	2	290	404	8	3	4,315	429	1,896	233	30
1967	405	69	38	26		287	420	8	2	4,273	481	1,921	333	30
1968	378	70	12	30	6	251	369	9	4	4,372	414	2,010	394	36
1969	379	73	9	26		239	347	7	3	4,349	410	2,034	---	36
1970	425	50	16	108	3	211	388	11	7	4,324	418	2,119	---	39
1971	425	83	31	83	13	186	396	28	13	4,323	418	2,299	---	52
1972	423	84	38	64	2	186	374	34	23	4,313	450	2,377	---	54
1973	445	81	47	67	0	173	369	38	37	4,334	491	2,462	---	54
1974	503	134	61	54	2	235	484	55	39	4,376	488	2,494	---	56
1975	653	167	40	38	0	330	575	55	19	---	---	---	---	56
1976	645	120	57	50	0	333	560	30	36	---	---	---	---	56
1977	692	136	70	49	1	341	597	35	36	---	---	---	---	57

Figures in these columns represent the well count at the end of the year. Figures are subject to change due to well-abandonments, reclassification, etc. The figures in these columns have been discontinued. See Tables 2, 3, 4 and 5 for producible wells and service wells in individual fields.

TESTS REPORTED TO HAVE PENETRATED PRECAMBRIAN ROCK IN THE SOUTHERN PENINSULA OF MICHIGAN

PERMIT	County	Well No.	Company	PRECAMBRIAN	TOTAL DEPTH	YEAR COMPLETED	Age	Rb-Sr	K-Ar
26112	Berrien Co.	10-6S-17W	Security Oil & Gas Thalman #1	4604 (-3880)	5647 (-4943)	1965			
29779	Branch Co.	7-5S-8W	Consumers Power Co. et al Lindsey-Hosettler #1	5375 (-4425)	5439 (-4549)	1974			
29969	Branch Co.	8-5S-8W	Consumers Power Co. et al H. Clark #1	5418 (-4539)	5475 (-4586)	1974			
23478	Charlevoix Co.	6-37N-10W	McClure Oil Co. State-Beaver Island #2	4718 (-3977)	4803 (-4062)	1961			
23435	Charlevoix Co.	27-38N-10W	McClure Oil Co. State-Beaver Island #1	4566 (-3888)	5383 (-4705)	1961			
30682	Cheboygan Co.	24-35N-1W	North. Mich. Explor. Co. et al State-Maverly #1-24	5617 (-4816)	5753 (-4952)	1975			
29191	Huron Co.	26-15N-15E	Mobil Oil Corp. C. J. Volmering #1	8872 (-8161)	9086 (-8375)	1973			
28607	Ingham Co.	29-2N-1W	Mobil Oil Corp. Walter Kranz, Jr. #1	7690 (-6751)	7866 (-6927)	1971			
10448	Lenawee Co.	32-8S-5E	Walter H. Eckert Harry Taylor #1	3865 (-3150)	3902 (-3186)	1944			
27986	Livingston Co.	11-3N-5E	Mobil Oil Corp. H. J. Messmore #1	7150?(-6170)	7589 (-6609)	1970			
11221	Monroe Co.	29-5S-10E	Joseph W. Sturman D. L. & R. L. Chapman #1	3342 (-2745)	3377 (-2780)	1945			
7702	Monroe Co.	19-7S-7E	Jacob Beck Mrs. James Sanclant #1	3595 (-2926)	5495 (-4826)	1954			
25494	Monroe Co.	16-7S-6E	Ferguson & Garrison Merlin Shimp #1	3637 (-2951)	3671 (-2985)	1964			
None	Ottawa Co.	30-5N-15W	H. J. Heinz Co.	6142 (-5523)	6221 (-5602)	1972			
29372	Holland Twp.		H. J. Heinz Co. #2	6142 (-5523)	6221 (-5602)	1972			
29372	Presque Isle Co.	13-33N-5E	Shell Oil Co. Taratuta #1-13	6738?(-5962)	6738 (-5962)	1973			Granite wash 6545? (-5769)
27199	Presque Isle Co.	29-35N-2E	Pan American Petro. Corp. D. E. Draysey #1	5877 (-5069)	5940 (-5132)	1968			
80139	North Allis Twp.		Consumers Power Co. Consumers Power Co. BD#1	4605 (-3989)	4627 (-4011)	1964			
25780	Casco Twp.	Projected	L. Bernhardt Puzzuoli #1	4152 (-3572)	4188 (-3608)	1965			
30376	Clay Twp.	17-2N-16E	Mich. Cons. Gas Co. Osterland #1-14	4449 (-3846)	4550 (-3947)	1975			
196	St. Clair Co.	14-3N-15E	St. Clair Oil & Gas Corp. Hurst #1	4730 (-4080)	4770 (-4110)	1929			Age Rb-Sr Biotite 1020
80151	St. Clair Twp.	7-5N-17E	Consumers Power Co. C.P.C. #1-7 BDW	4707 (-4069)	4733 (-4095)	1971			
80152	St. Clair Twp.	7-5N-17E	Consumers Power Co. C.P.C. #2-7 BDW	4684 (-4052)	4702 (-4070)	1971			
31335	St. Joseph Co.	11-6S-10W	Marathon Oil Co. Lloyd Cupp #1-11	5074 (-4182)	5283 (-4391)	1977			
30974	Sanilac Co.	20-12N-15E	McClure Oil & Mich. Nat. Res. Hewett-Shadd Unit #1-20	8676 (-7891)	8975 (-8190)	1976			
10792	Bridgehampton Twp.		I. C. Chamness Troy-Roddenberry Comm. #1	6075 (-5189)	6094 (-5208)	1944			
10141	Washtenaw Co.	27-1S-7E	Colvin & Assoc. & Elec. Wm. F. Voss Comm. #1	6374 (-5459)	6410 (-5495)	1944			Age Rb-Sr Biotite 950
11341	Washtenaw Co.	16-1S-7E	Colvin & Assoc. & Rot. St. Viola Meinzinger #1	5670 (-4852)	5692 (-4874)	1945			Age Rb-Sr Biotite 1050
80146	Wayne Co., City of Woodhaven	22-4S-10E	Marathon Oil Co. Woodhaven BD#1	3704 (-3095)	3752 (-3143)	1969			
10430	Wayne Co.	16-4S-9E	Colvin & Assoc. & Elec. Theisen Estate #1	3985 (-3360)	4046 (-3321)	1944			



