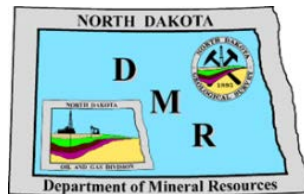


NORTH DAKOTA DEPARTMENT OF MINERAL RESOURCES: OIL & GAS UPDATE

November 8, 2018 | Western Dakota Energy Association



Visit Us: www.dmr.nd.gov

PRODUCING WELLS

ACTIVE DRILLING RIGS

OIL & GAS PRODUCTION

OIL PRICE

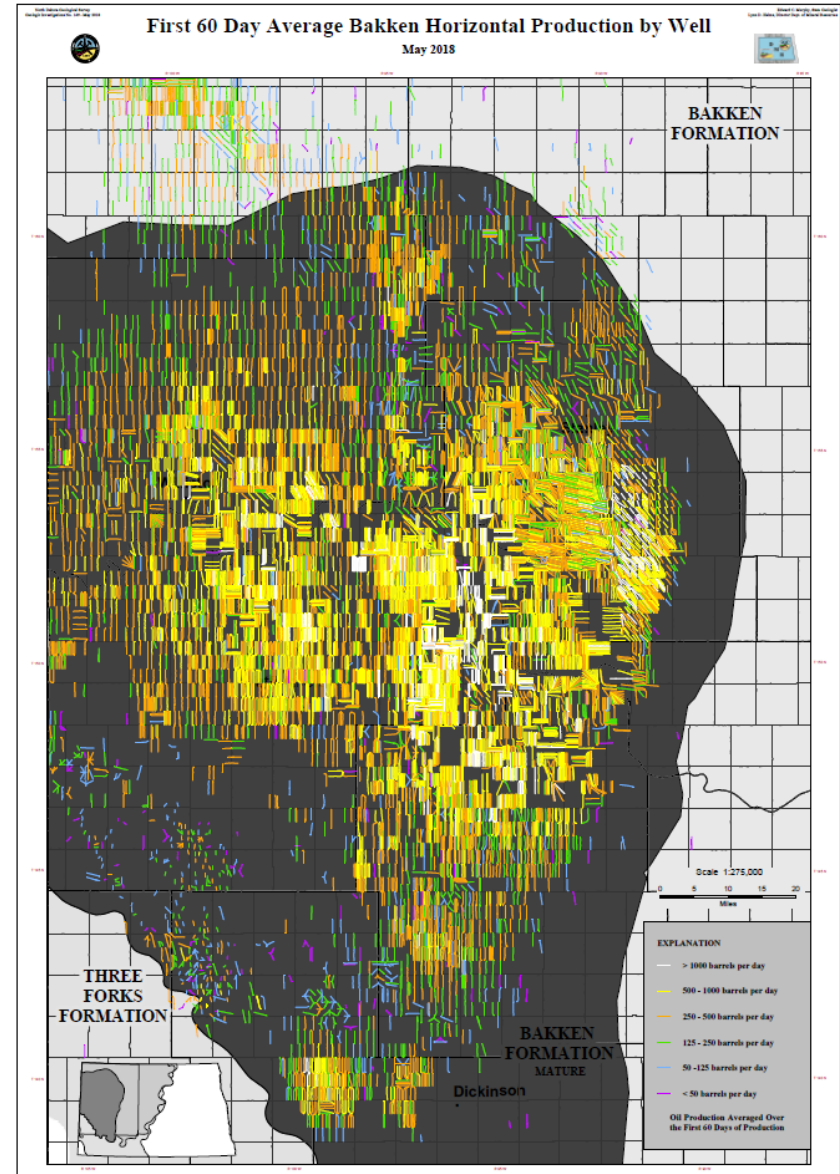
ENHANCED OIL RECOVERY

COUNTIES FORECAST

Wells



Active	15,103
Conventional	1,980
Bakken/Three Forks	13,121
Inactive	1,492 > 1,427
>\$50 for 90 days Jan 2018	
Waiting on Completion	877 > 925
+\$55 for 90 days Feb 2018	
Permitted	1,844 > 1,888
+\$60 for 90 days April 2018	
Increase Density	13,451 > 13,029
Approved 10/19/18	
Total	32,177 > 32,372
Estimated Final	40,000 - 85,000
\$60-80/BO & 60-70 rigs	20 - 70 years



PRODUCING WELLS

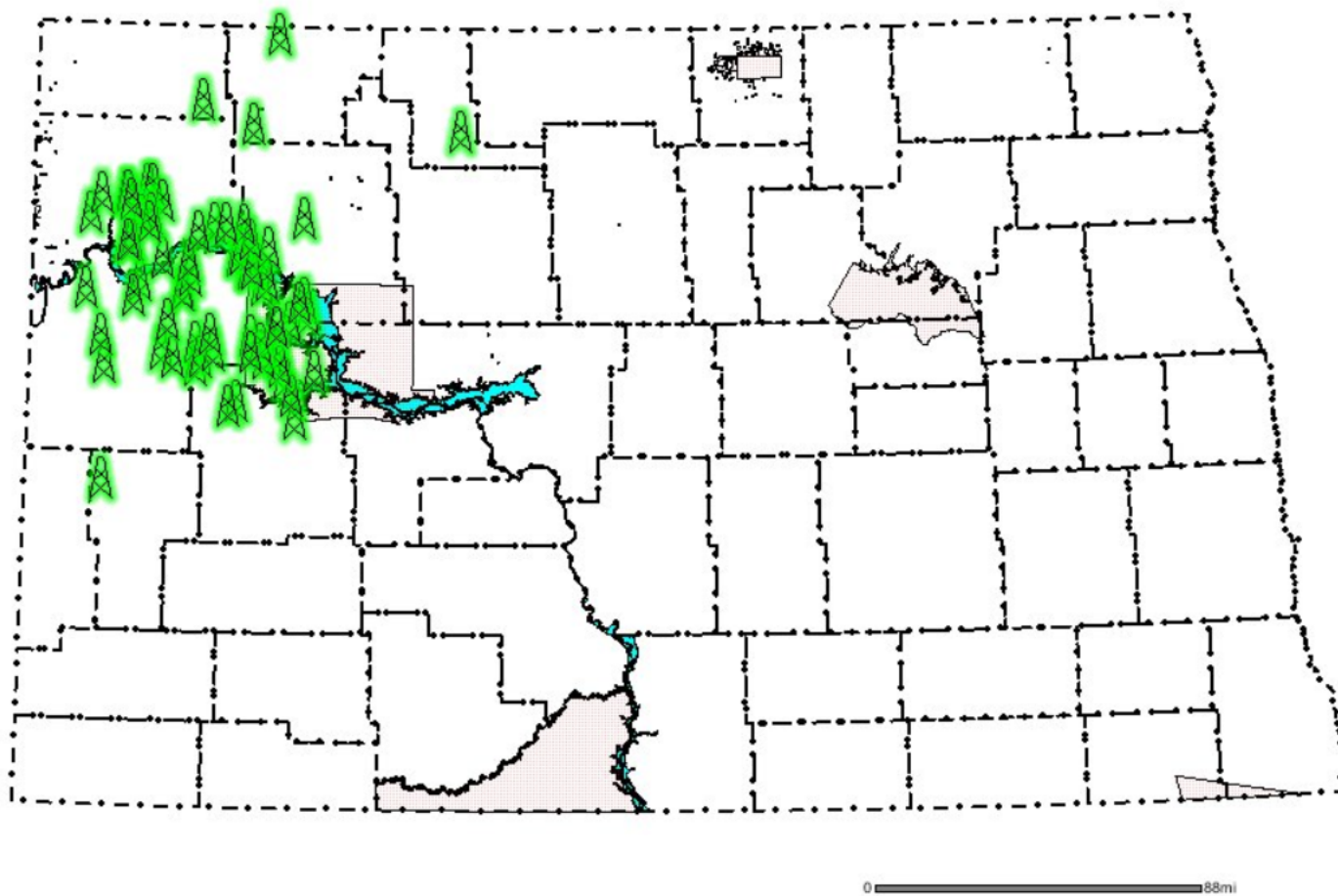
ACTIVE DRILLING RIGS

OIL & GAS PRODUCTION

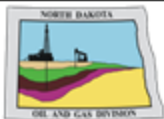
OIL PRICE

ENHANCED OIL RECOVERY

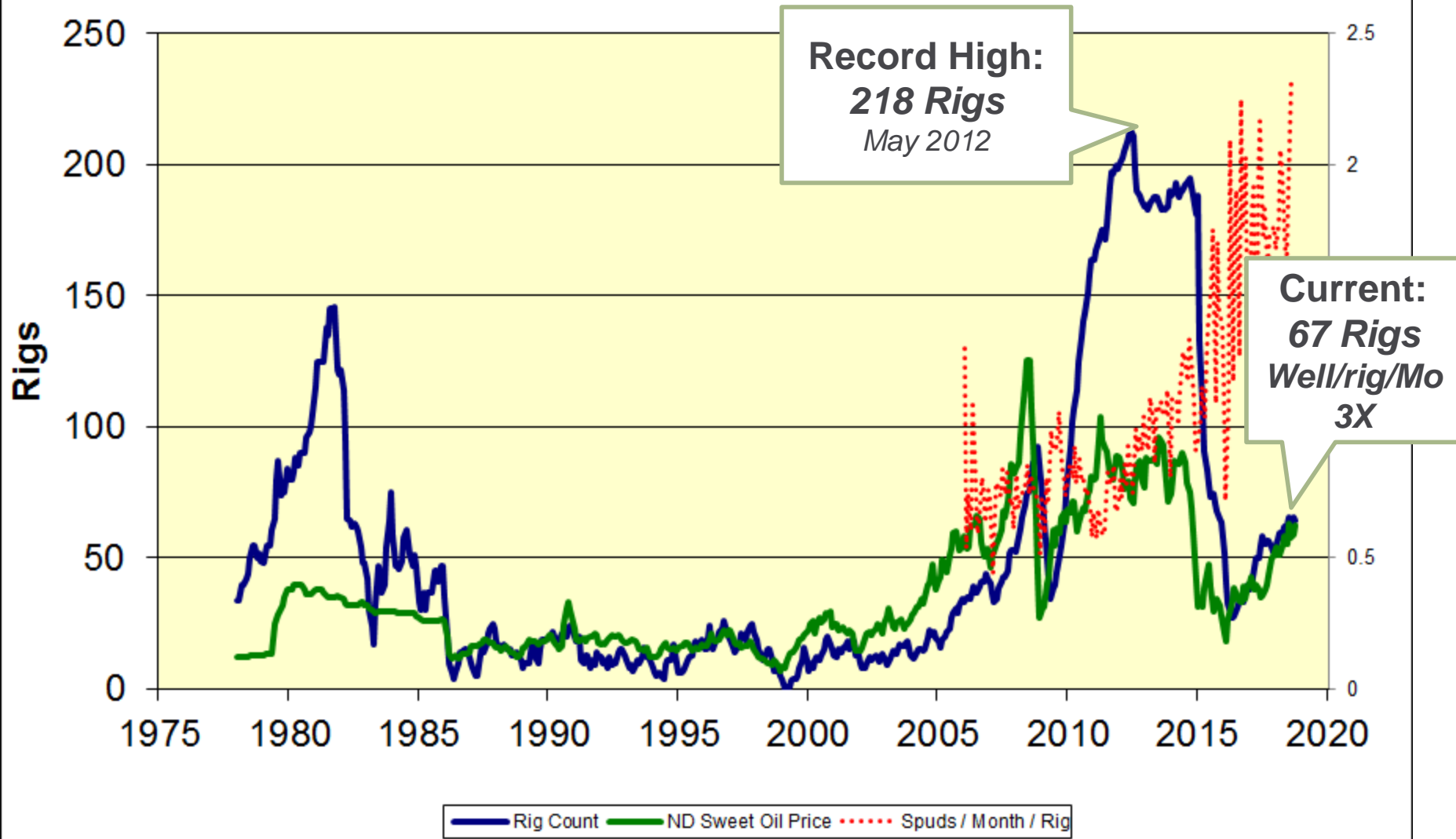
COUNTIES FORECAST



Rigs - 67



North Dakota Average Monthly Rig Count



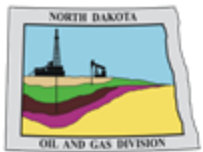
PRODUCING WELLS
ACTIVE DRILLING RIGS

OIL & GAS PRODUCTION

OIL PRICE

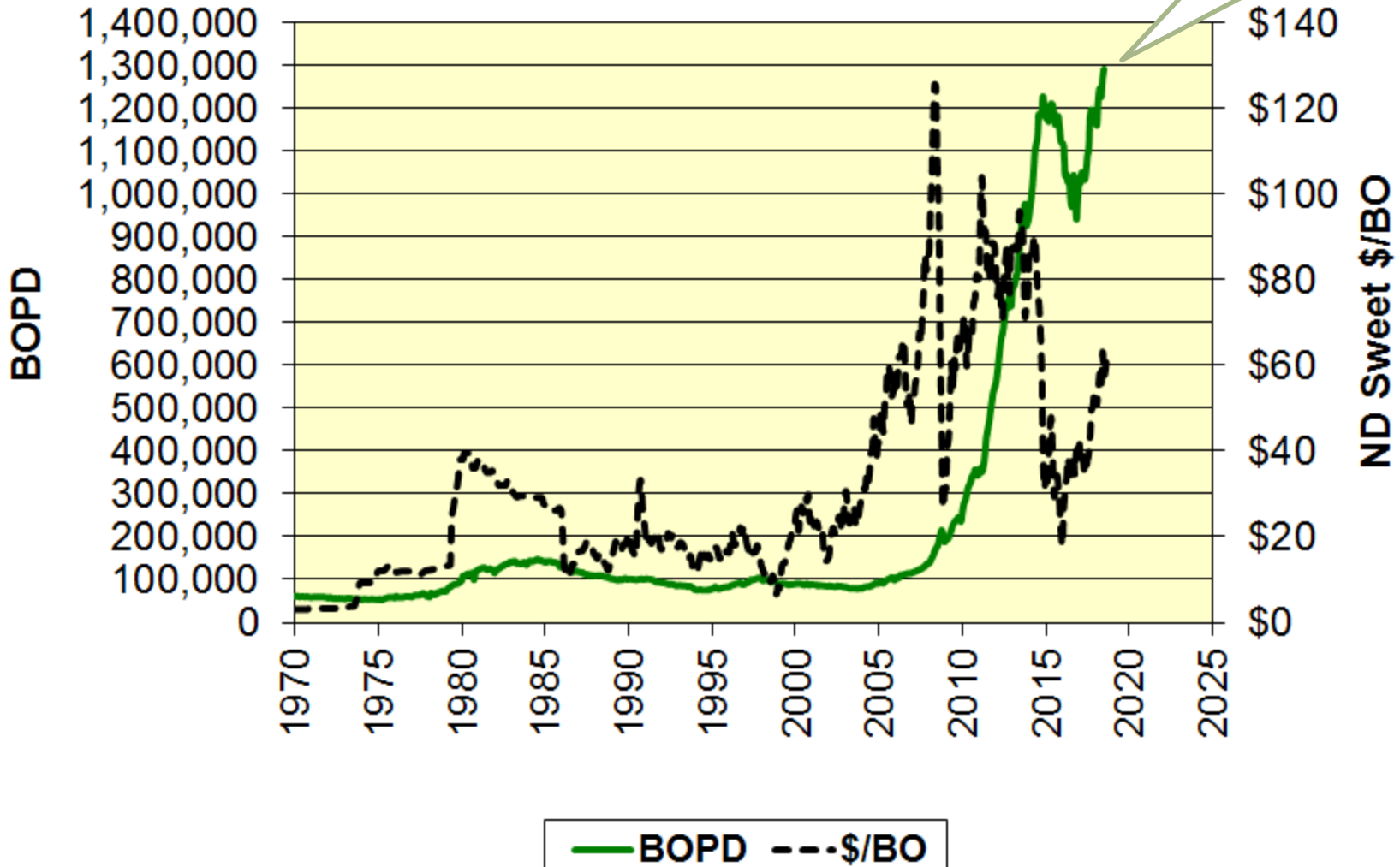
ENHANCED OIL RECOVERY

COUNTIES FORECAST



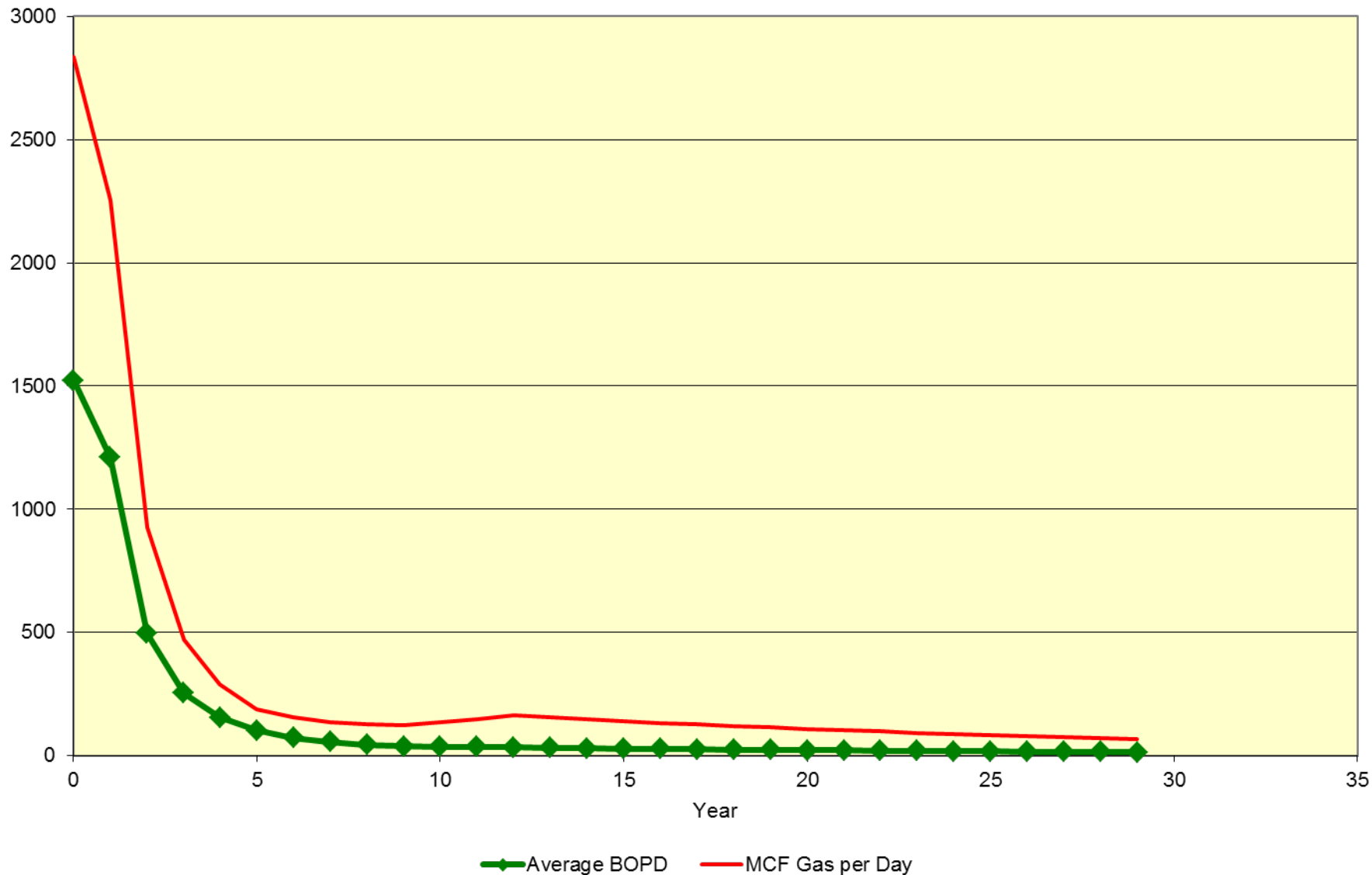
North Dakota Daily Oil Produced and Price

All-time high
1,291,496
barrels/day
August 2018



Oil & Gas Production

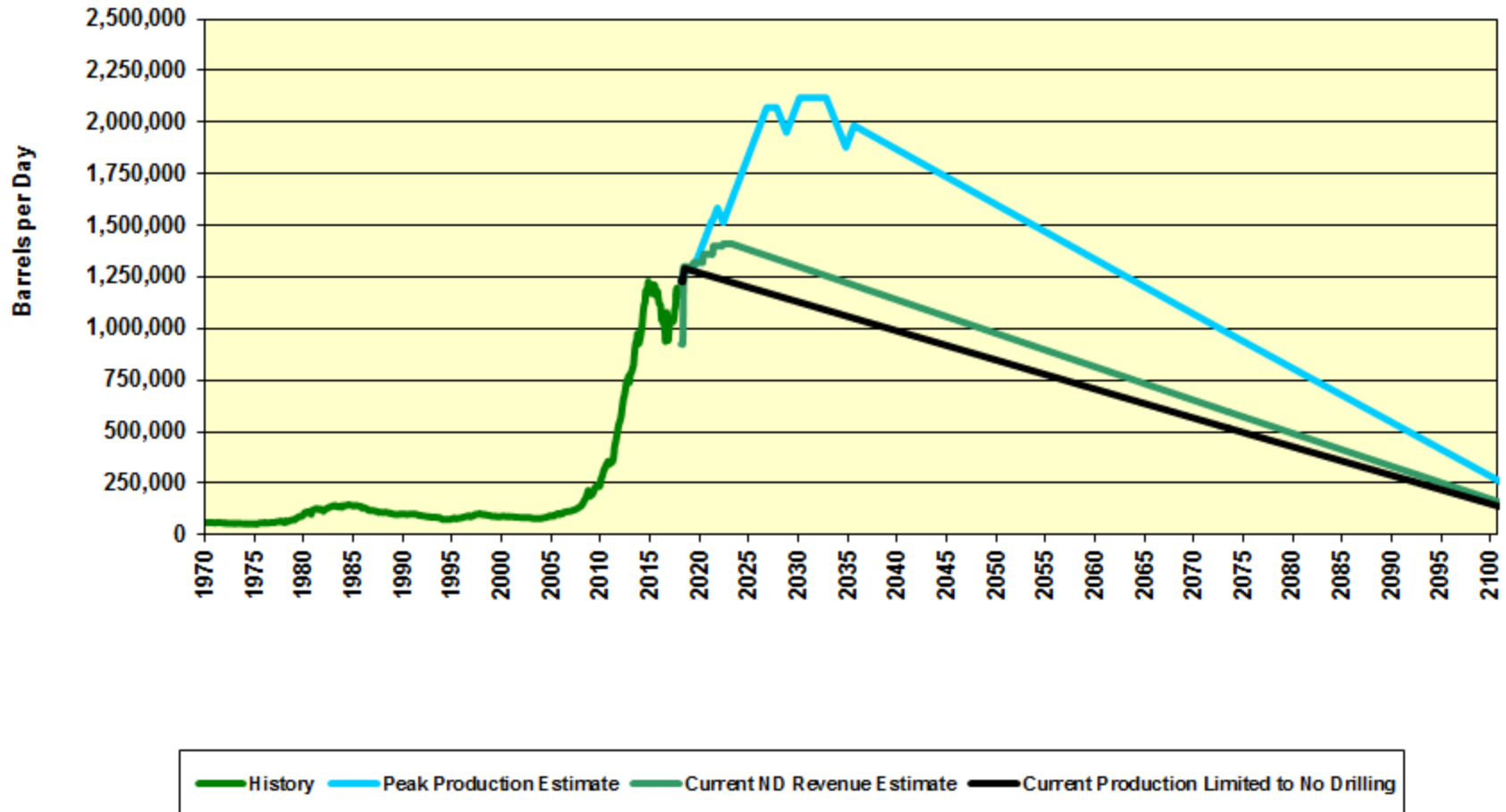
Typical Bakken Well Production



Oil & Gas Production

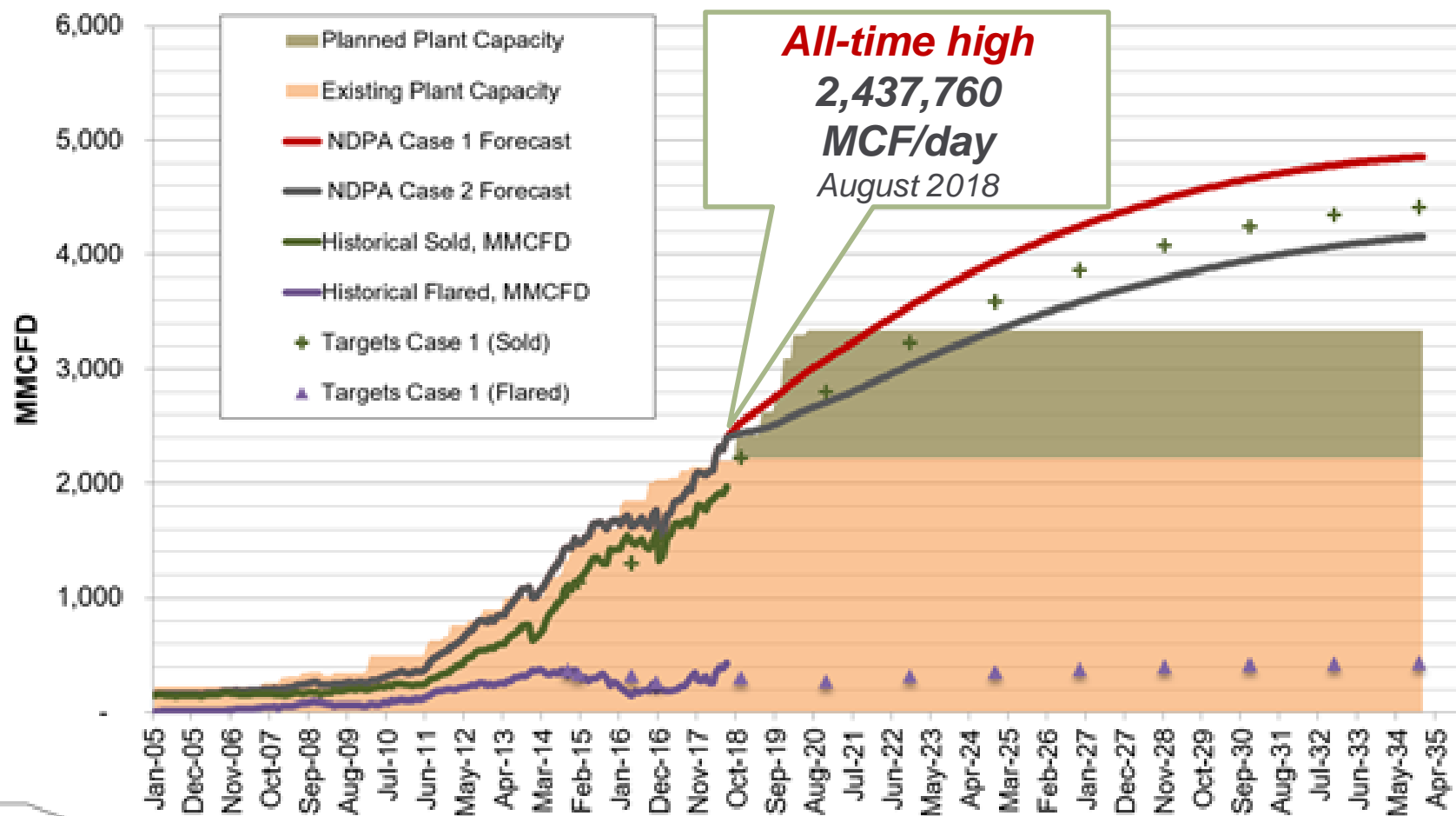


North Dakota Oil Production



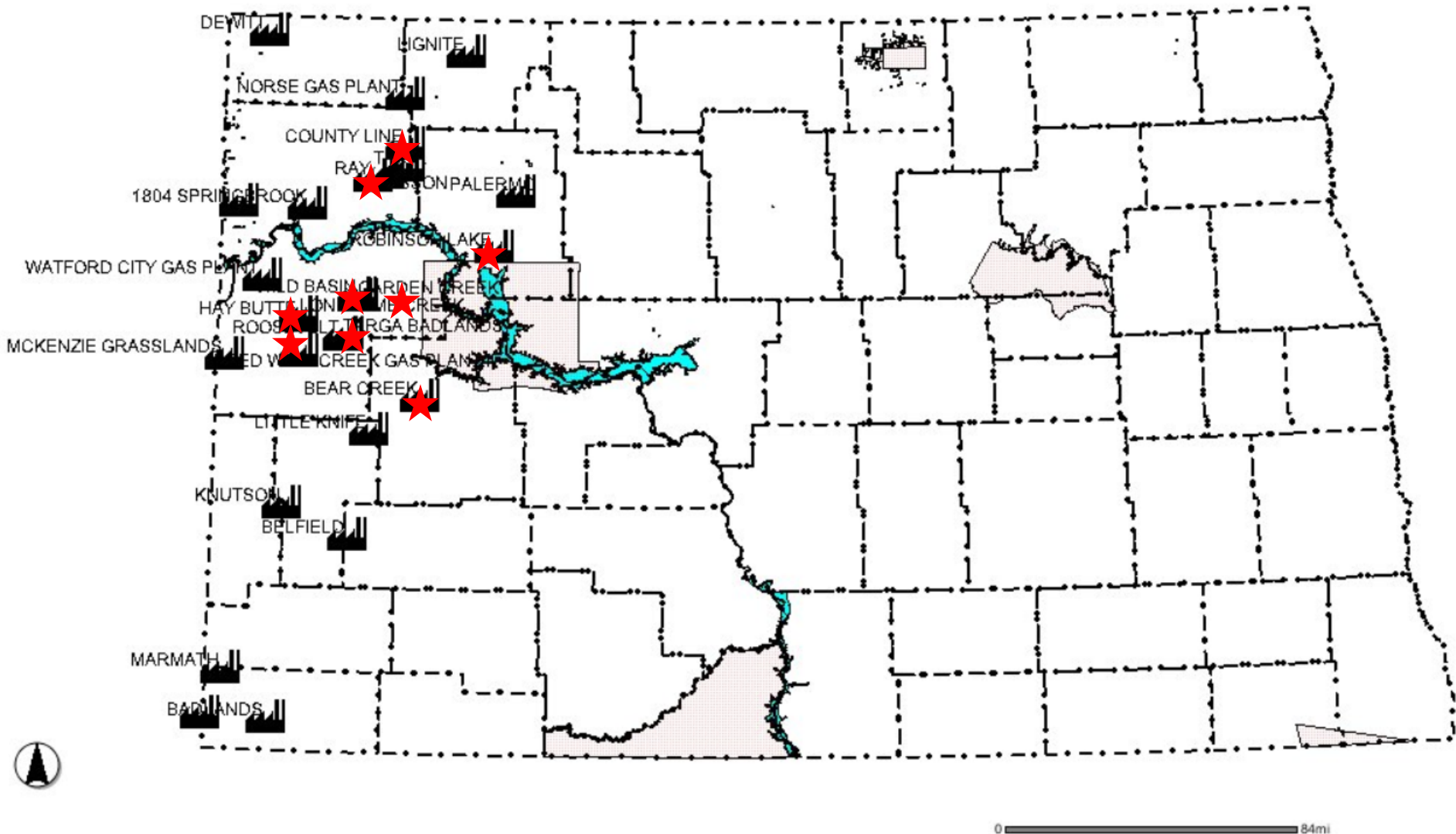
Gas Production Forecast

Solving the Flaring Challenge



Gas Processing Plants

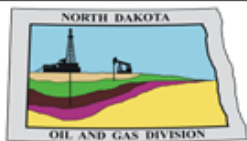
2.14 BCFD in 2017 > 3.36 BCFD in 2020



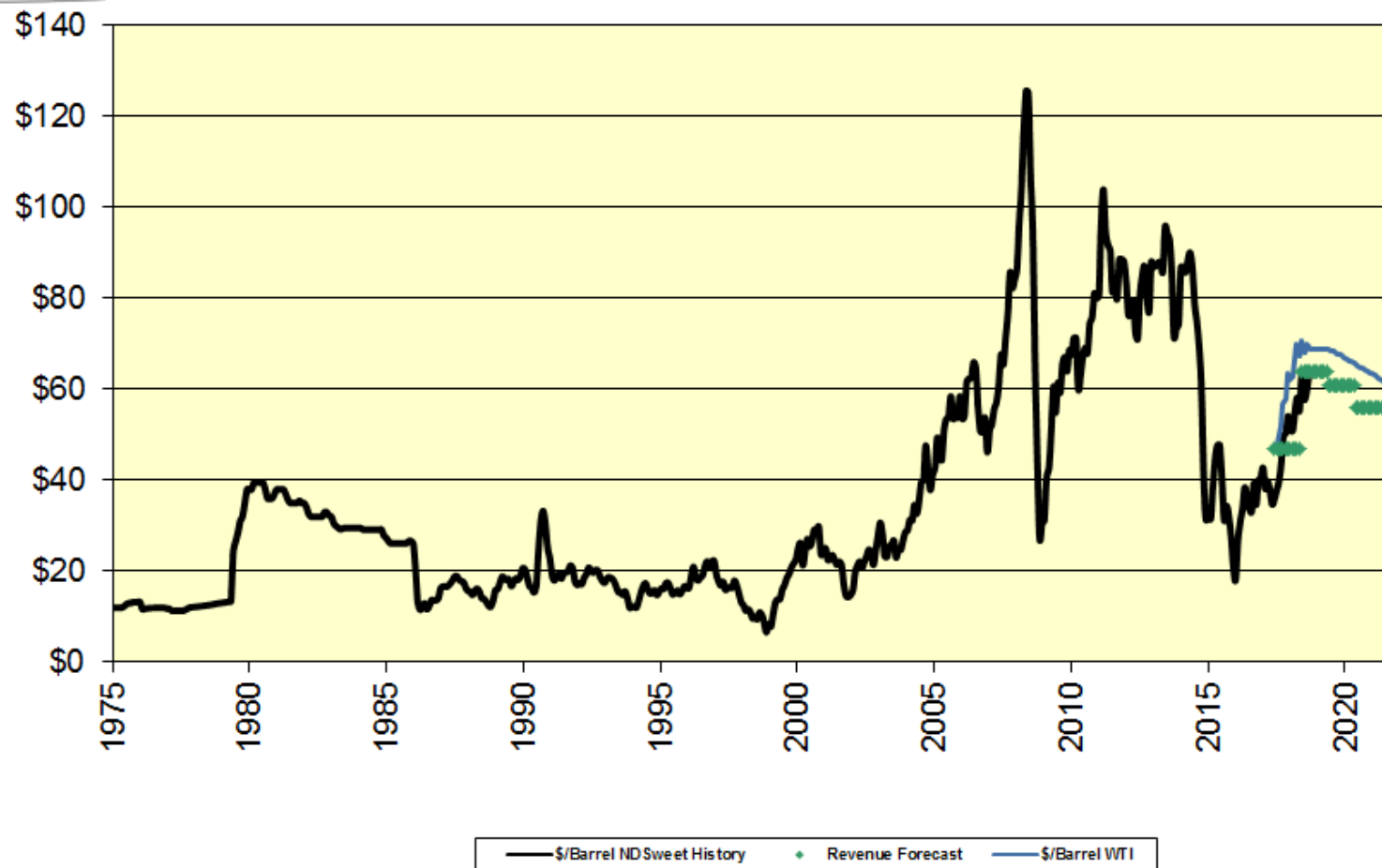
PRODUCING WELLS
ACTIVE DRILLING RIGS
OIL & GAS PRODUCTION

OIL PRICE

ENHANCED OIL RECOVERY
COUNTIES FORECAST



North Dakota Oil Price



PRODUCING WELLS

ACTIVE DRILLING RIGS

OIL & GAS PRODUCTION

OIL PRICE

ENHANCED OIL RECOVERY

COUNTIES FORECAST

Enhanced Oil Recovery (EOR)¹

- EOG is the 1st company to say it has significantly increased oil production from an unconventional play using gas injection.
- Field tests since program started in 2013:
 - The production increases on 15 wells indicated from 30-70% reserve gains.
 - A 32-well test in 2016 added 300,000 bbl of oil at \$6/bbl finding cost.
 - Work is ongoing on 100 wells in six areas in 2017.

Enhanced Oil Recovery (EOR)¹

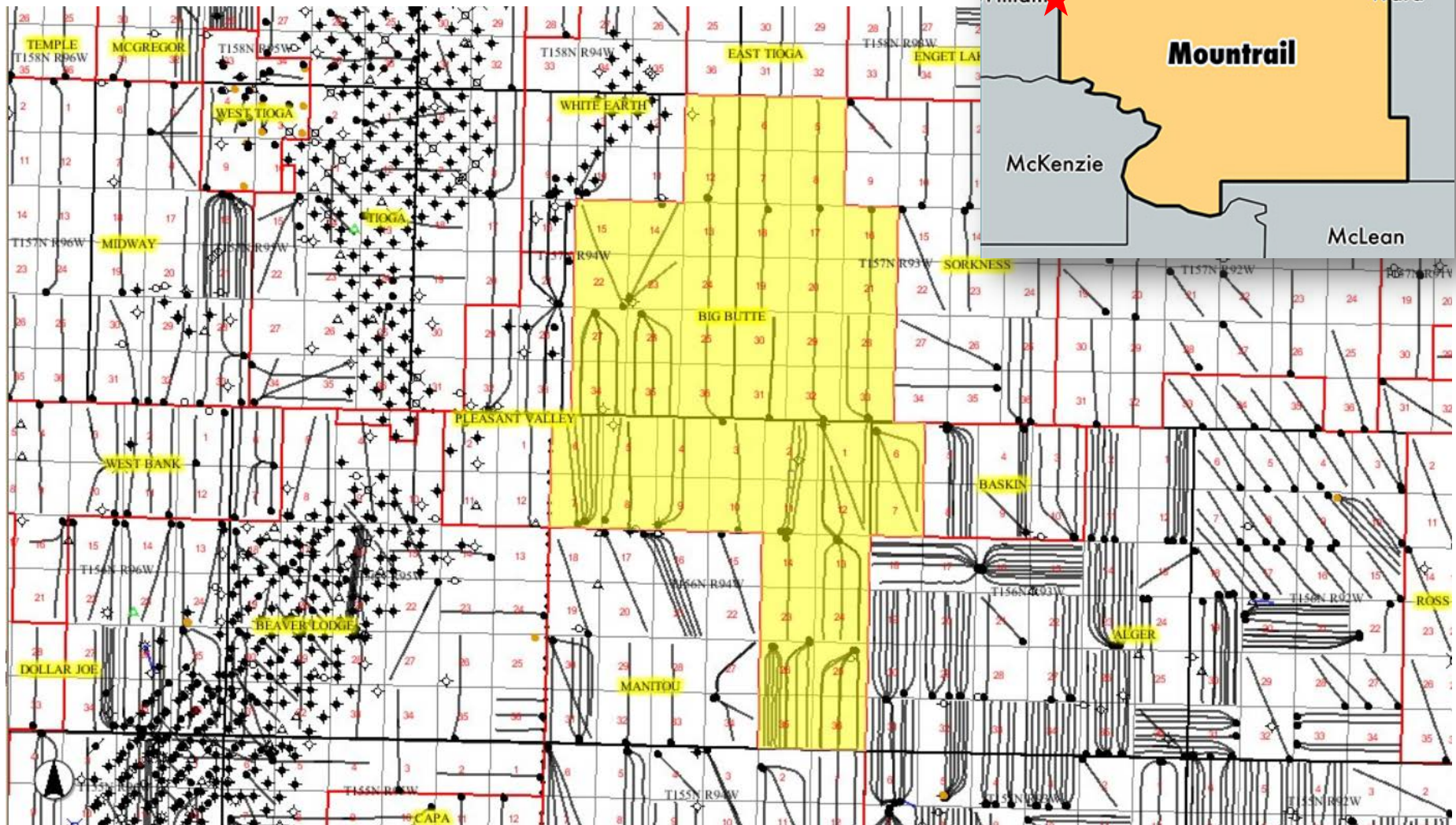
Inputs and Outputs

- Additional capital costs average about \$1 million per well
- The process uses associated gas from its wells
- Production response is in 2-3 months
- \$1 invested adds \$2 to net present value

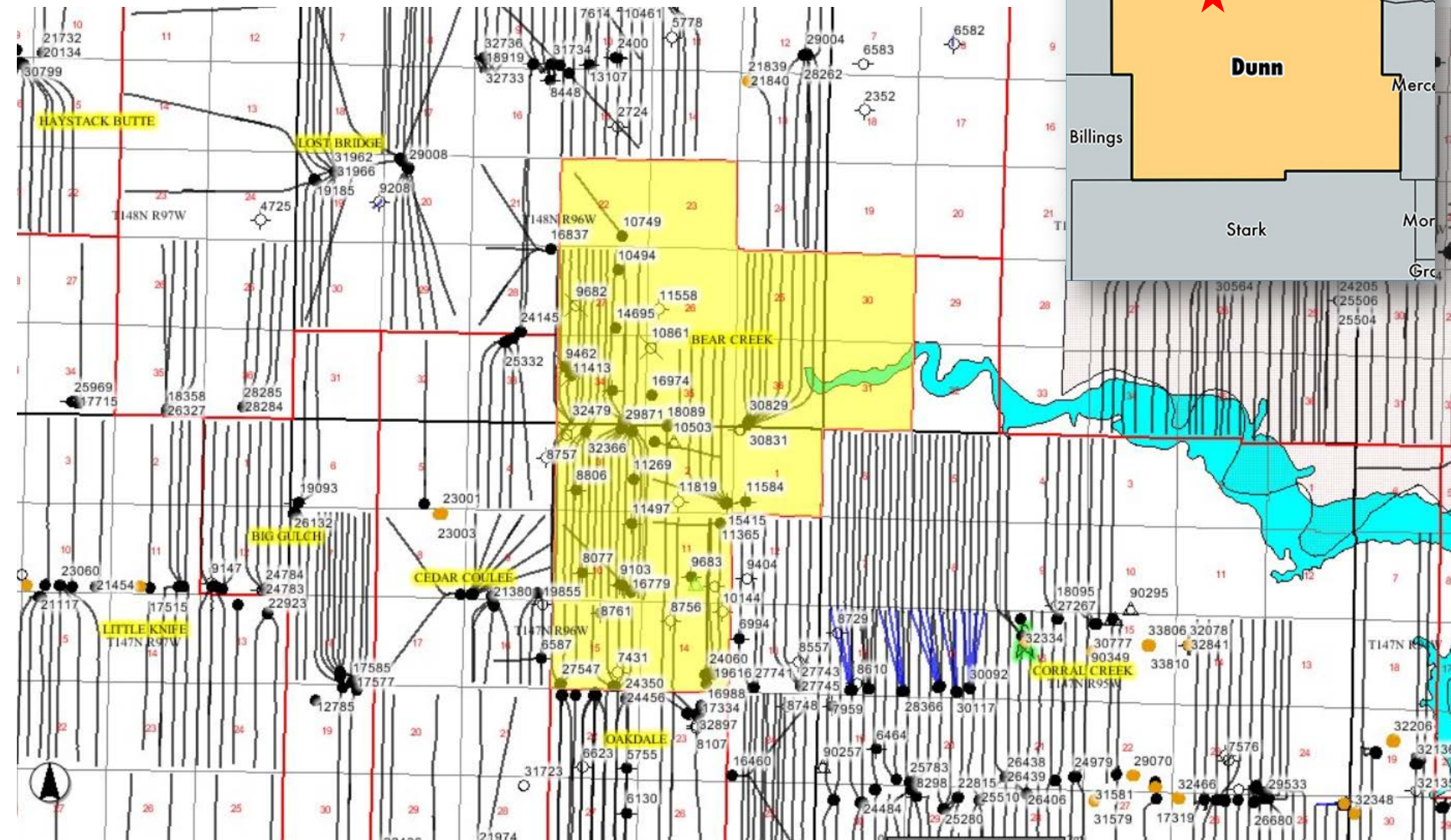
It Works if:

- The formation is able to contain high-pressure gas injection near the well.
- Wellbores contact the most productive rock.
- The completion maximizes the fractured area within a restricted zone around the wellbore.

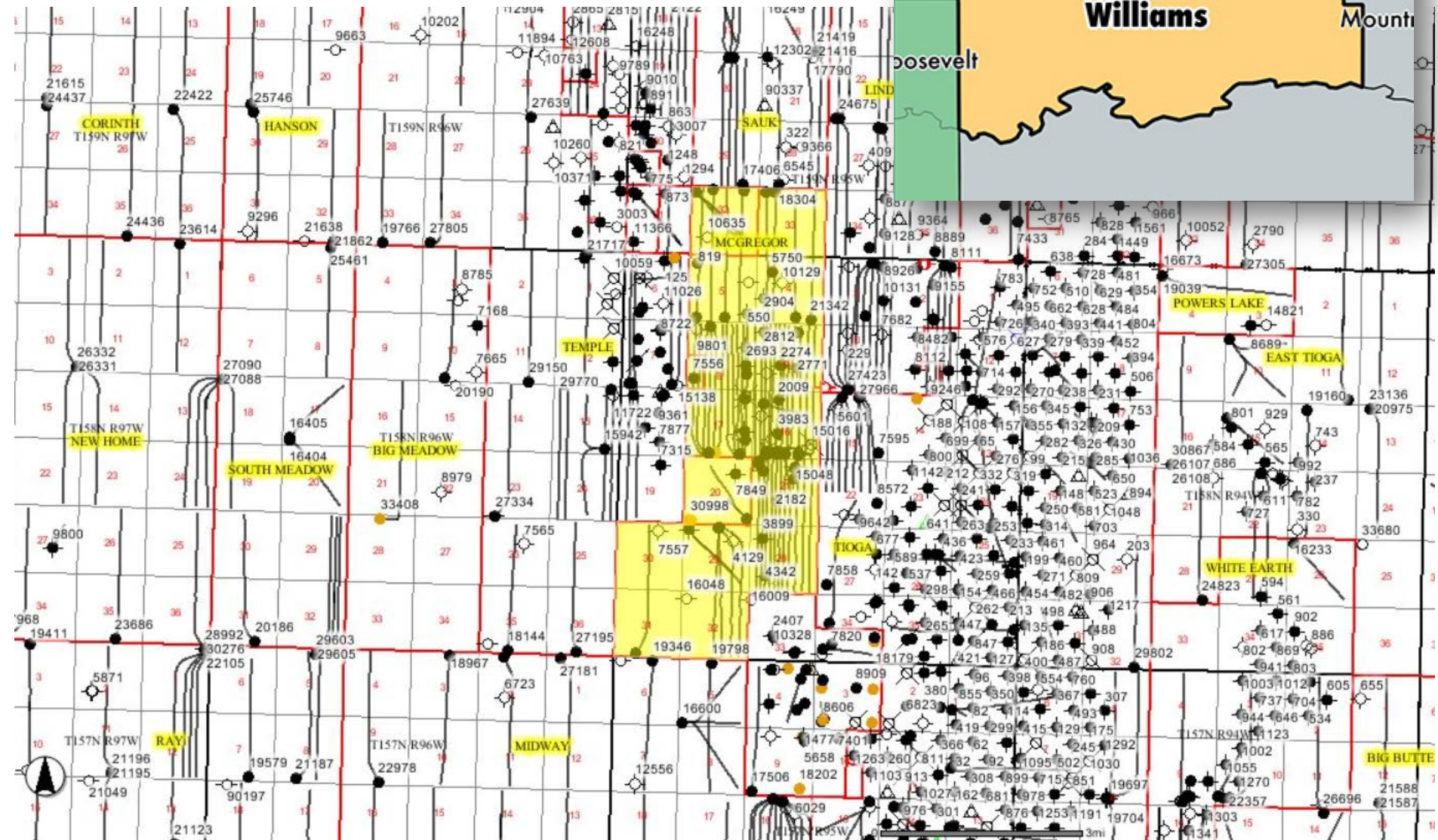
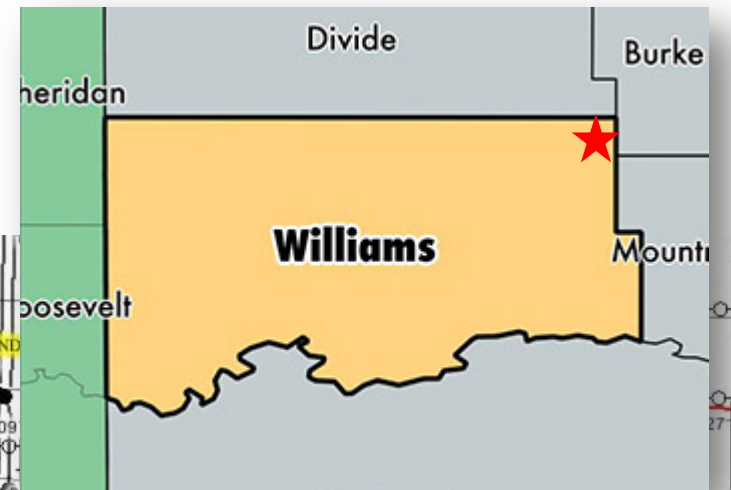
Big Butte