STATE OIL AND GAS REVENUE

Years	Royalty	Rental	Bonus	Application and Assignment Fees	Total Income
1927-1931	\$ 85,262.60	\$ 43,821.60	\$ 27,707.50	\$ 1,204.00	\$ 157,995.70
1932-1936	209,125.99	205,349.64	87,211.25	4,506.00	506,192.88
1937-1941	1,302,355.65	724,330.32	515,705.83	7,367.00	2,549,758.80
1942-1946	1,645,462.42	2,021,512.76	601,065.34	3,759.00	4,271,799.52
1947-1951	1,813,632.16	2,256,913.51	1,307,470.34	4,398.00	5,382,414.01
1952-1956	2,727,410.47	1,989,342.96	257,186.50	3,028.00	4,976,967.93
1957-1961	1,879,927.18	769,593.64	475,840.80	3,702.00	3,129,063.62
1962-1966	1,259,162.06	1,476,949.69	409,809.00	4,982.00	3,150,902.75
1967-1971	2,160,038.71	3,258,021.87	2,168,524.59	6,009.00	7,592,594.17
1972	944,440.64	831,057.14	10,165,150.69	2,854.00	11,943,502.47
1973	1,960,853.63	1,261,207.88	3,132.75	1,658.00	3,226,852.26
1974	5,814,636.01	1,280,108.62	7,131,732.00	2,248.00	14,228,724.63
1975	9,637,835.43	1,297,691.74	514,247.80	2,603.00	11,452,377.97
1976	13,293,209.27	1,328,660.13	524,973.00	616.00	15,147,458.40
1977	13,327,908.44	1,190,619.60	357,005.74	3,069.00	14,878,602.78
TOTAL	58,061,260.66	19,935,181.10	24,546,763.13	52,003.00	102,595,207.89