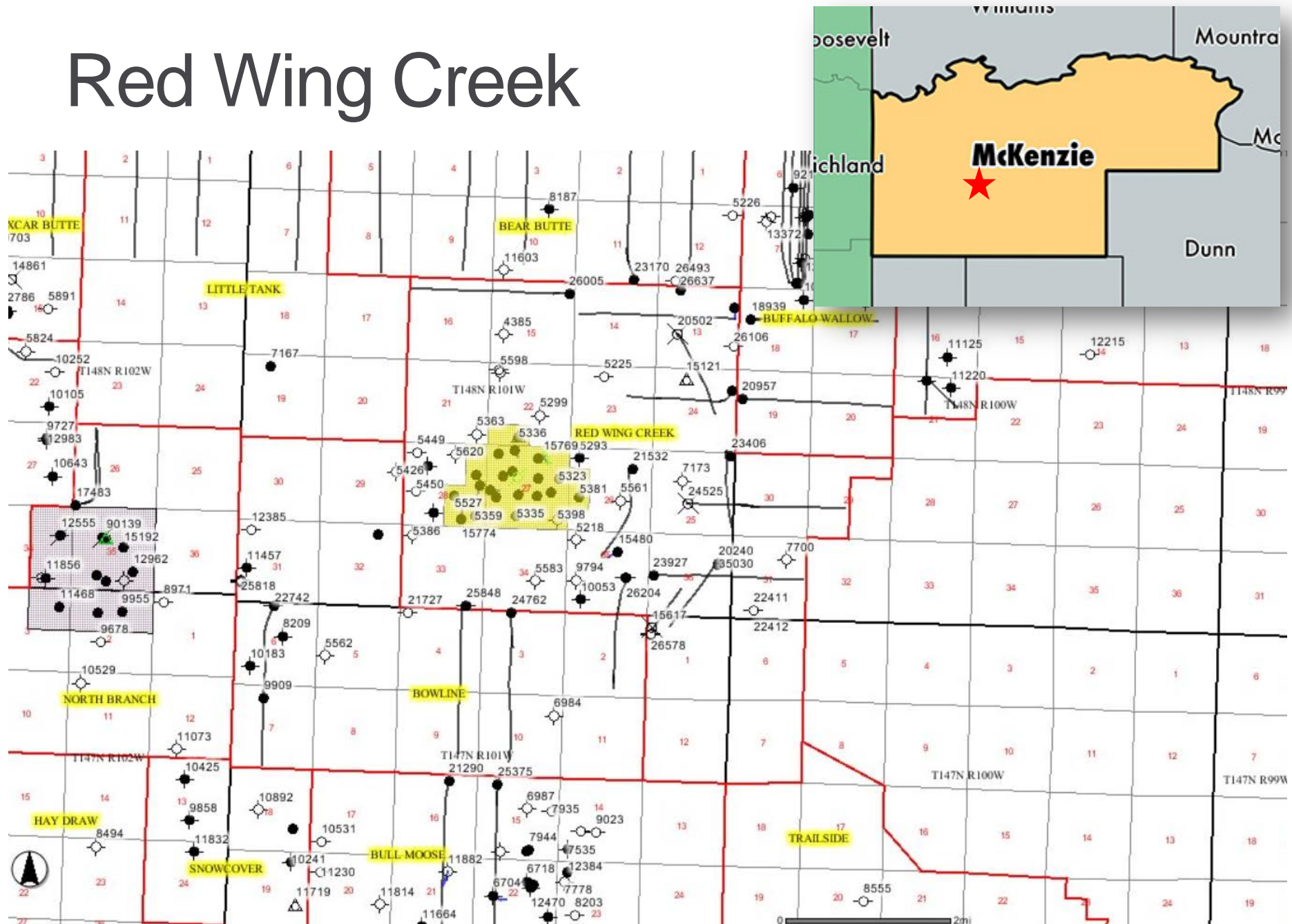
Bear Creek



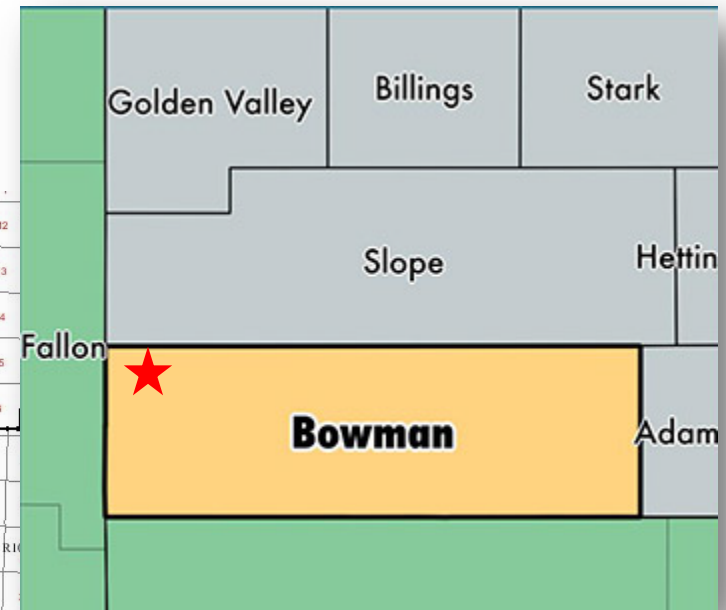
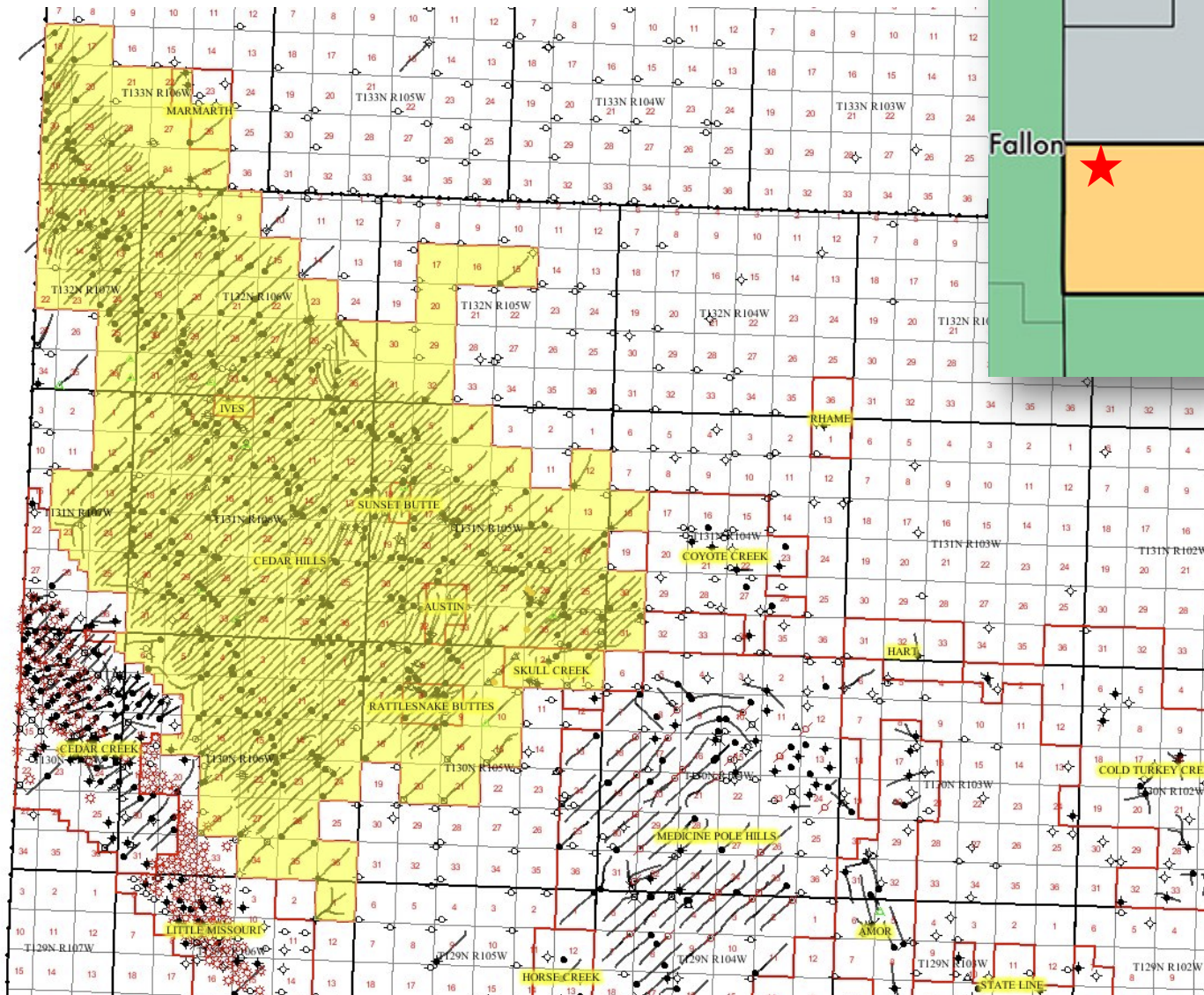
McGregor



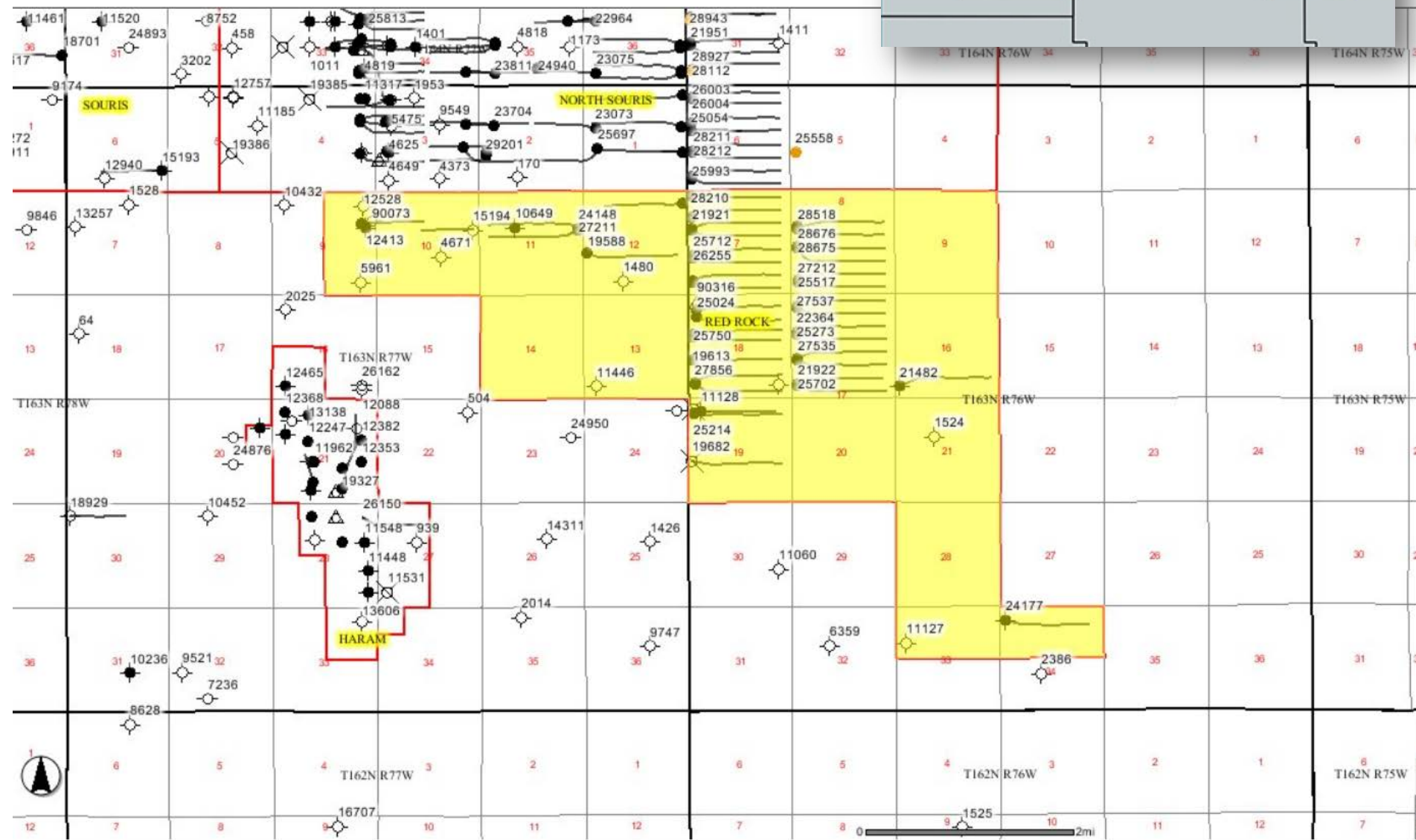
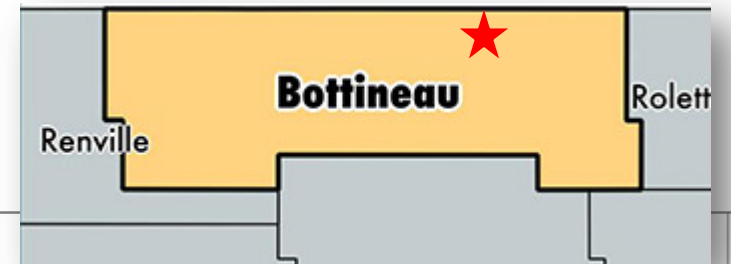
Red Wing Creek



Cedar Hills

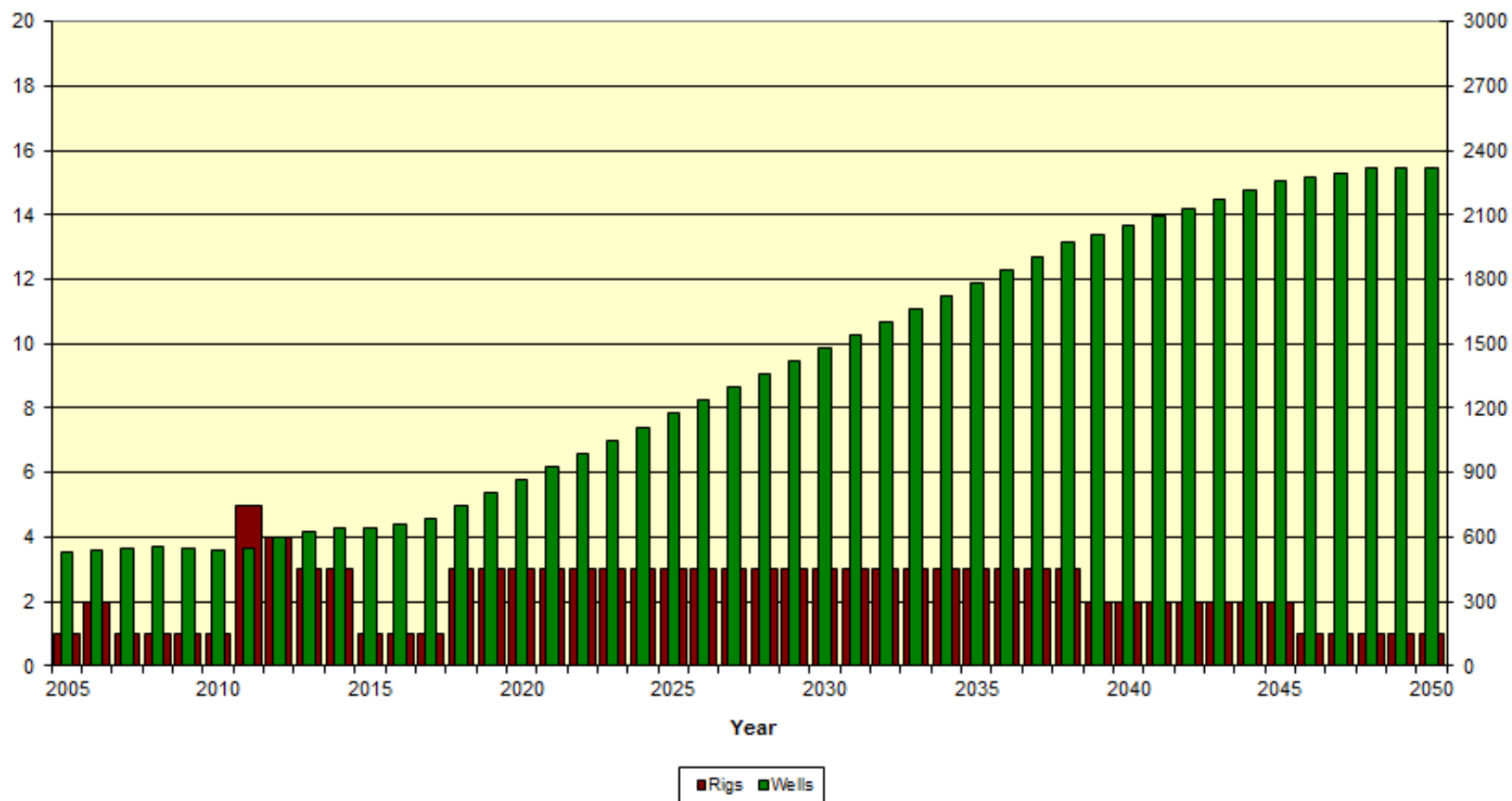


Red Rock

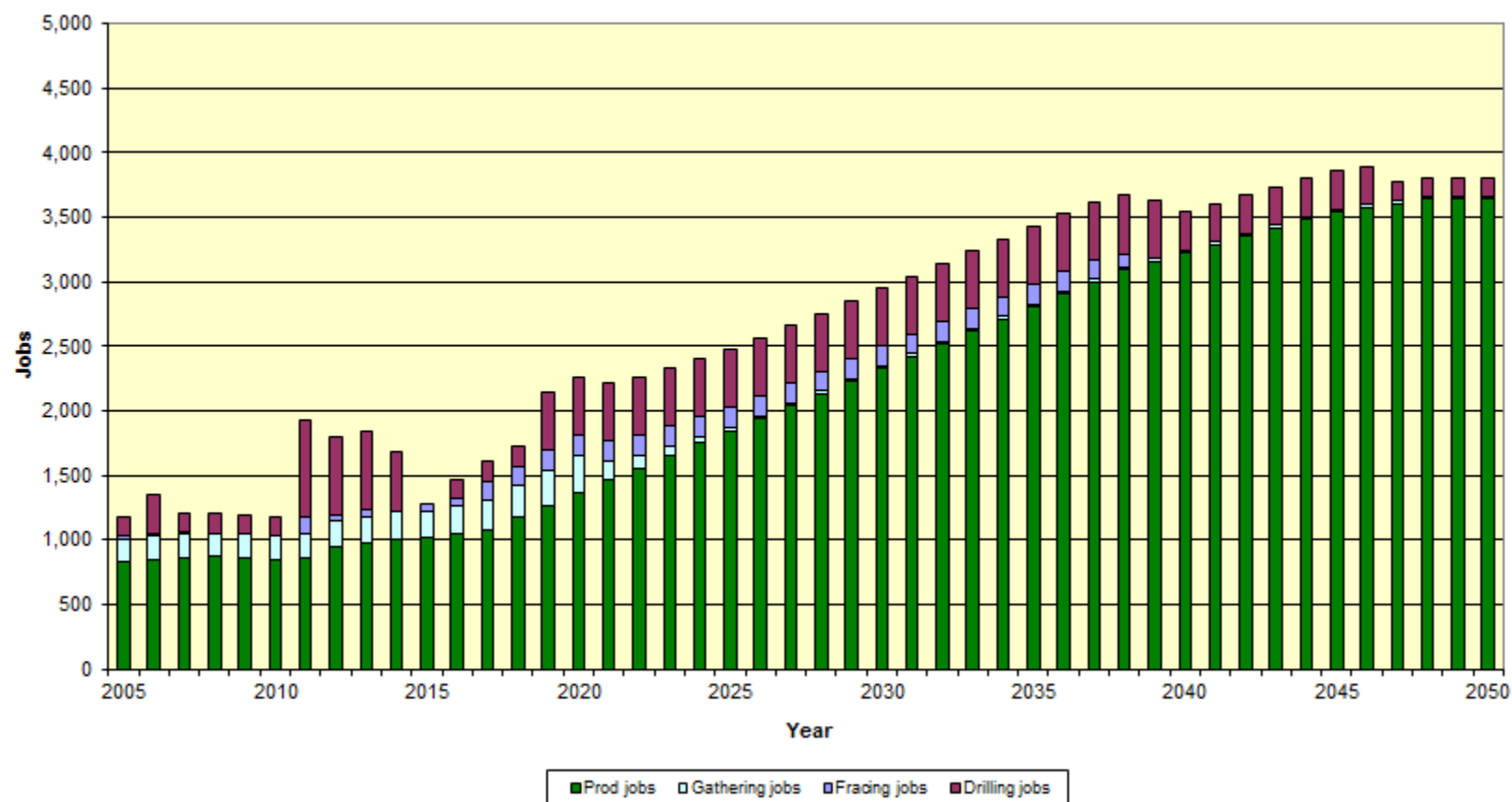


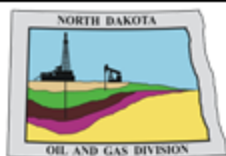
PRODUCING WELLS
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Billings Rigs and Wells

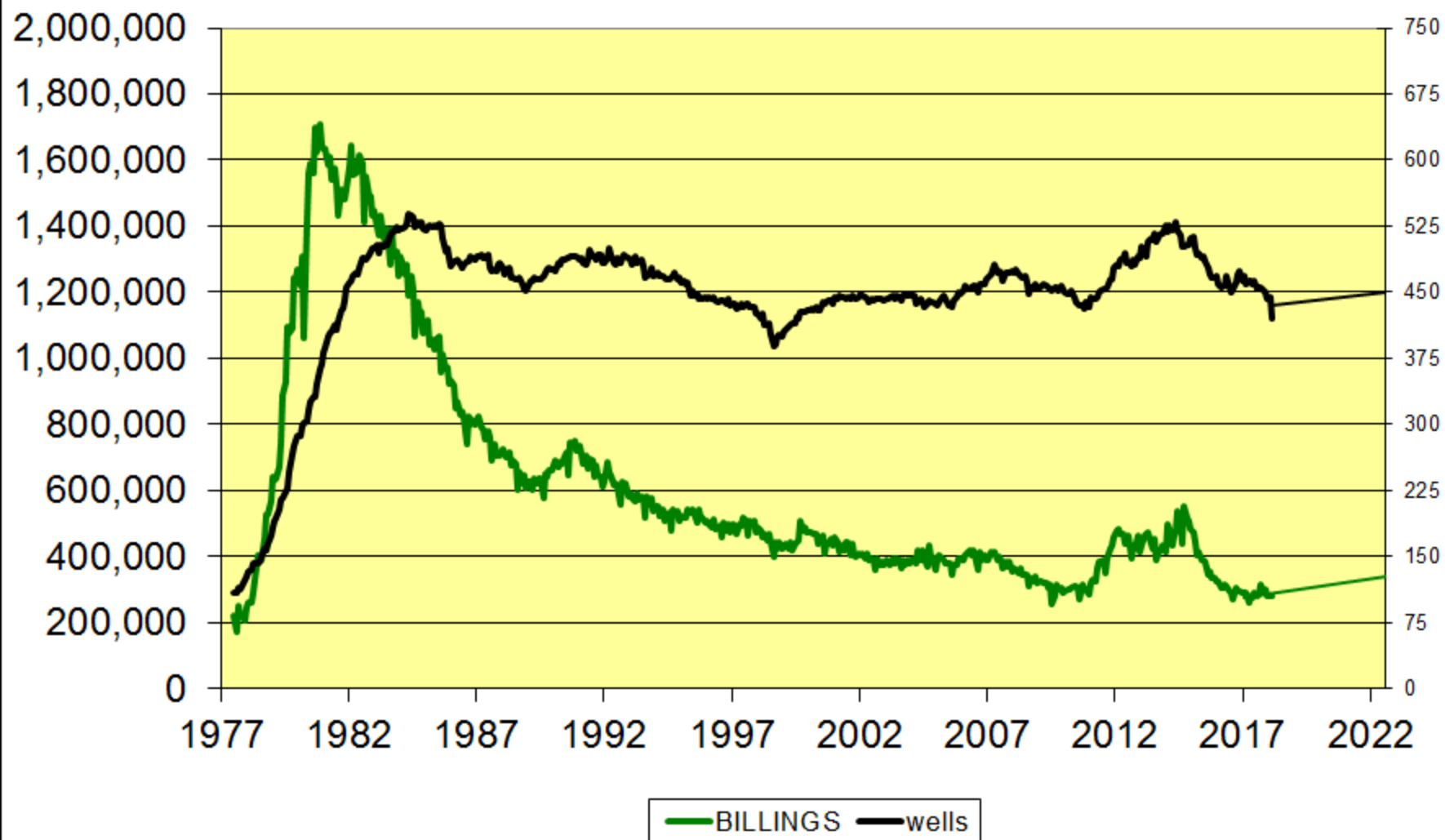


Billings Oil Industry Jobs

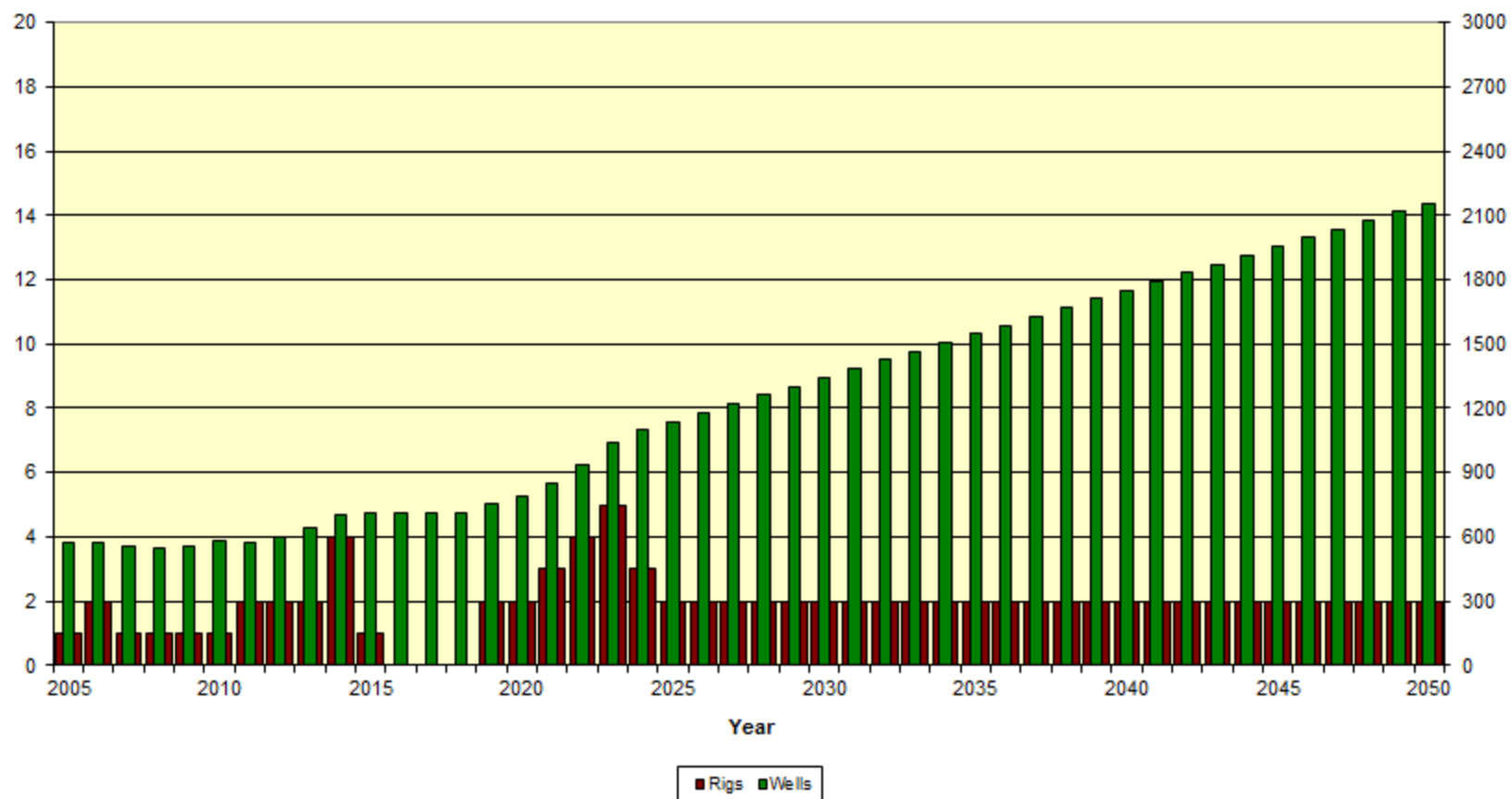




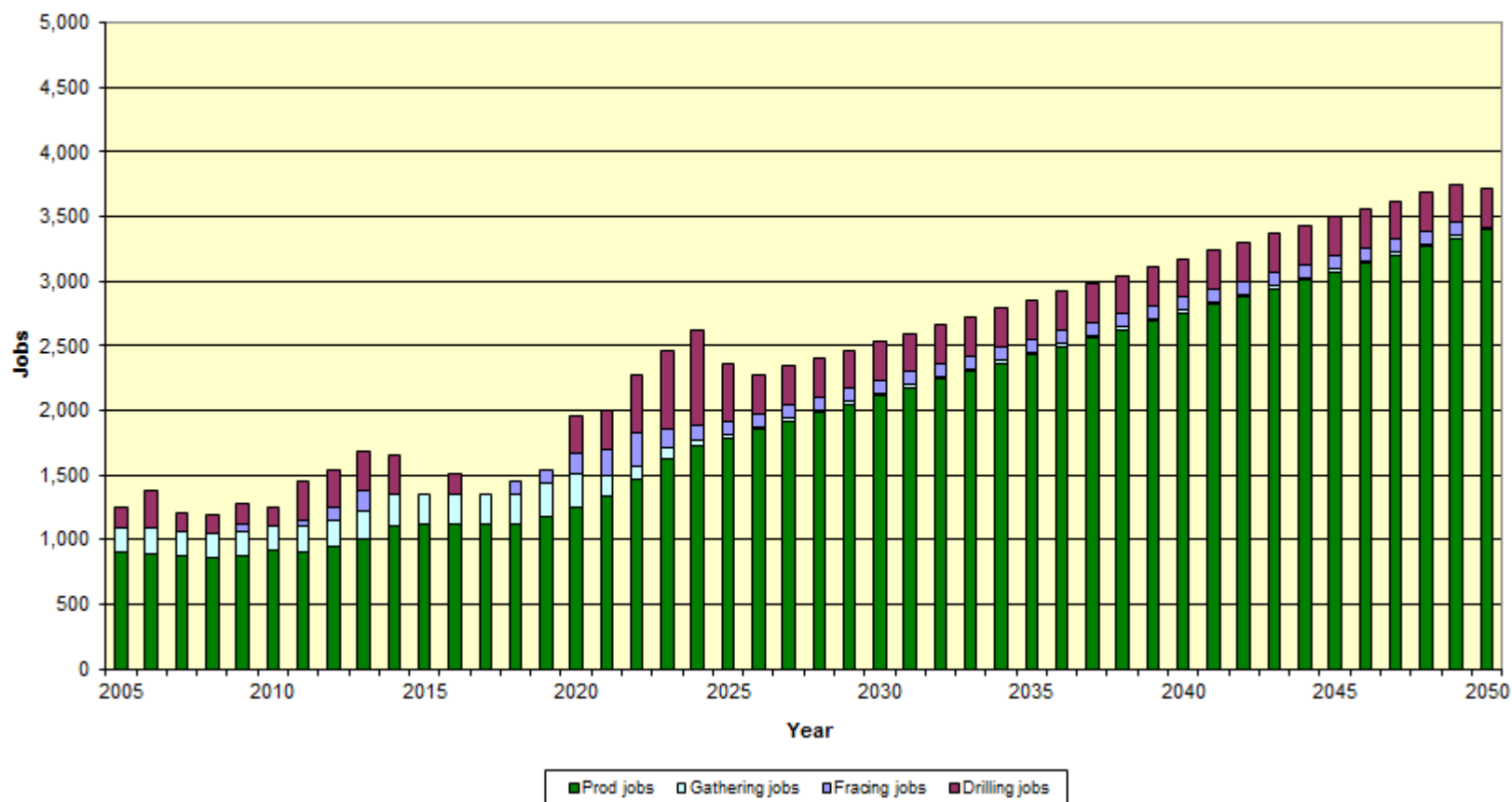
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

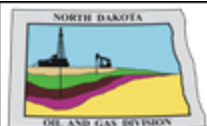


Bottineau Rigs and Wells

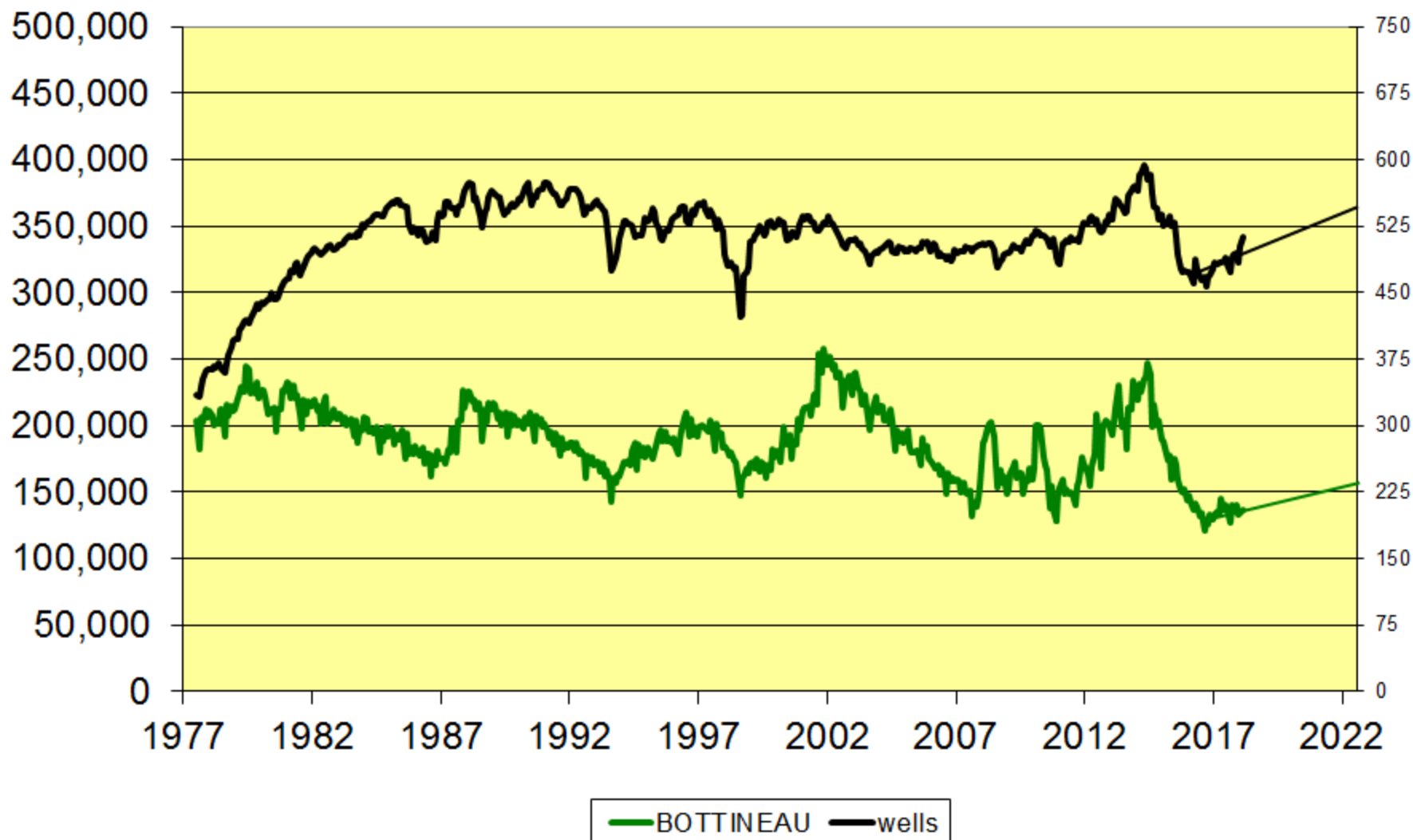


Bottineau Oil Industry Jobs

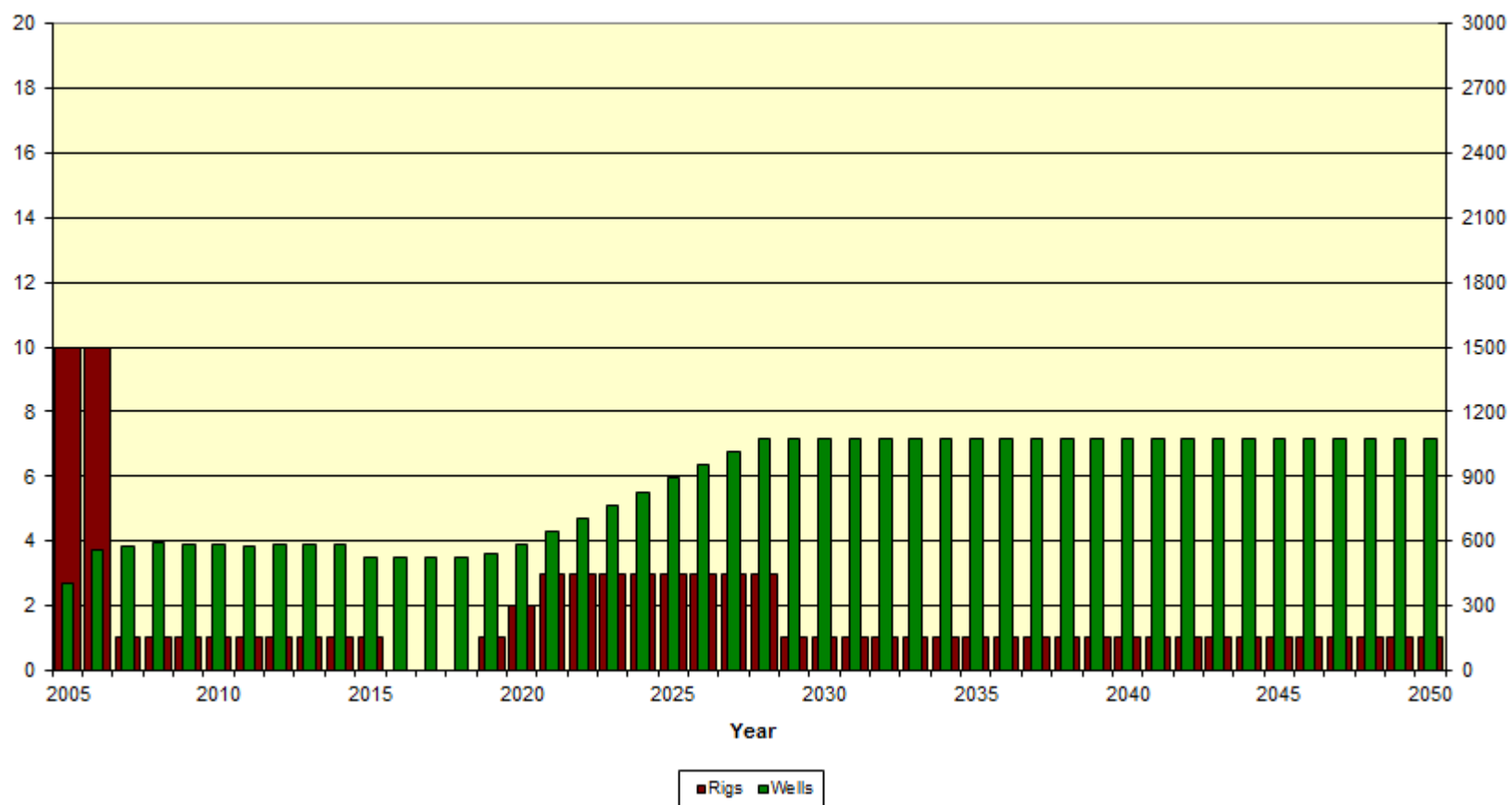




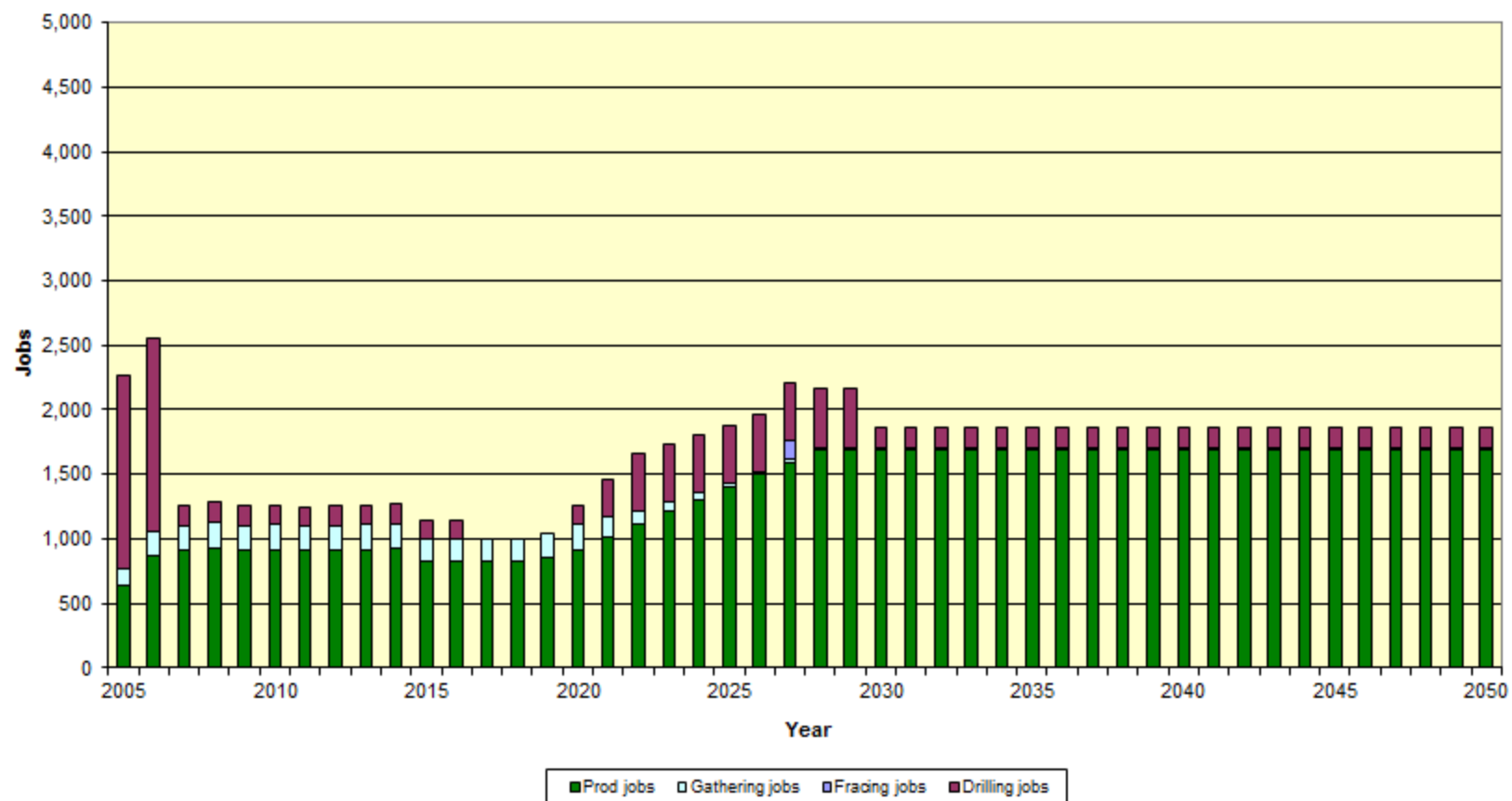
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