ABBREVIATIONS

A.A.P.G.	American Assoc. Petroleum Geologists	MCF	Thousand Cubic Feet
A.P.I.	American Petroleum Institute	MCFGPD	Thousand Cubic Feet Gas Per Day
(A) I.P.	(Acid) Initial Production or Potential	Mich.	Michigan formation
A-1 Carb.	A-1 Carbonate	Miss.	Mississippian
A-2 Carb.	A-2 Carbonate	M.S.	Mt. Simon ss.
Bbls.	Barrels	NFW	New Field Wildcat
B.B.	Bois Blanc formation	(N) I.P.	(Natural) Initial Production or Potential
B.D.	Brine Disposal	Niag.	Niagaran
BDW	Brine Disposal Well	Nt.	Nontechnical
BOPD	Barrels Oil Per Day	OBS	Observation Well
B.R.	Black River	OP	Out Post Well
Camb.	Cambrian	Ord.	Ordovician
"Camb."	Unidentified Cambrian	OWDD	Old Well Drilled Deeper
Cat.	Cataract formation	P.D.C.	Prairie du Chien formation
c.f.p.b.	Cubic feet per barrel	Penn.	Pennsylvanian
C.H.	Cabot Head formation	Pilot Wtr.	Pilot Water
Cinn.	Cincinnati	P.M.	Pressure Maintenance
Cl.	Clinton formation	Prod. Form.	Producing Formation
Cold.	Coldwater formation	R.C.	Reed City formation
Compl.	Completion	RW	Reworked Well
Coop.	Cooperative	Rich.	Richfield formation
D & A	Dry and Abandoned	Sag.	Saginaw formation
Dev.	Devonian	Sal.-Niag.	Salina-Niagaran
D.R.	Detroit River formation	SD	Shut Down
D.R. SZ	Detroit River Sour Zone	Seis.	Seismograph
Dres.	Dresbach formation	SO & G	Show Oil and Gas
Dd., DD.	Dundee	S.P.	St. Peter formation
Dd.-R.C.	Dundee-Reed City	Stray	Michigan Stray formation
DPT	Deeper Pool Test	Sub.	Subsurface geology
E.C.	Eau Claire formation	SW	Service Well
Explor.	Exploratory	SWD	Salt Water Disposal
Fran.	Franconia formation	Sylv.	Sylvania formation
Geo. Test	Geological Test	SZ	Sour Zone (In Detroit River)
G.O.R.	Gas-Oil Ratio	Thick.	Thickness
Grav.	Gravity, Gravimeter	(T) I.P.	(Treatment) Initial Production or Potential
GS	Gas Storage	Trav.	Traverse
GSW	Gas Storage Service Well	Tremp.	Trempealeau formation
GW	Glenwood	Trent.-Blk.	Trenton-Black River
Incs.	Includes	Unit.	Unitized
Inj.	Injection		
L.P.G.	Liquid Petroleum Gas		
Marsh.	Marshall formation		