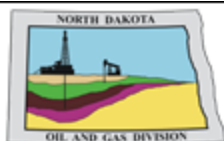


Bowman Rigs and Wells

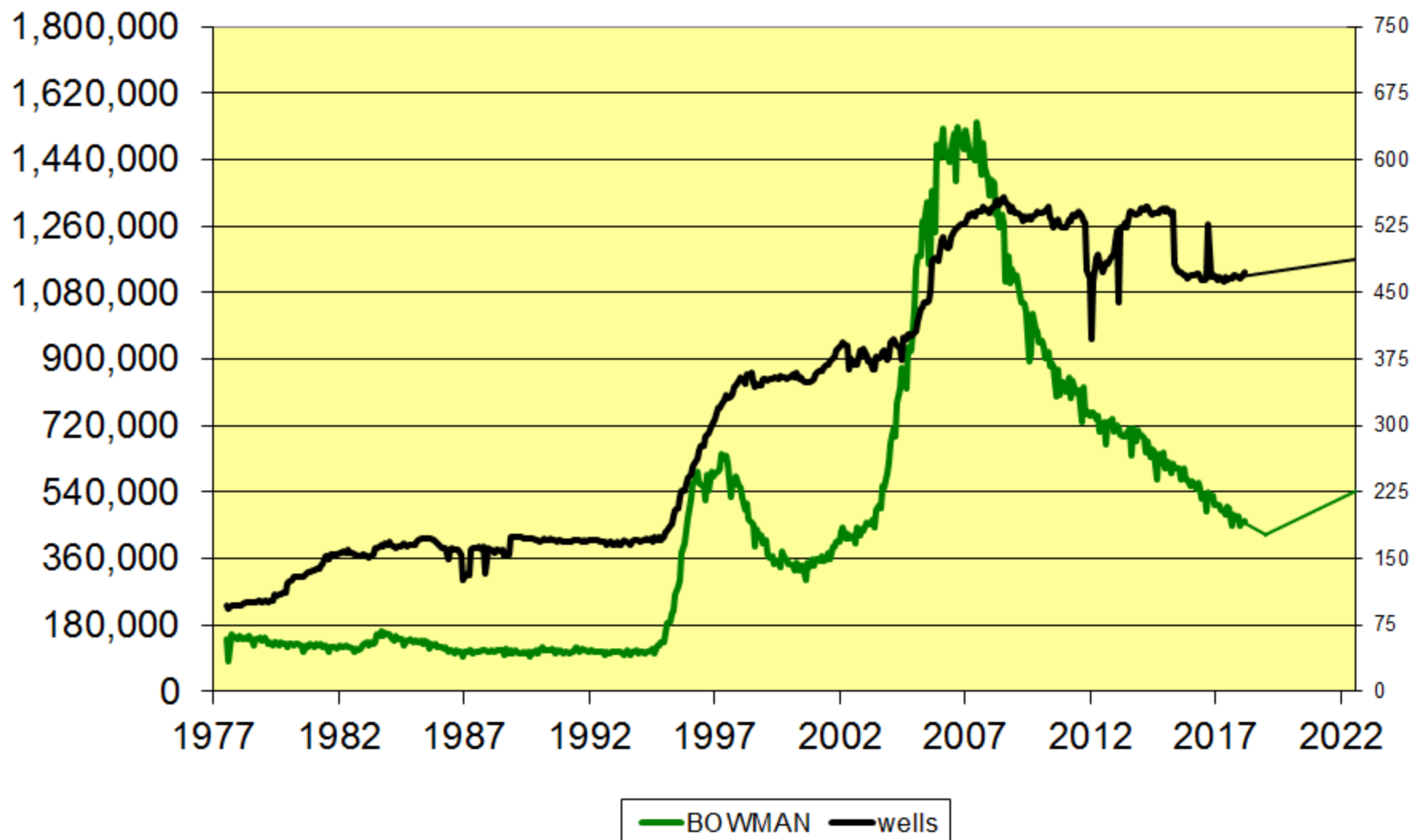


Bowman Oil Industry Jobs

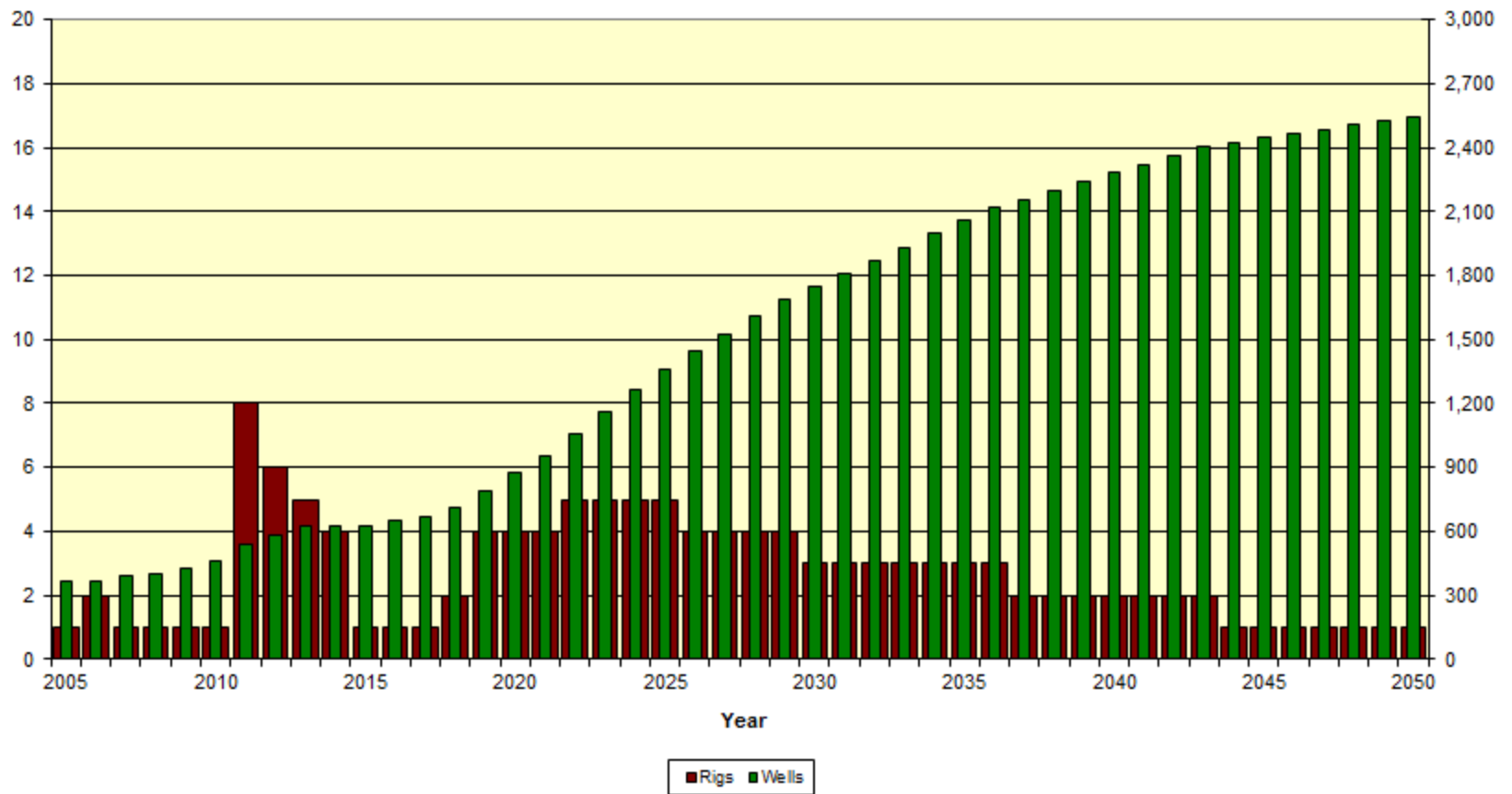




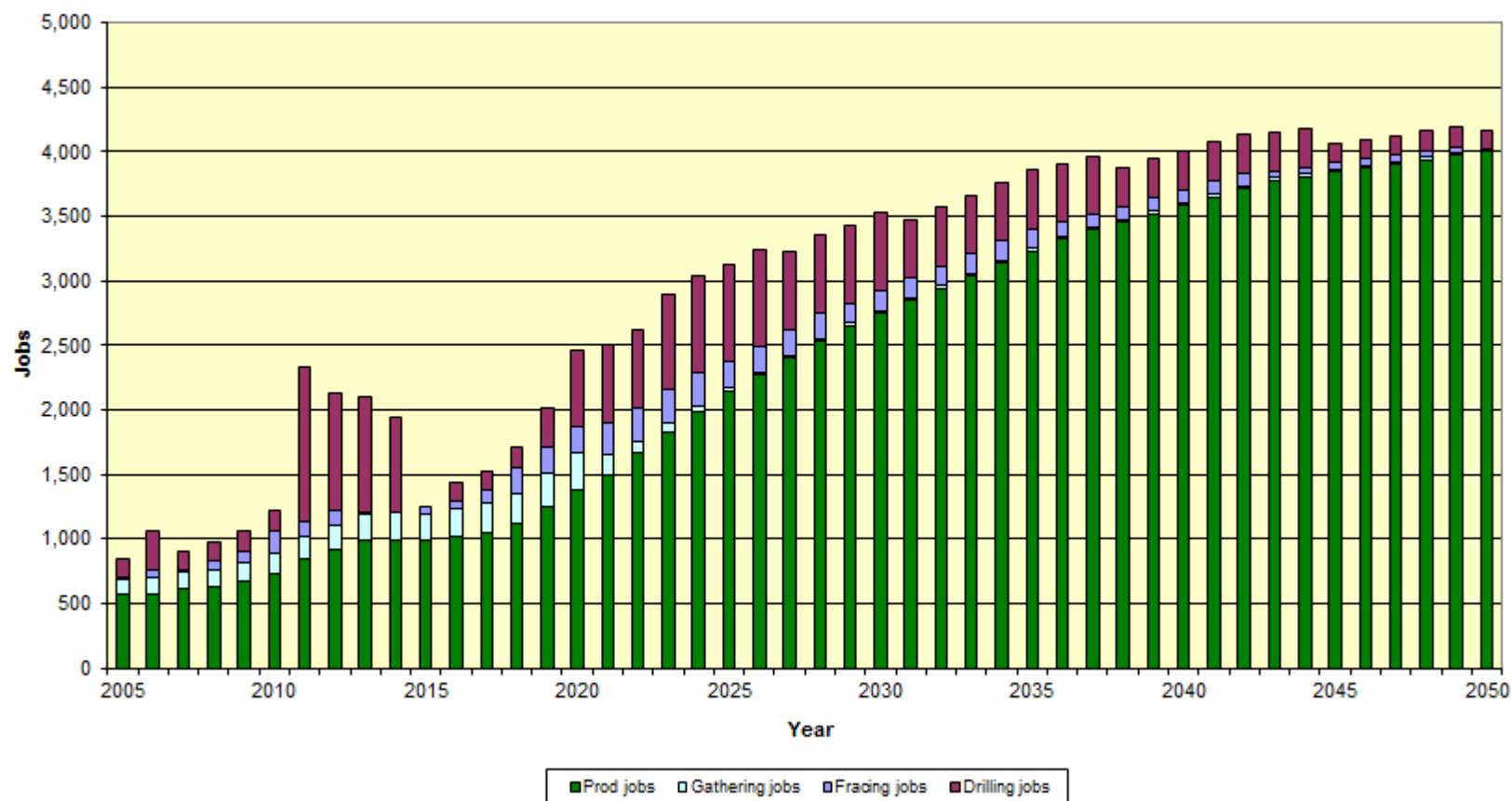
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



Burke Rigs and Wells

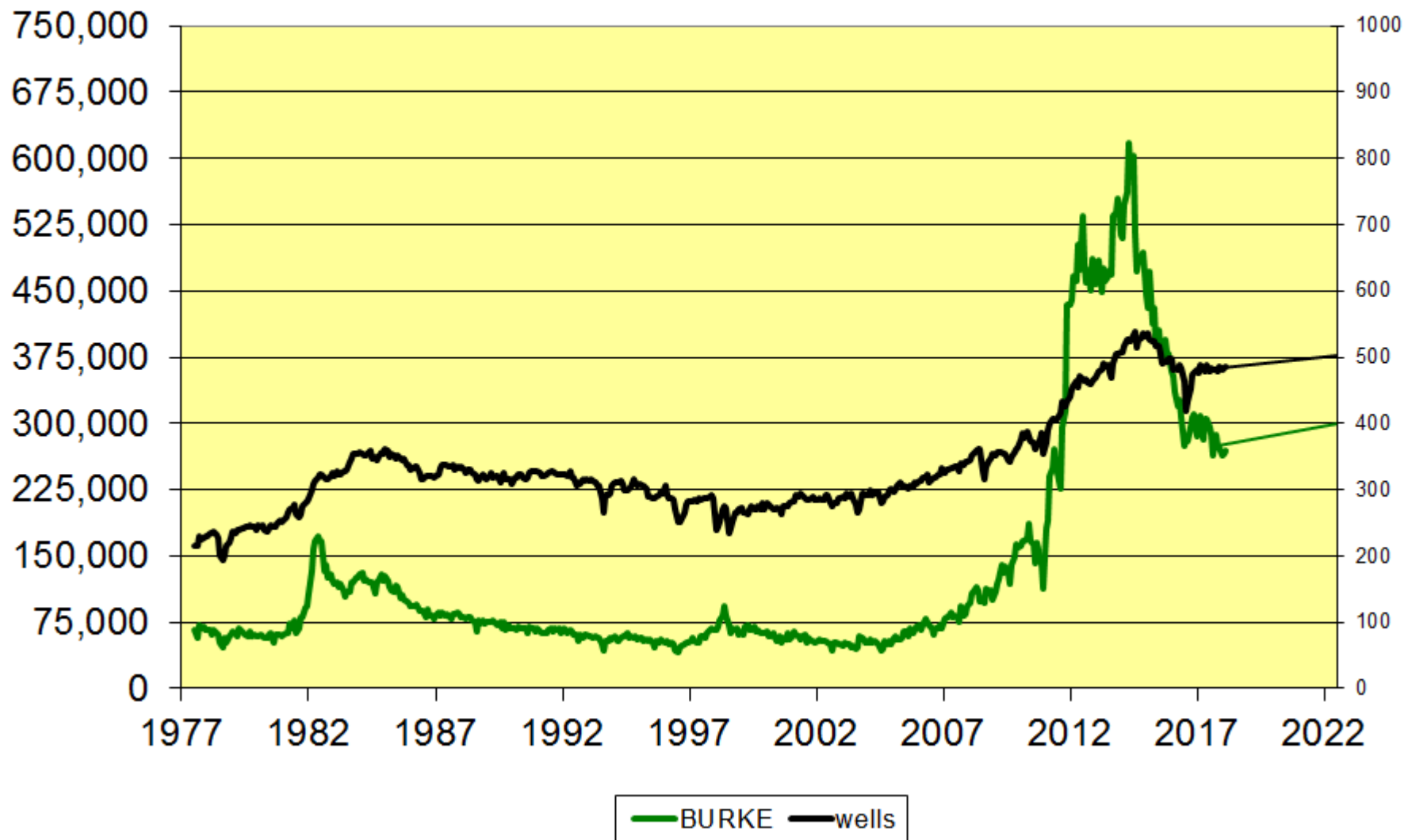


Burke Oil Industry Jobs

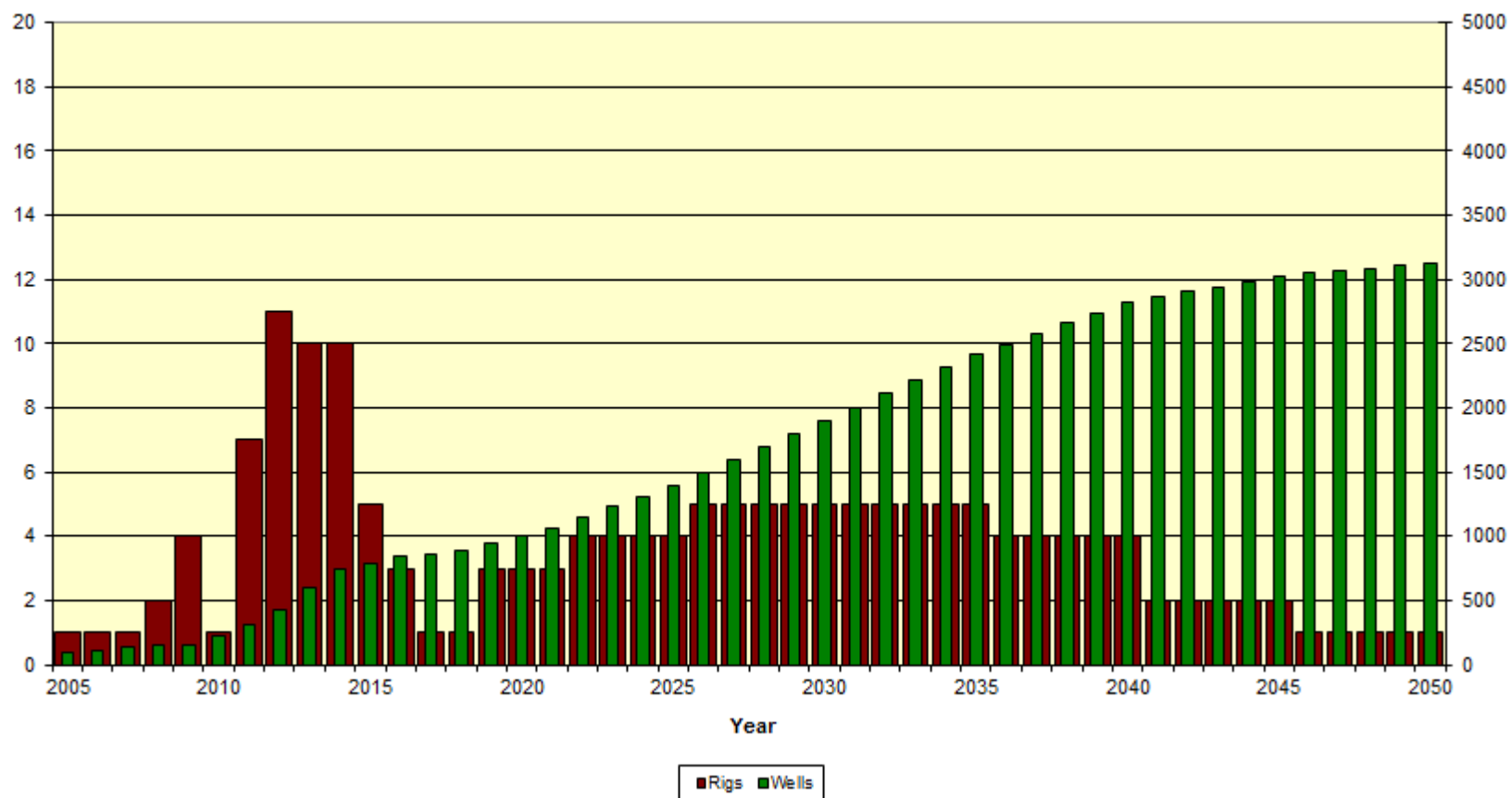




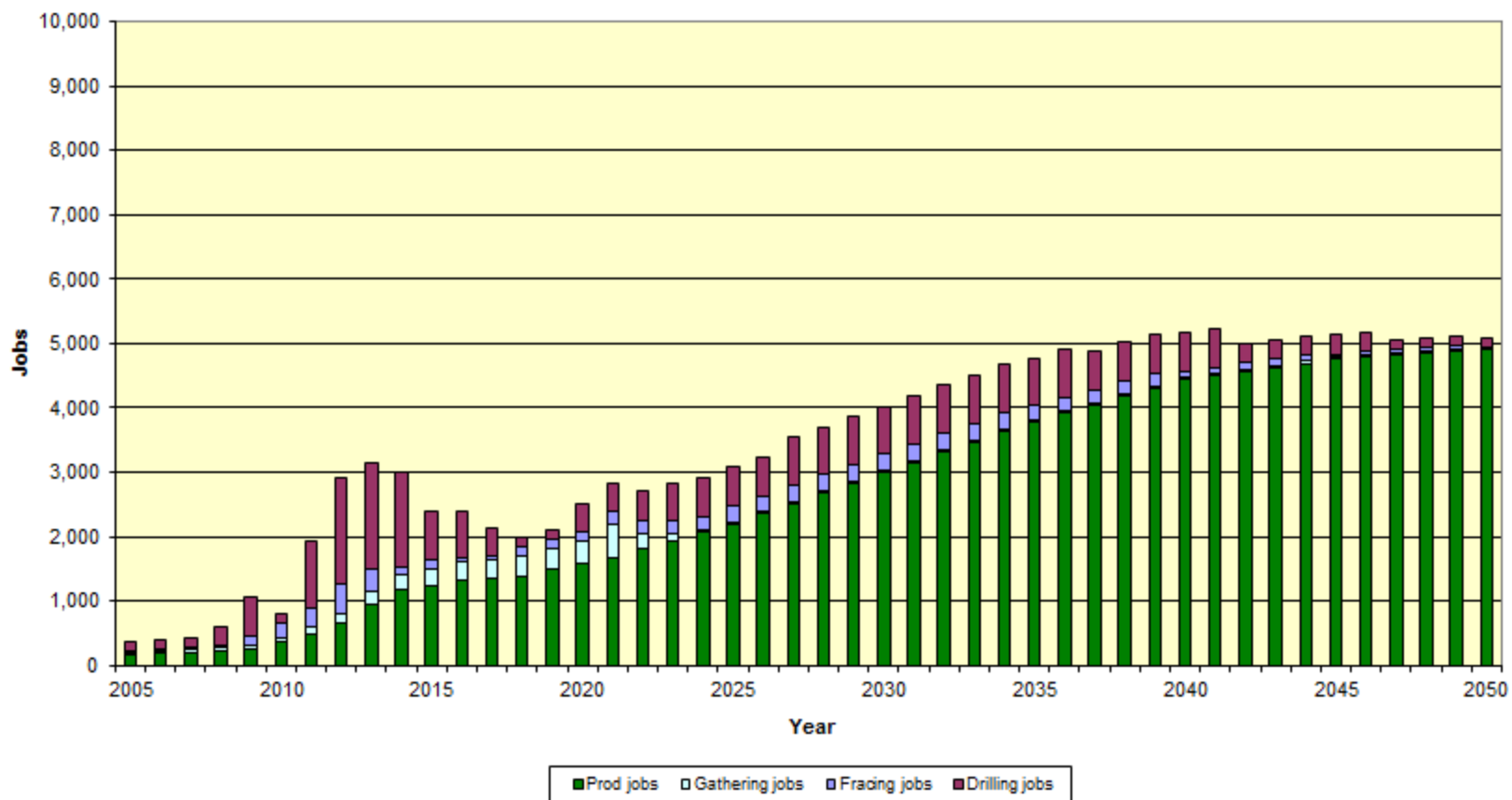
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



Divide Rigs and Wells

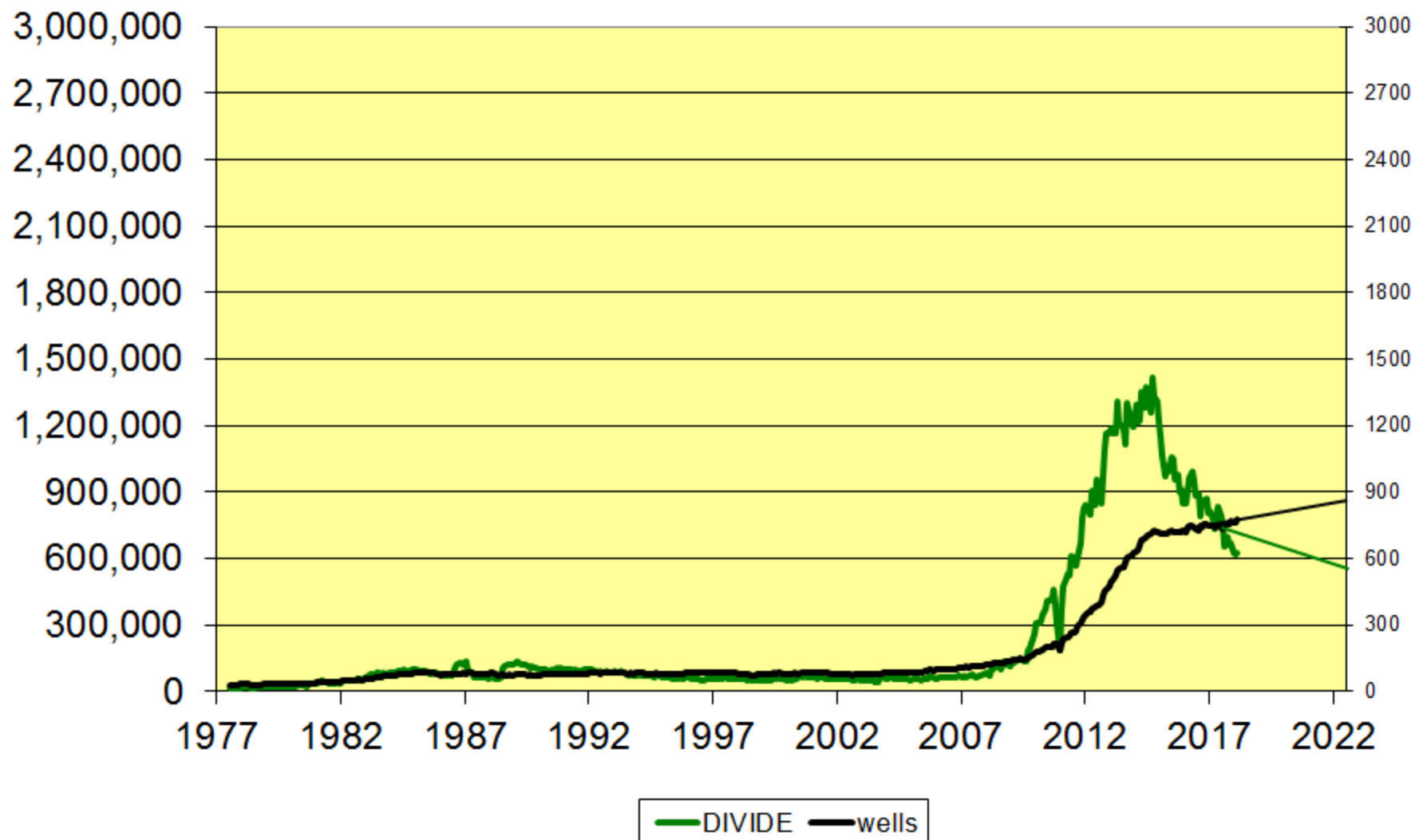


Divide Oil Industry Jobs

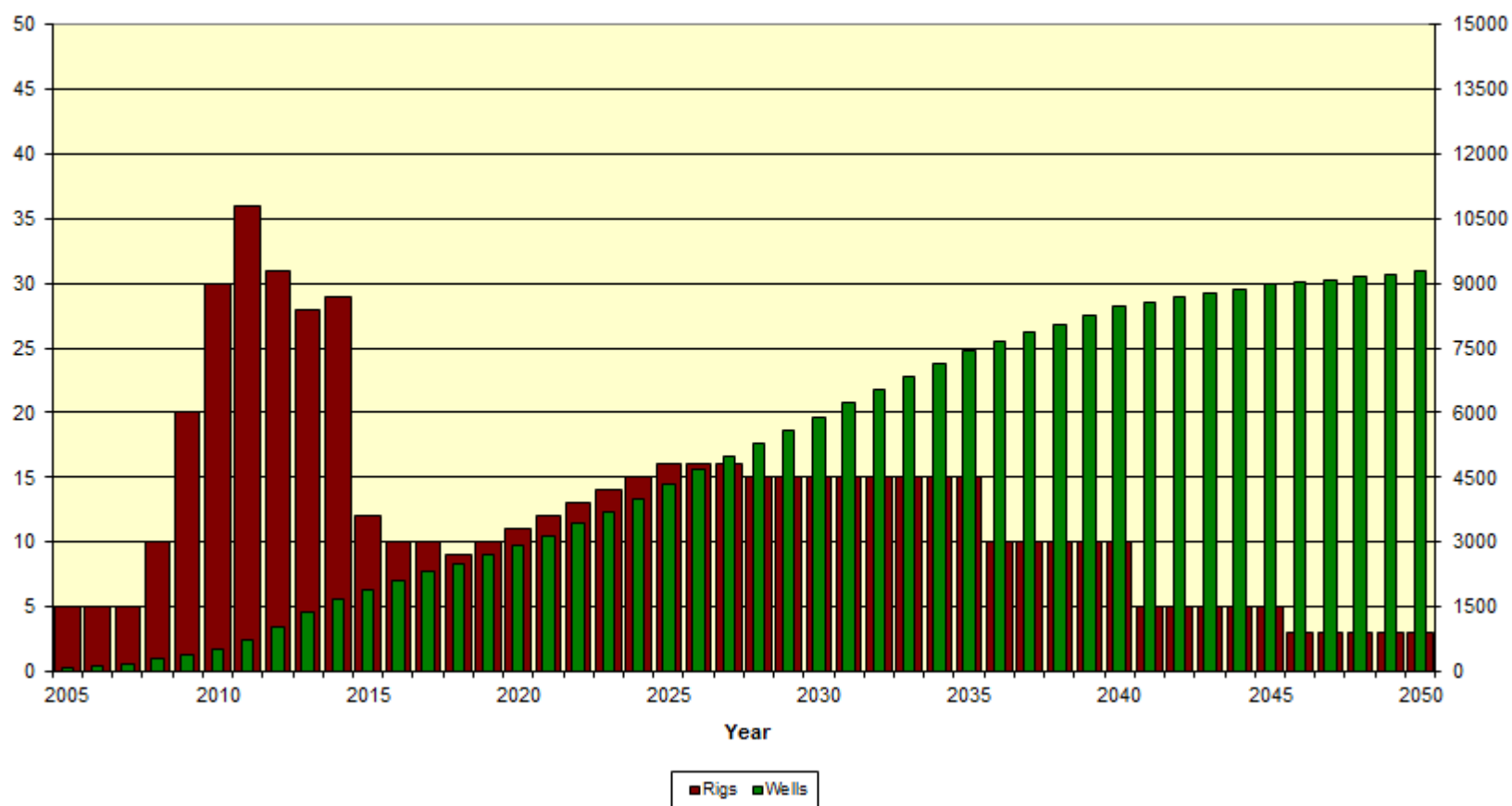




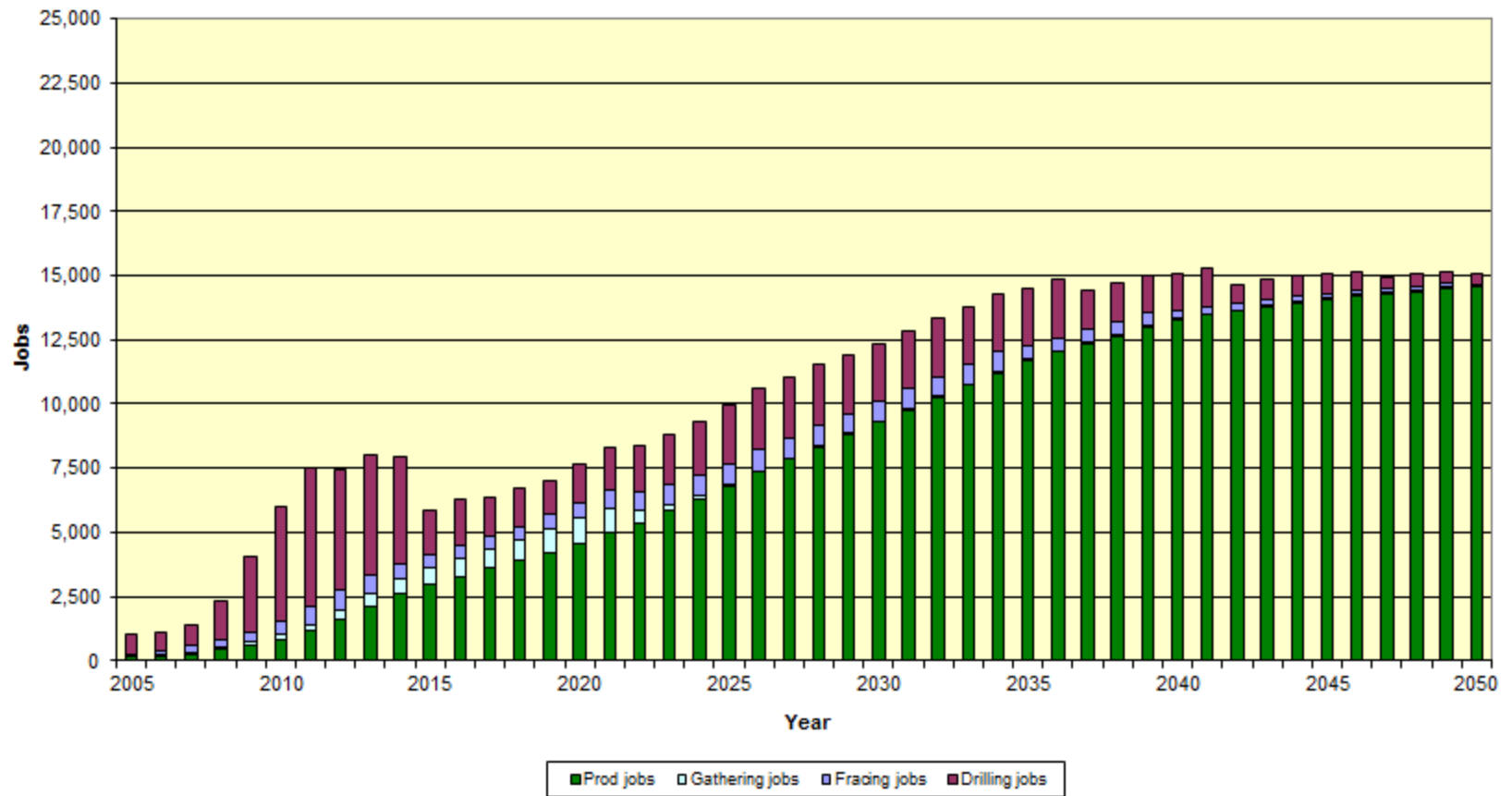
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

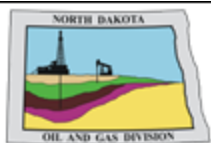


Dunn Rigs and Wells

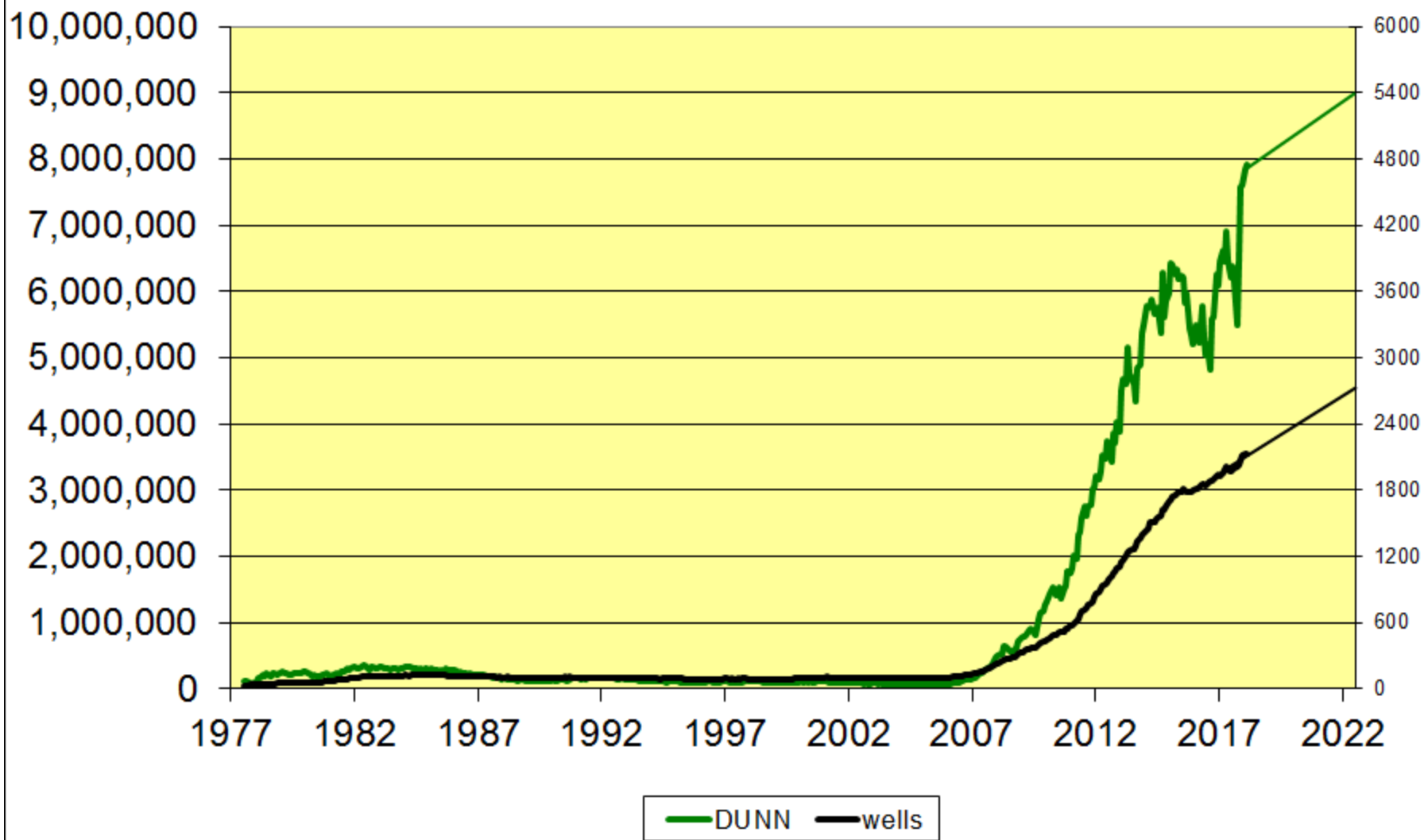


Dunn Oil Industry Jobs

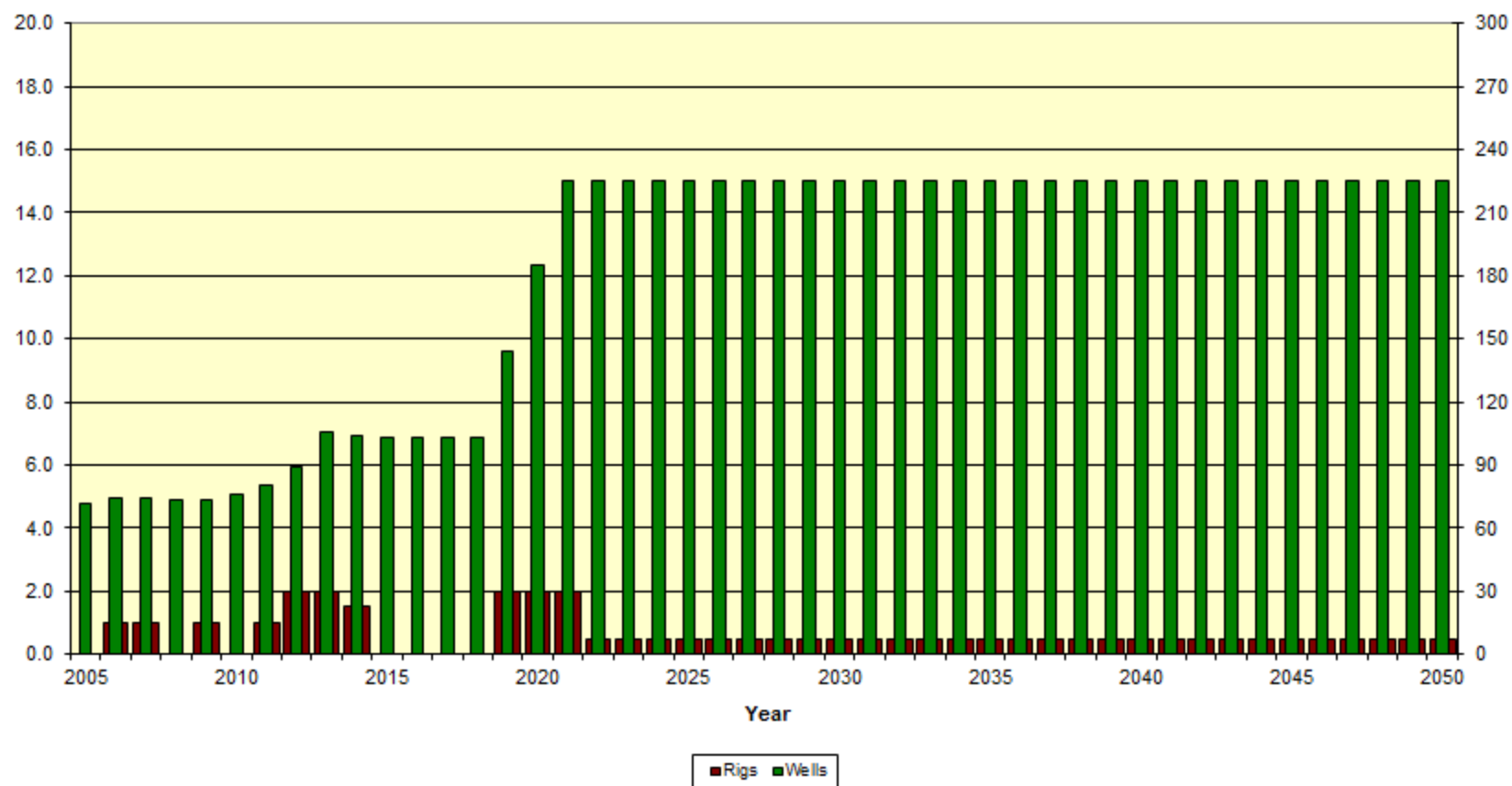




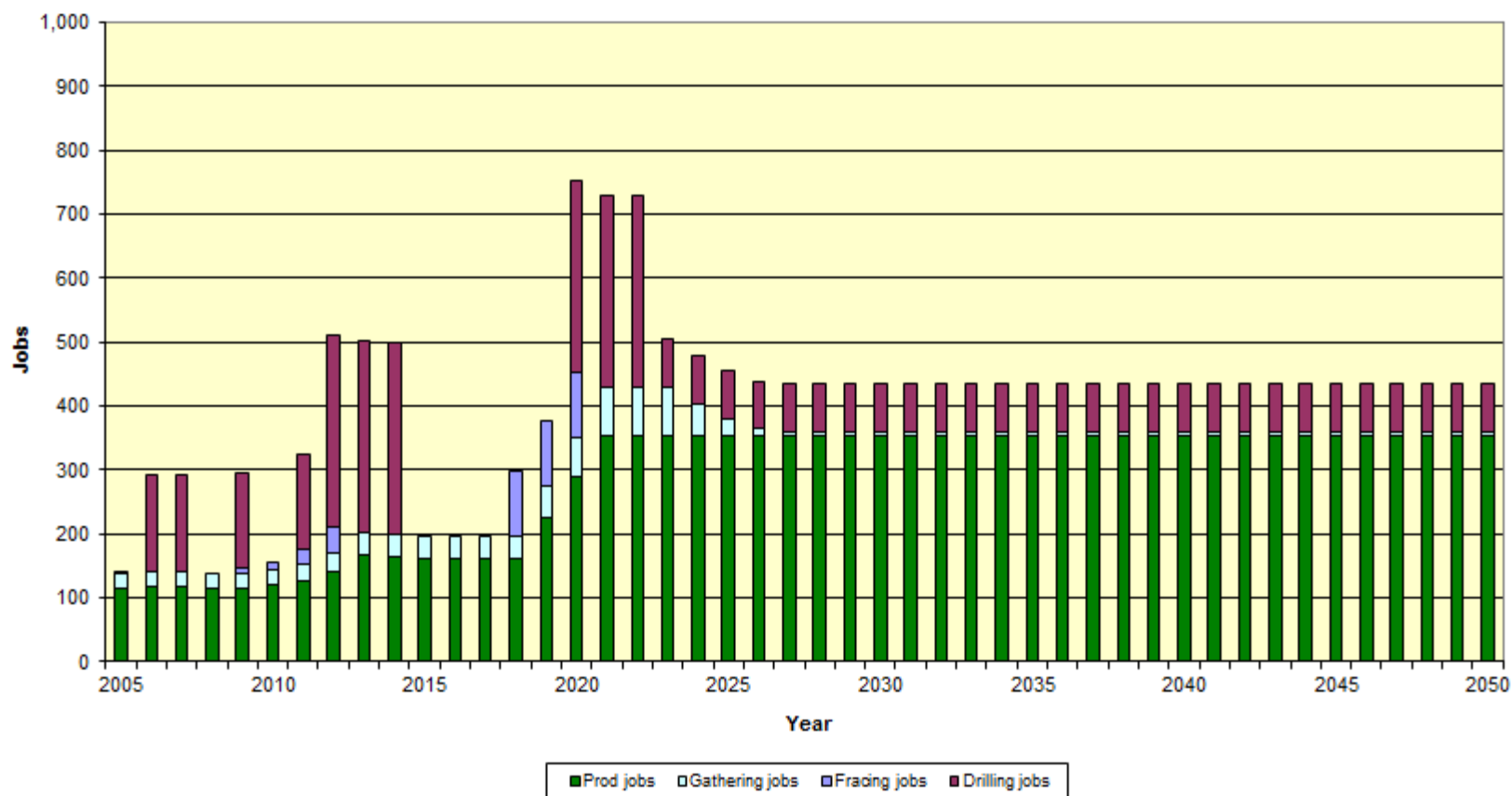
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



Golden Valley Rigs and Wells (includes Red River)