Permit numbers issued in 1976 for directional holes

30776	Otsego County	31103	Gd. Traverse County
30789	Gd. Traverse County	31105	Crawford County
30816	Eaton County	31121	Calhoun County
30817	Gd. Traverse County	31122	Otsego County
30835	Otsego County	31126	Manistee County
30836	Kalkaska County	31132	Otsego County
30837	Gd. Traverse County	31136	Kalkaska County
30848	Otsego County	31156	Presque Isle County
30851	Otsego County	31163	Manistee County
30869	Otsego County	31167	Manistee County
30875	Gd. Traverse County	31168	Kalkaska County
30876	Gd. Traverse County	31172	Macomb County
30878	Montcalm County	31177	Kalkaska County
30887	Otsego County	31178	Gd. Traverse County
30914	Kalkaska County	31182	Kalkaska County
30932	Gd. Traverse County	31194	Gd. Traverse County
30940	Presque Isle County	31199	St. Clair County
30946	Gd. Traverse County	31201	Montmorency County
30947	Macomb County	31205	Gd. Traverse County
30948	Manistee County	31211	Kalkaska County
30949	Gd. Traverse County	31222	Gd. Traverse County
30951	Otsego County	31228	Otsego County
30955	Otsego County	31237	Manistee County
30964	Manistee County	31244	Wexford County
30965	Manistee County	31254	Kalkaska County
30966	Kalkaska County	31255	Otsego County
30986	Manistee County	31274	Kalkaska County
30989	Antrim County	31275	Manistee County
30990	Calhoun County	31278	Gd. Traverse County
31002	Gd. Traverse County	31285	Hillsdale County
31003	Kalkaska County	31294	Otsego County
31016	Wexford County	31300	Kalkaska County
31019	Otsego County	31305	Oakland County
31021	Crawford County	31317	Manistee County
31023	Otsego County	31322	Wexford County
31026	Manistee County	31324	Kalkaska County
31035	Otsego County	31327	Manistee County
31052	Gd. Traverse County	31334	Manistee County
31053	Manistee County	31347	Oakland County
31057	Manistee County	31354	Manistee County
31058	Manistee County	31355	Wexford County
31059	Manistee County	31380	Otsego County
31062	Manistee County	31383	Kalkaska County
31073	Otsego County	31388	Wexford County
31074	Manistee County	31401	Otsego County
31076	Manistee County		
31077	Manistee County		
31082	Kalkaska County		
31083	Kalkaska County		
31088	Manistee County		

Directional holes with two or more permit number.

29629** and 29553	31132***, 30835** and 30461
29671**, 29650** and 29478	31156** and 31091
29729 and 29466*	31163***, 31126** and 31074
29828 and 29451*	31177** and 31127
29900**, 29827 and 29426*	31178** and 31144
29912** and 29842	31211***, 31182** and 30914
29918*** and 29839	31237** and 31198
29929** and 29905	31244** and 31215
29995** and 29947	31300** and 31168
30049**, 30013** and 29914	31305** and 31262
30034** and 29955	31317** and 31216
30052** and 30001	31355***, 31322** and 31221
30077** and 29942	31334** and 31167
30099** and 30051	31347** and 31304
30113*** and 30038	31380** and 31183
30115** and 30008	31388** and 30295
30530** and 30459	31415** and 31325
	31435***, 31388**, and 30295

30458** and 30363	31436** and 31342
30583** and 30502	31439** and 31261
30603** and 30557	31499** and 30775
30604** and 30562	31454** and 29050
30118** and 30458	31460***, 31437**, and 31367
30132** and 30098	31489** and 31354
30172** and 30092	31503** and 31315
30211** and 29703	31513** and 31403
30234** and 30188	31559 and 31194*
30245*** and 30030	31563** and 31511
30251***, 30211** and 29703	31565***, 31554***, 31483**, and 31417
30356** and 30197	31572** and 31379
30460** and 30413	31588** and 31519
30372** and 30313	31613** and 31571
30422*** and 30301	31614** and 31556
30423*** and 30175	31642** and 31612
30428****, 30422, 30383 and 30242	31643** and 31456
30444** and 30349	31646** and 28459
30496**, 30476** and 30364	31649** and 31376
30512** and 30221	31656** and 31599
30626** and 30499	31680** and 30085
30662** and 30602	31683** and 31508
30685** and 30651	31711** and 31633
30744** and 30712	31715** and 31685
30748** and 30693	31727***, 31706**, and 31586
30791** and 29309	31752** and 31664
30817***, 30789**, and 30656	31774** and 30233
30836** and 30398	31776** and 29902
30837***, 30744** and 30712	31803** and 29027
30851** and 30741	31822** and 31757
30858** and 30739	31823****, 31816***, 31702**, and 28872
30869 and 30586*	31850** and 31811
30878** and 29952	31851** and 31606
30887** and 30848	31879** and 31820
30946** and 30891	31894** and 31858
30947** and 30629	31897** and 31856
30948** and 30905	31902** and 31852
30949** and 30896	31910** and 31885
30965** and 30883	31966** and 31920
30966** and 30908	31995** and 31974
30986** and 30961	32009** and 31982
30989** and 30788	32010** and 31987
31003** and 30564	32019** and 31980
31035** and 30910	32032** and 31988
31052** and 30818	32073** and 32016
31057** and 30675	32074** and 32022
31058 and 30213*	32089** and 32036
31062** and 29417	32105** and 32046
31073***, 30876** and 30840	
31103** and 30900	