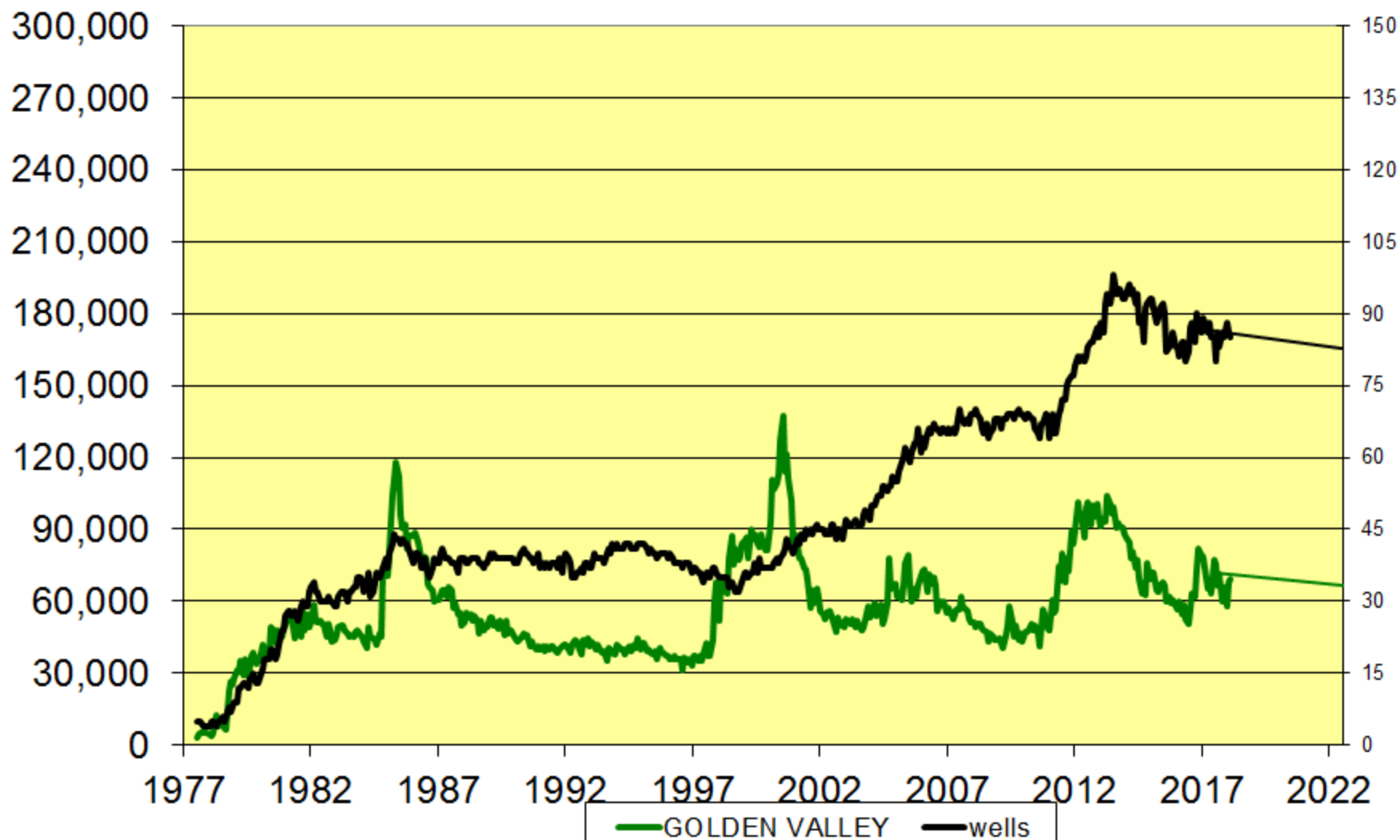


Golden Valley Oil Industry Jobs

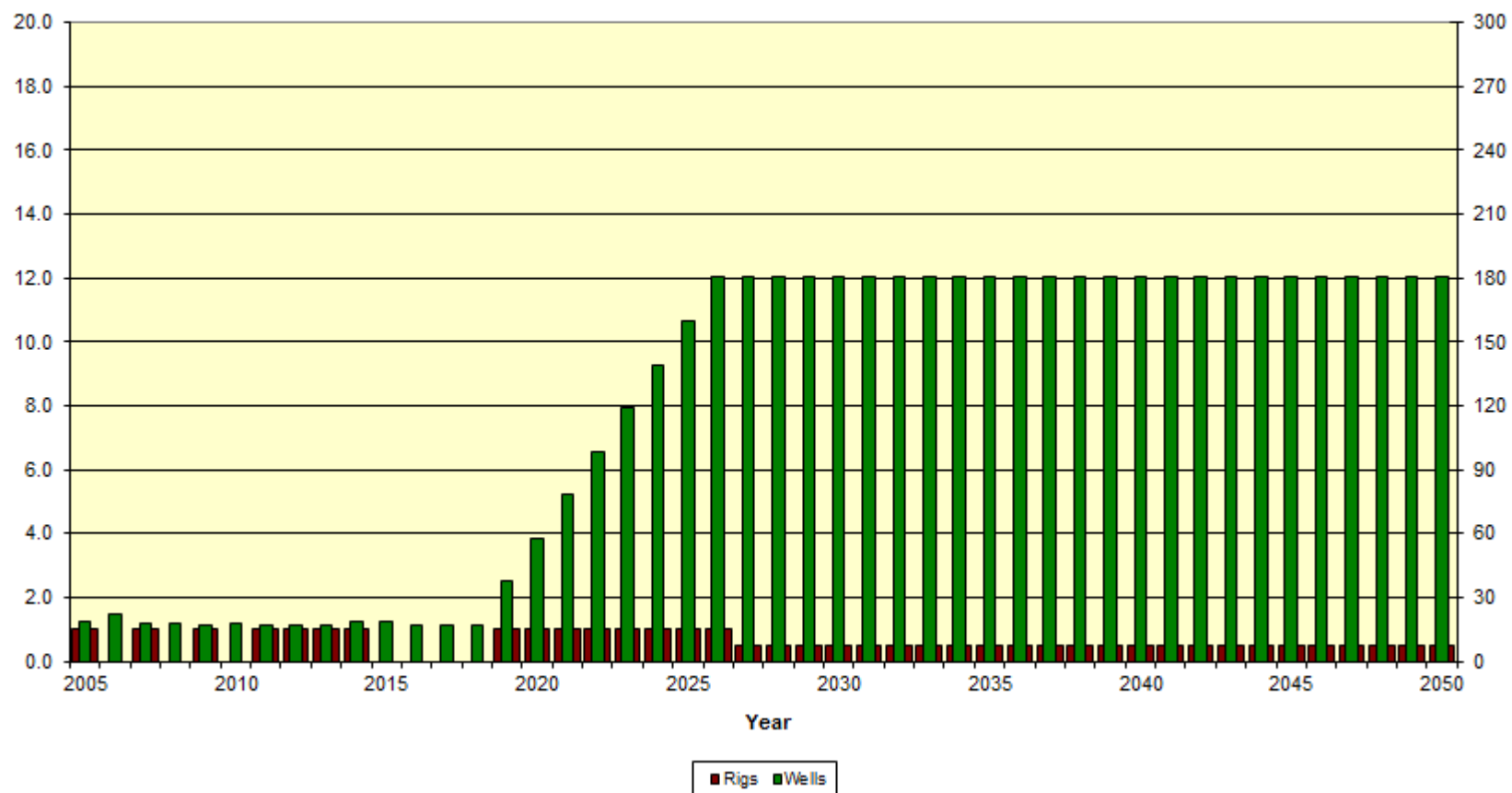




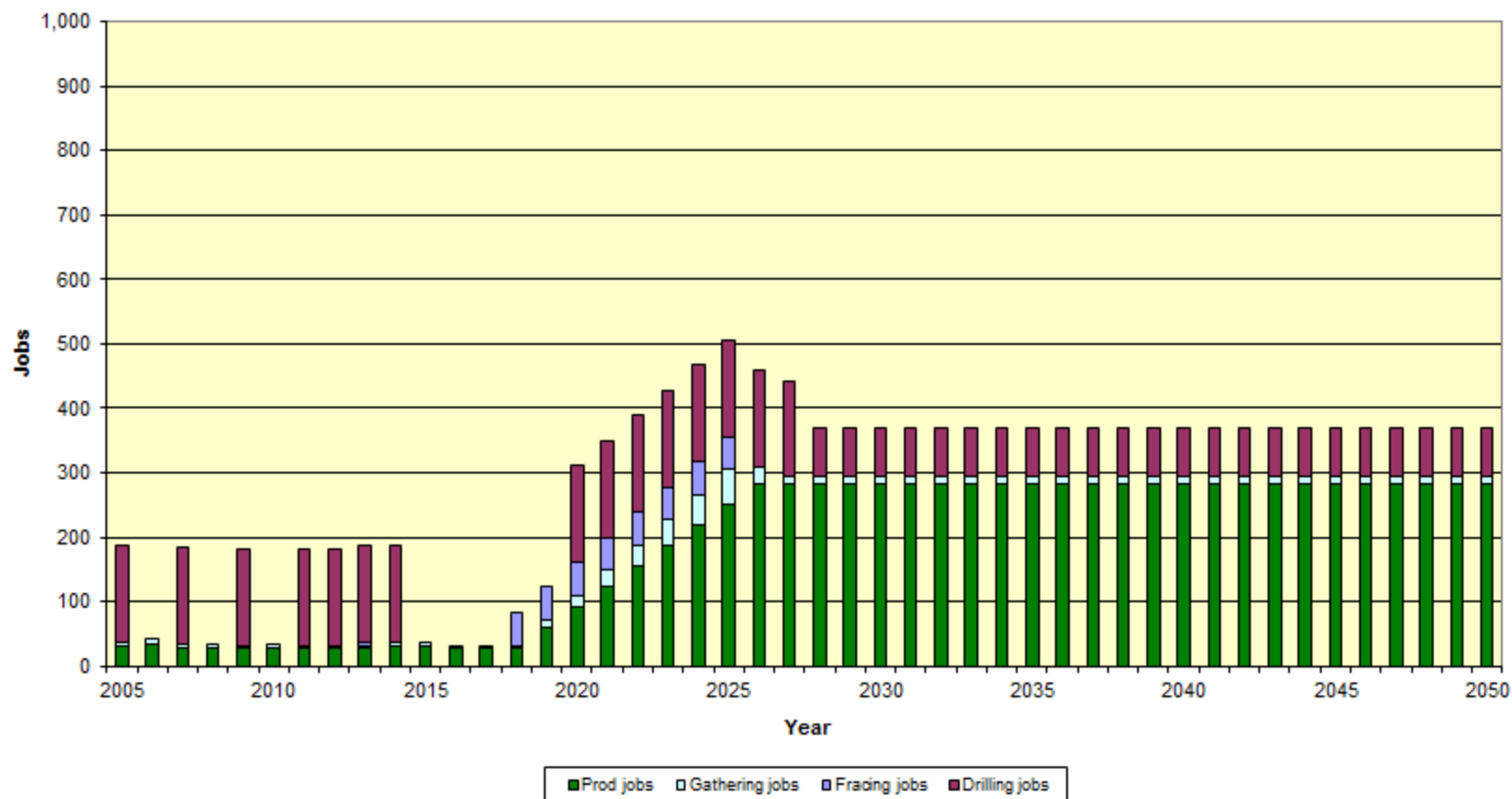
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



McHenry Rigs and Wells

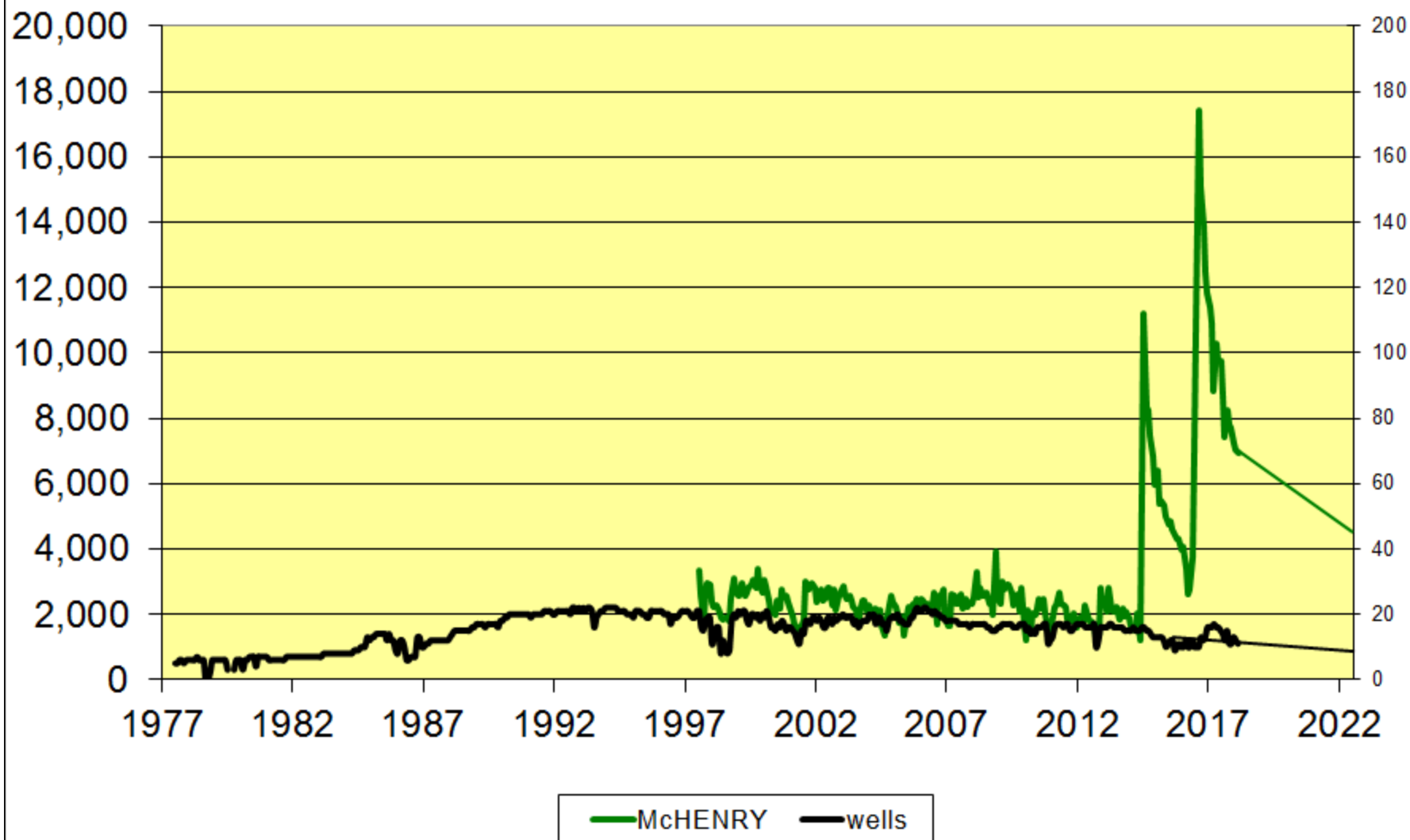


McHenry Oil Industry Jobs

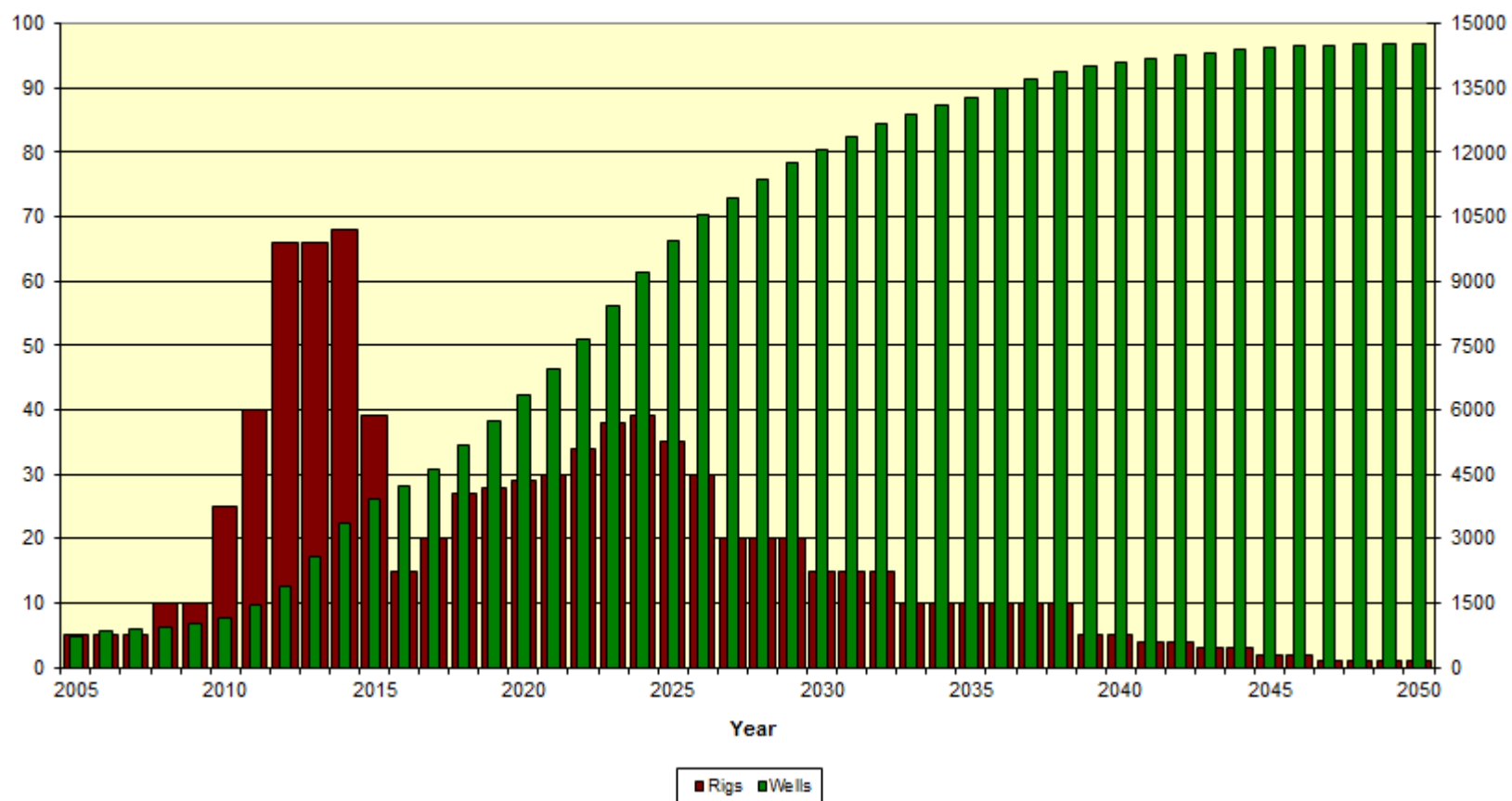




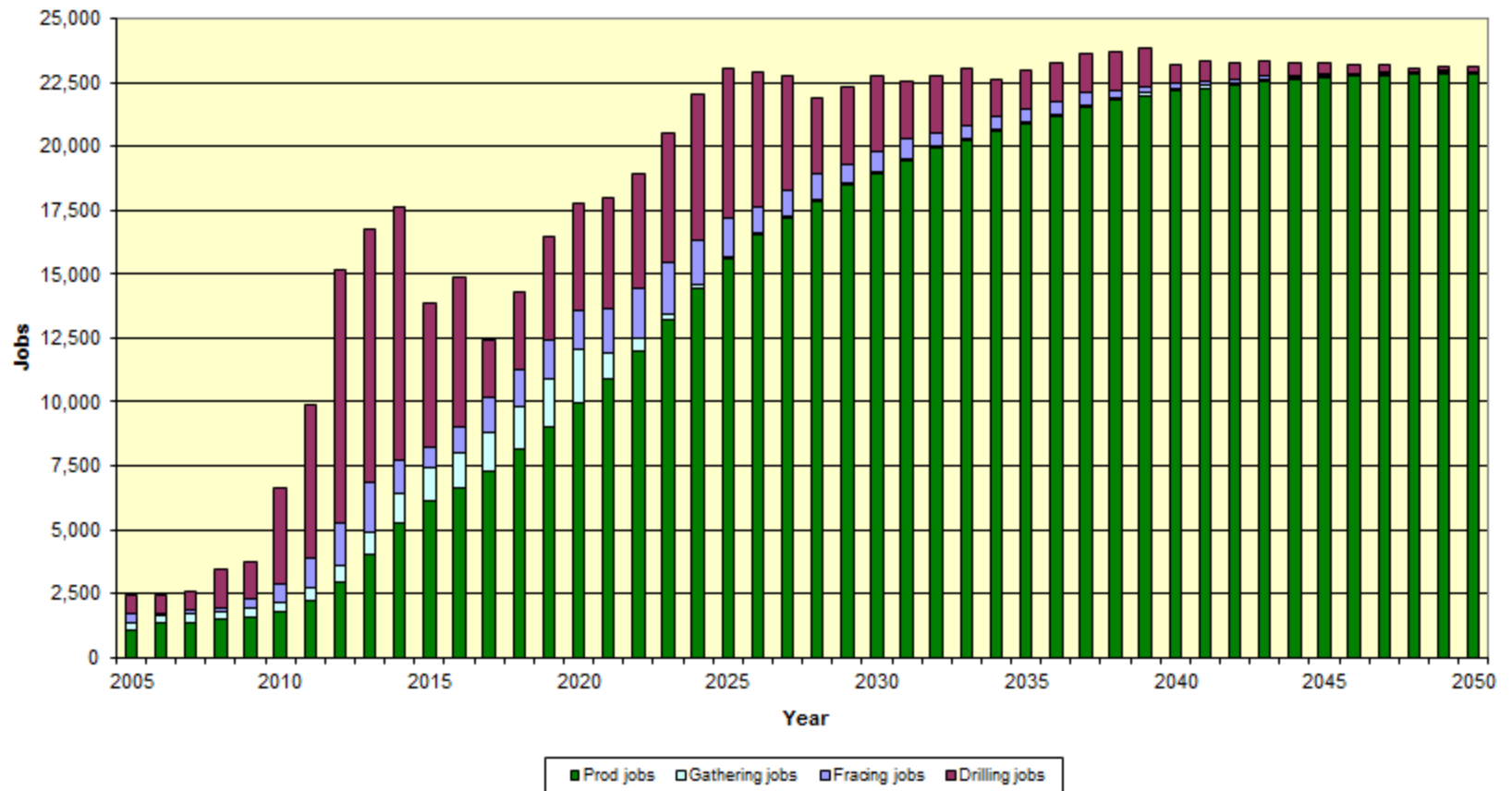
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