*Terminated permit.
 **Directional hole drilled from plugged-back vertically drilled dry hole.
 ***Second directional hole drilled from plugged-back directionally drilled dry hole.
 ****Third directional hole drilled from a plugged-back directionally drilled dry hole.

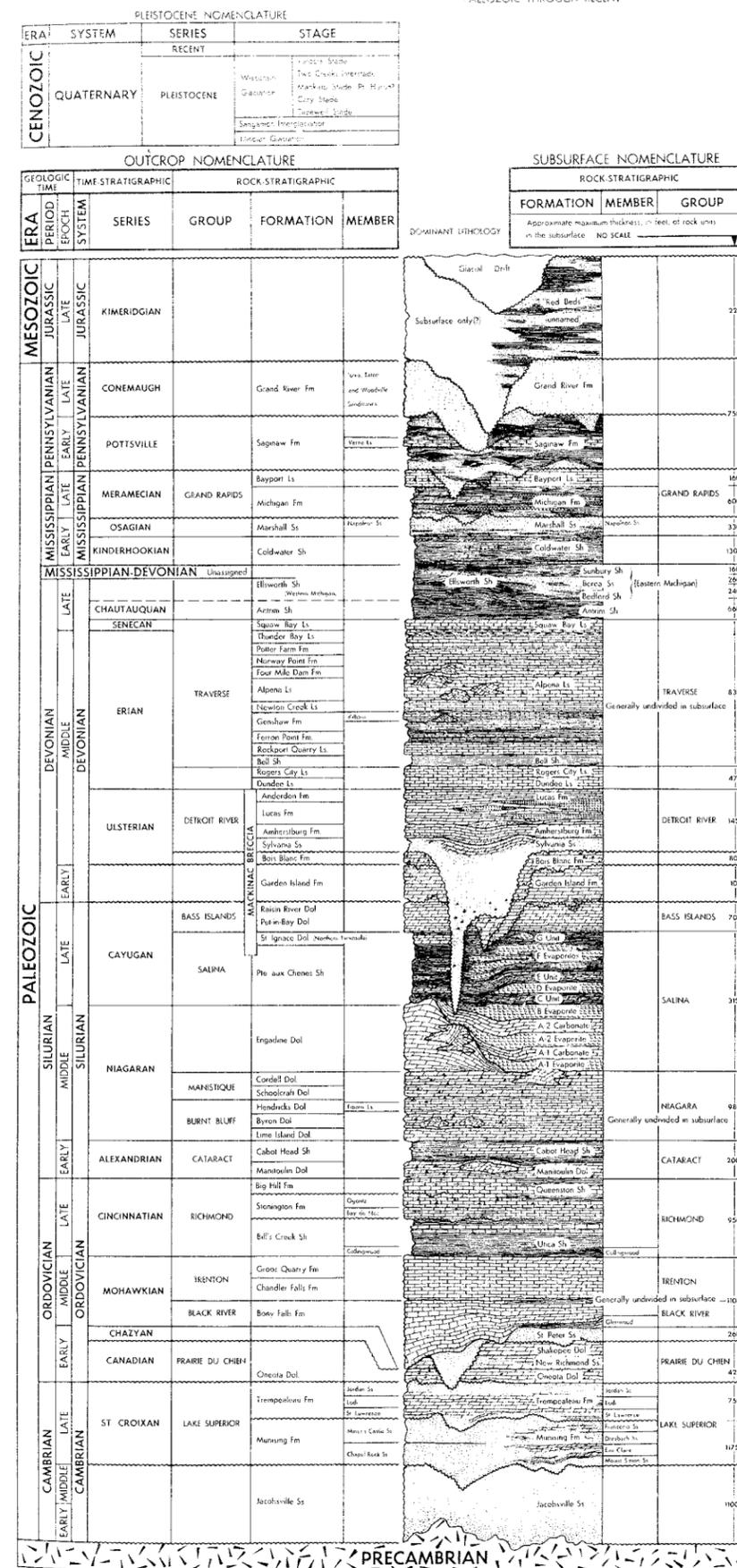
New permits (left column) issued for a previously drilled well or for a previously issued but terminated permit.
Year of issue: 1977

31415	issued for well drilled or permitted under	31325
31435	"	31388 & 30295
31436	"	31342
31439	"	31261
31449	"	30775
31450	"	30824
31454	"	29050
31460	"	31437 & 31367
31489	"	31354
31503	"	31315
31513	"	31403
31559	"	31194
31563	"	31511
31565	"	31554, 31483, & 31417
31572	"	31379
31588	"	31519
31589	"	24883
31592	"	29491
31613	"	31571
31614	"	31556
31635	"	31232
31642	"	31612
31643	"	31456
31646	"	28459
31649	"	31376
31653	"	29074
31656	"	31599
31680	"	30085
31683	"	31508
31684	"	6071
31687	"	2432
31692	"	31332
31711	"	31633
31715	"	31685
31719	"	28946
31727	"	31706 & 31586
31736	"	30959
31752	"	31664
31753	"	23891
31774	"	30233
31776	"	29902
31791	"	21594
31803	"	29027
31804	"	30911
31822	"	31757
31823	"	31816, 31702, & 28872
31847	"	20944
31850	"	31811
31851	"	31606 & 29520
31866	"	21957
31879	"	31820
31894	"	31858
31897	"	31856
31902	"	31852
31910	"	31885
31923	"	31290
31966	"	31920
31995	"	31974
32004	"	27506
32005	"	30931
32009	"	31982
32010	"	31987
32019	"	31980
32030	"	24501
32032	"	31988
32073	"	32016
32074	"	32022
32089	"	32036
32105	"	32046

STRATIGRAPHIC SUCCESSION IN MICHIGAN

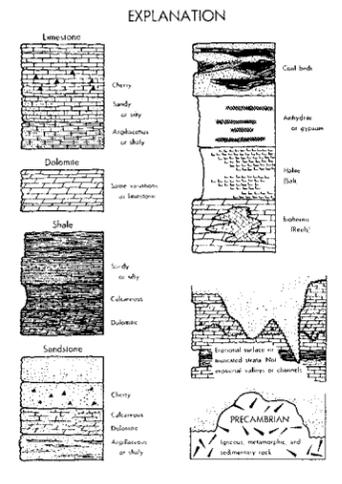
MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
Howard A. Tanner, Director
Geological Survey Division
Arthur E. Slaughter, State Geologist

Geologic Names Committee
Second Edition, Revised 1964
Revised by Howard A. Tanner, Director
Arthur E. Slaughter, State Geologist



Principal of and gas pays, and informal terms used in petroleum exploration and applied to parts of formations or groups in the subsurface.

STRATIGRAPHIC POSITION	INFORMAL TERMS	PAYS
Basal sandstones of Saginaw Fm	_____	_____
In lower part of Michigan	_____	_____
Marshall Ss	_____	_____
Coldwater Sh	_____	_____
In upper part of Ellsworth Sh	_____	_____
Berea Ss	_____	_____
Saginaw Bay Ls	_____	_____
Upper part of Traverse Group in Western Michigan	_____	_____
Rogers City Ls	_____	_____
Dundee Ls	_____	_____
Dundee Ls (?) Upper part of Lucas Fm (?)	_____	_____
In Lucas Fm	_____	_____
Ankerberg Fm	_____	_____
Part of Salina Group & Unit	_____	_____
Divisions of A-2 Carbonate in Western Michigan	_____	_____
A-1 Carbonate	_____	_____
Upper part of Niagara Series	_____	_____
Part of Niagara Series	_____	_____
Trenton Group	_____	_____
Black River Group	_____	_____
Onondaga Dol	_____	_____



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CHART 1
1964