McKenzie Rigs and Wells

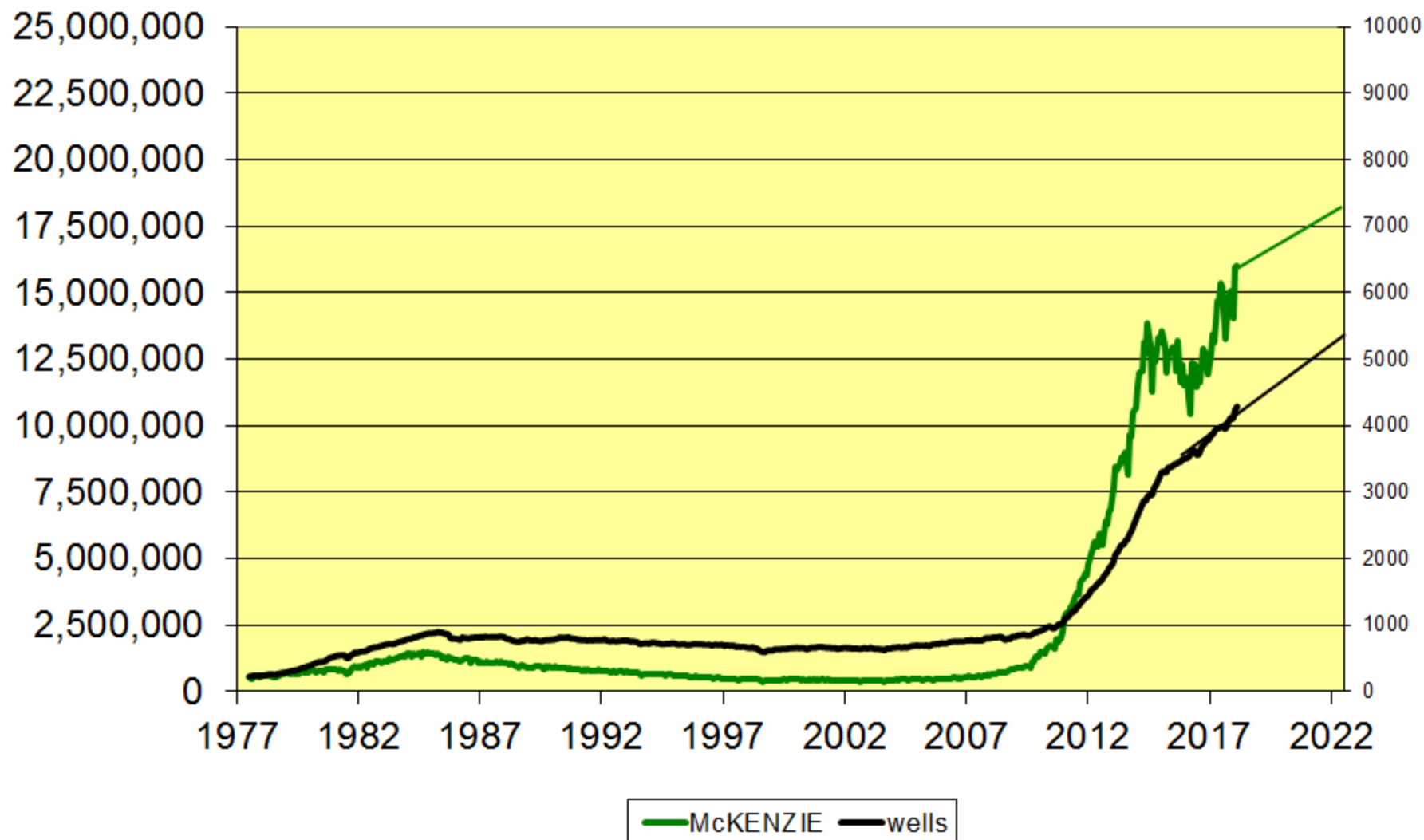


McKenzie Oil Industry Jobs

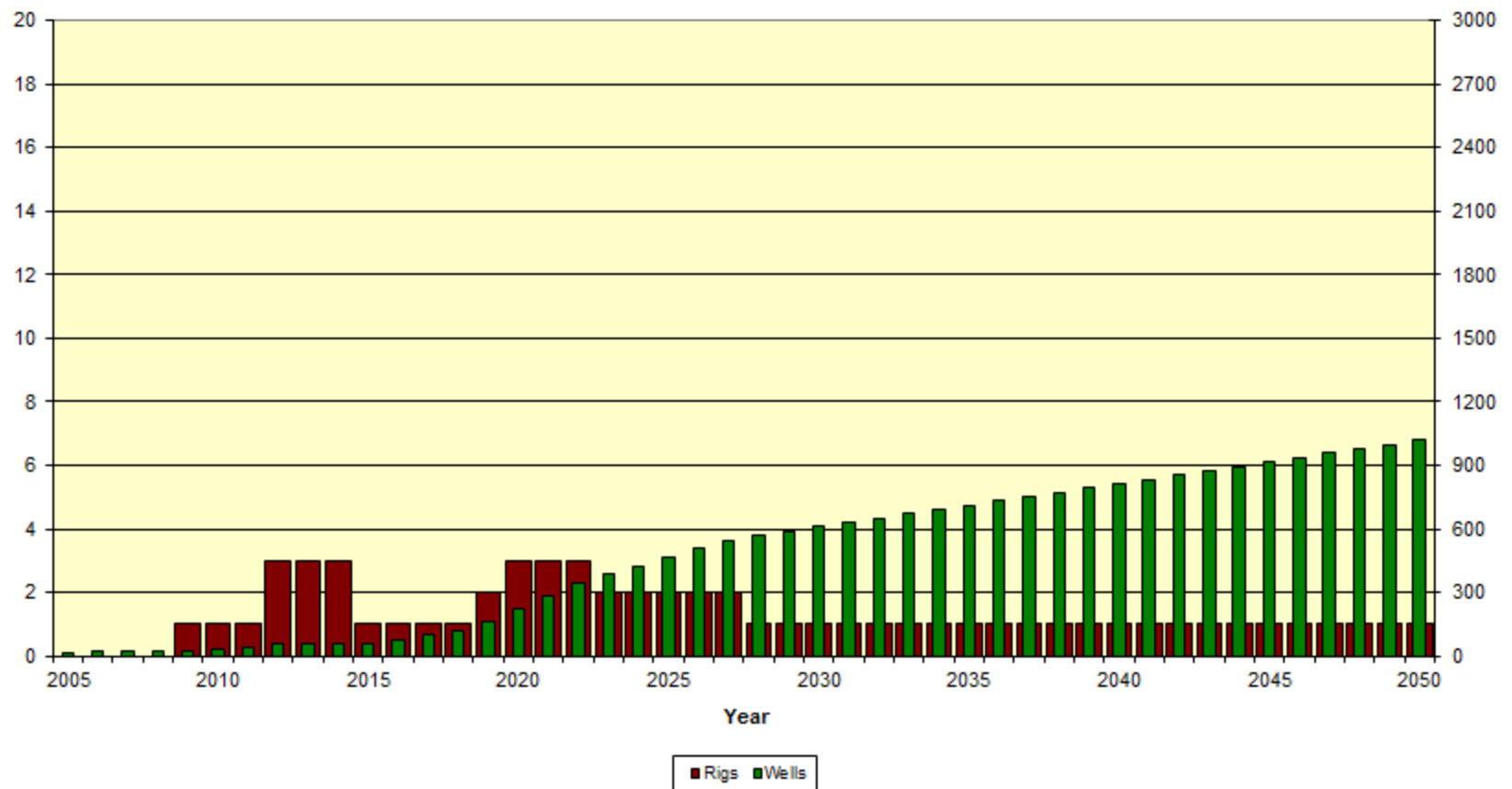




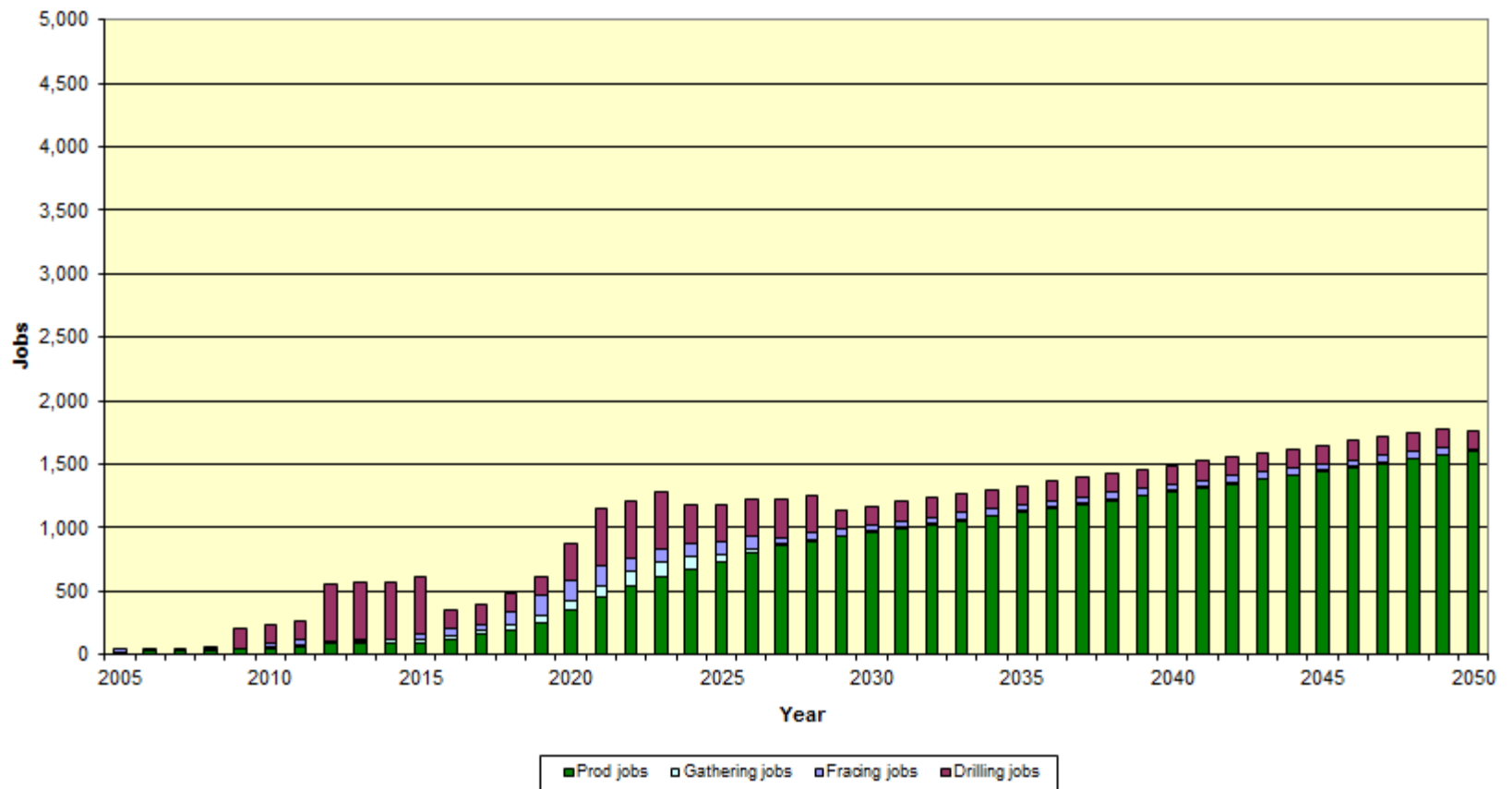
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

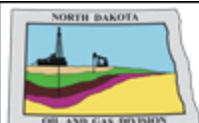


McLean Rigs and Wells

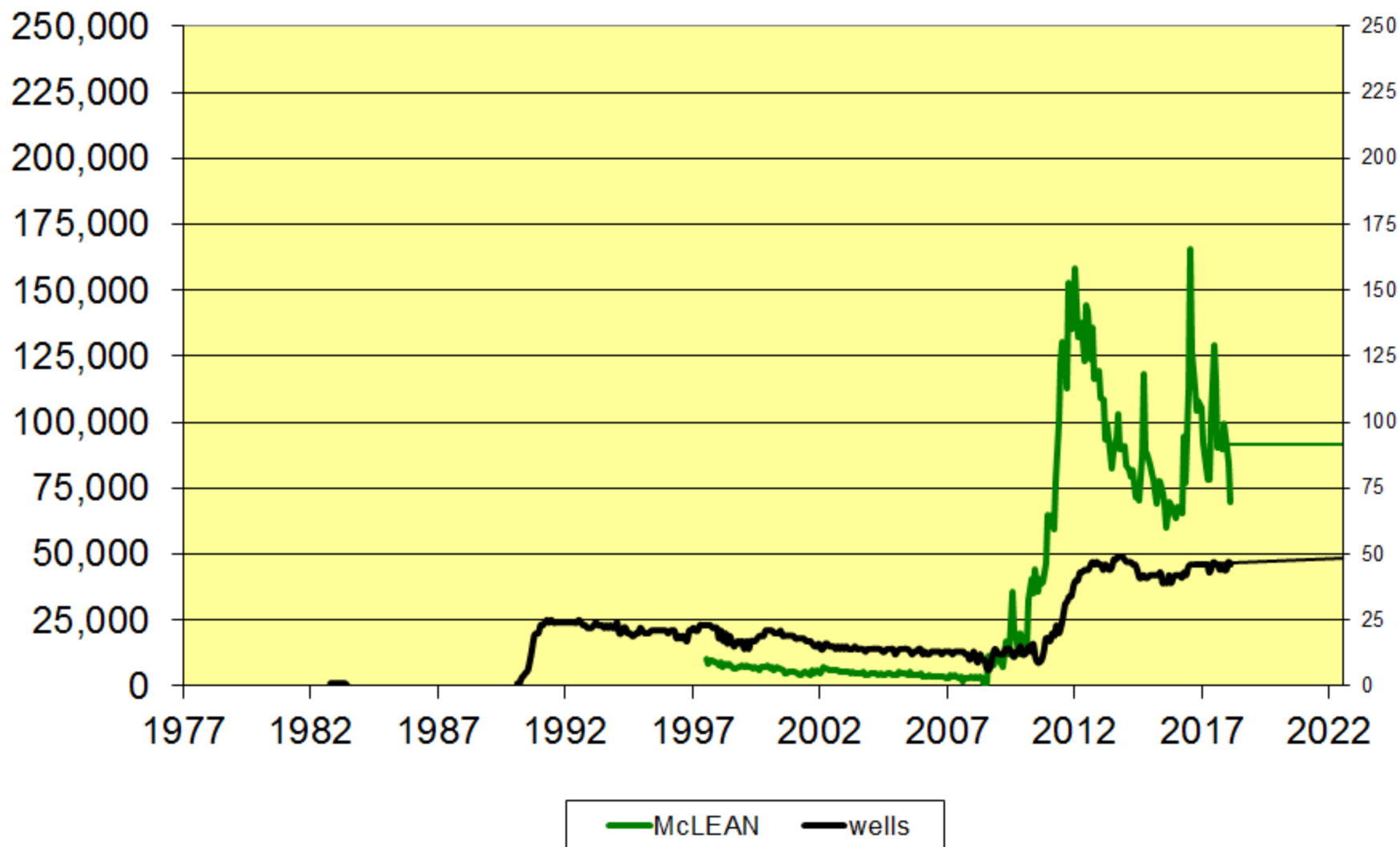


McLean Oil Industry Jobs

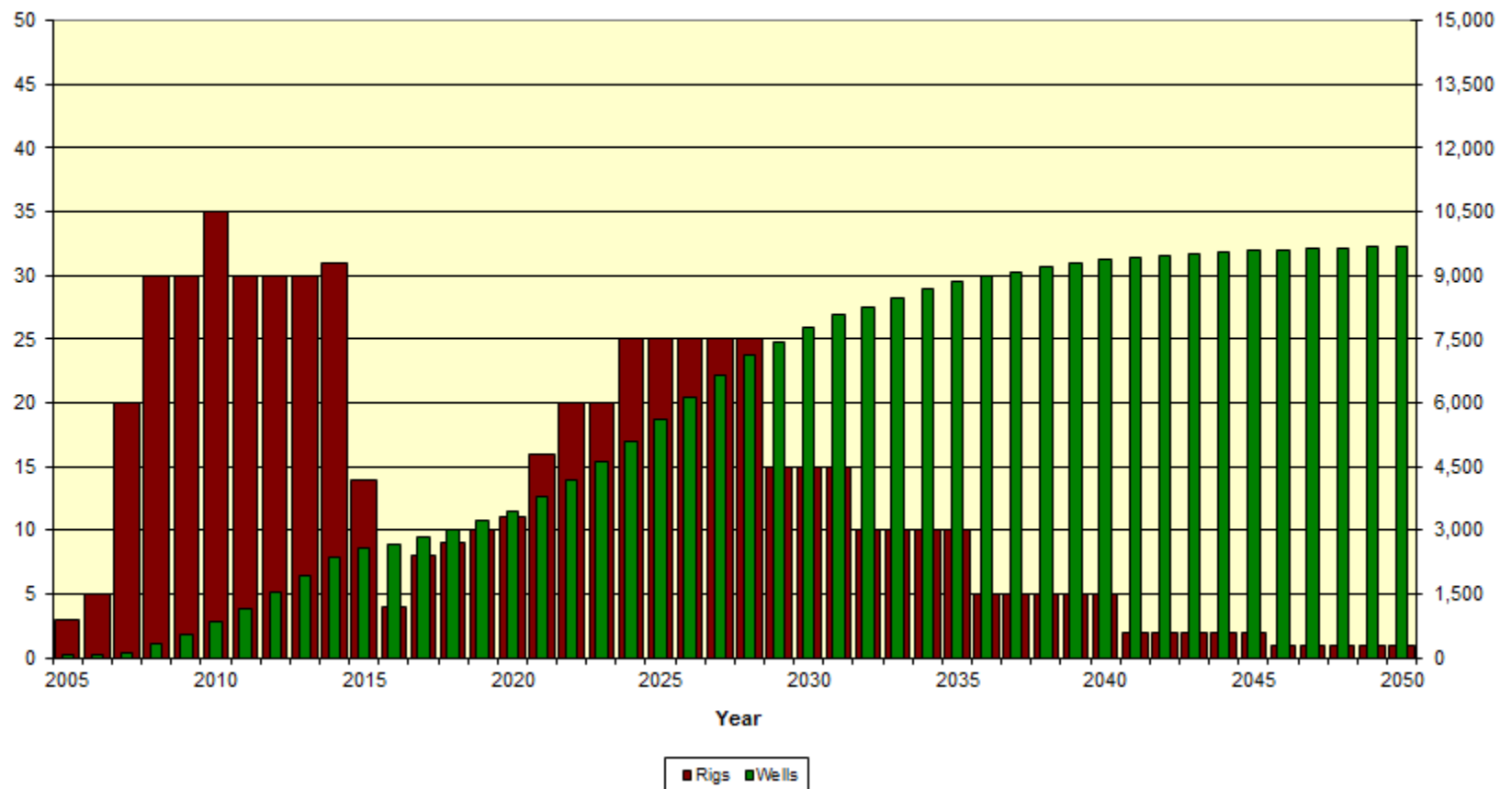




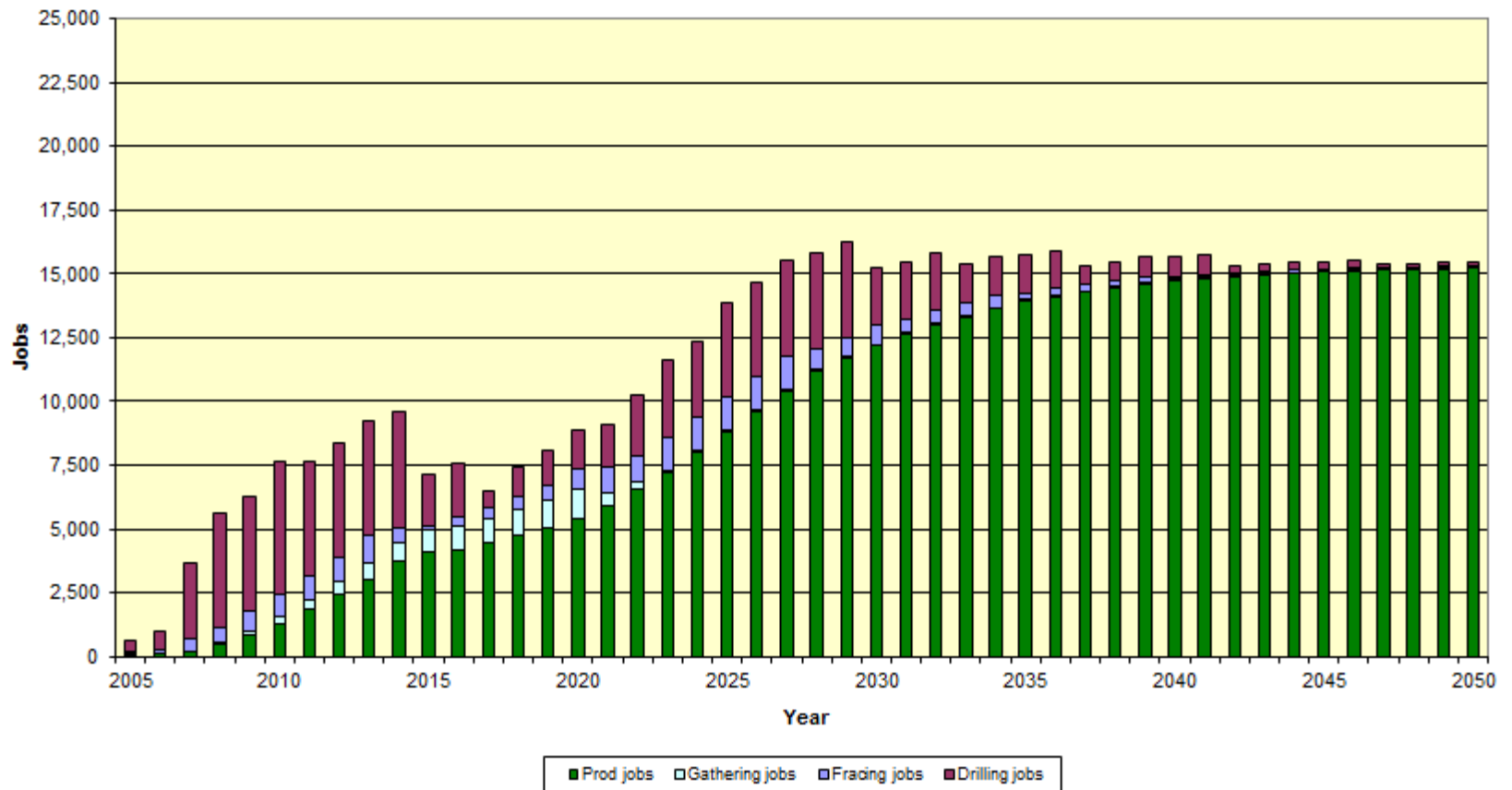
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

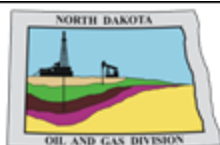


Mountrail Rigs and Wells

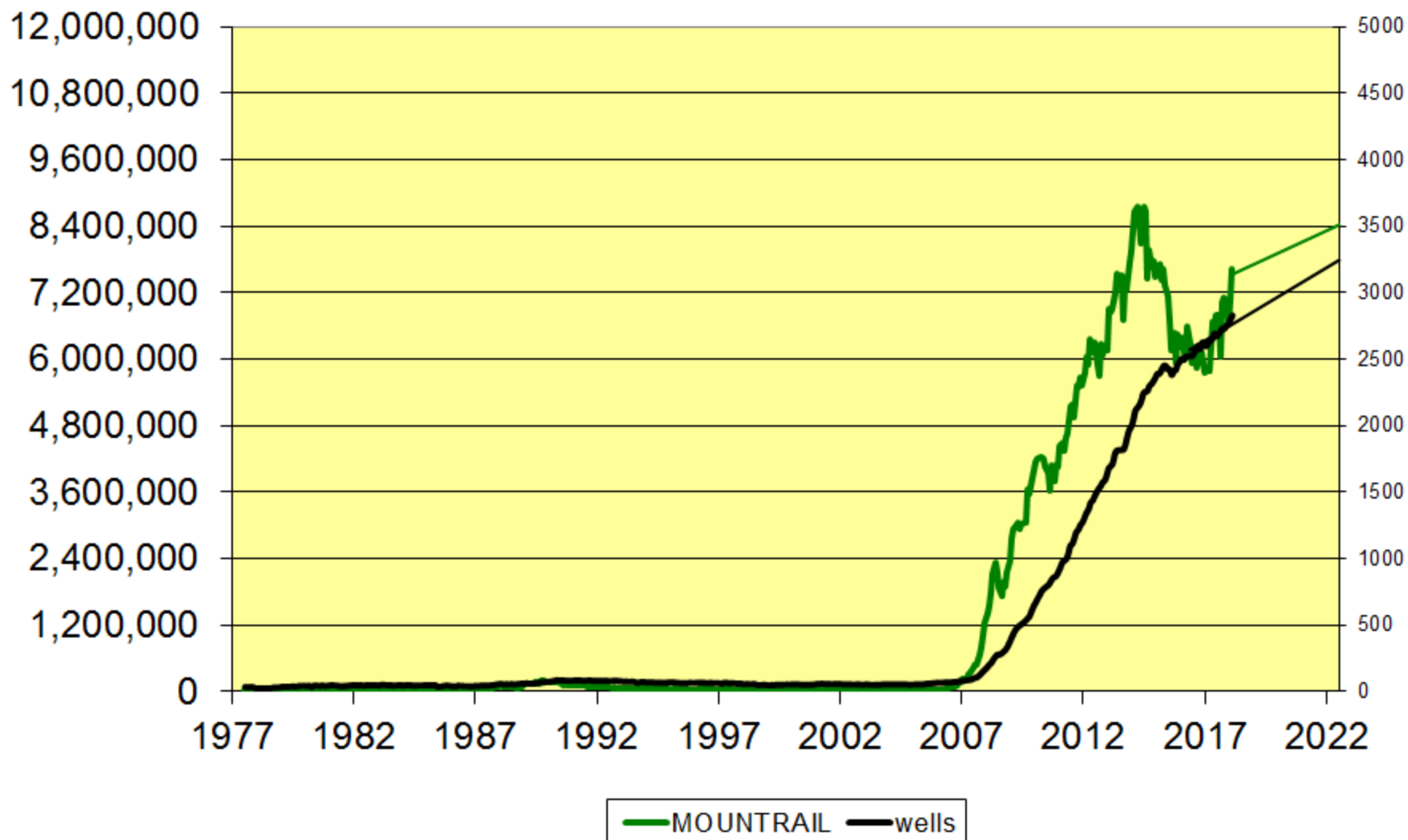


Mountrail Oil Industry Jobs

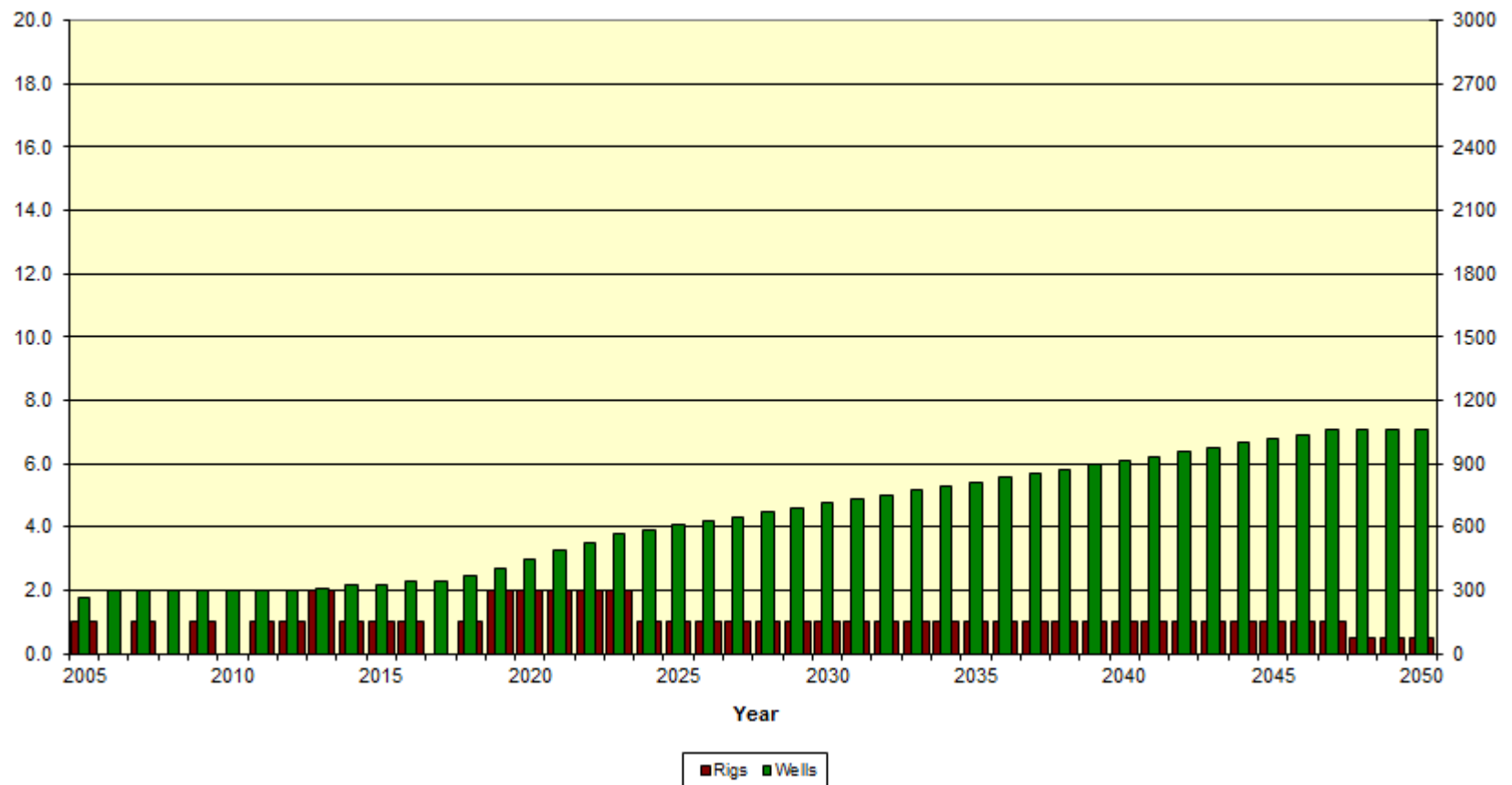




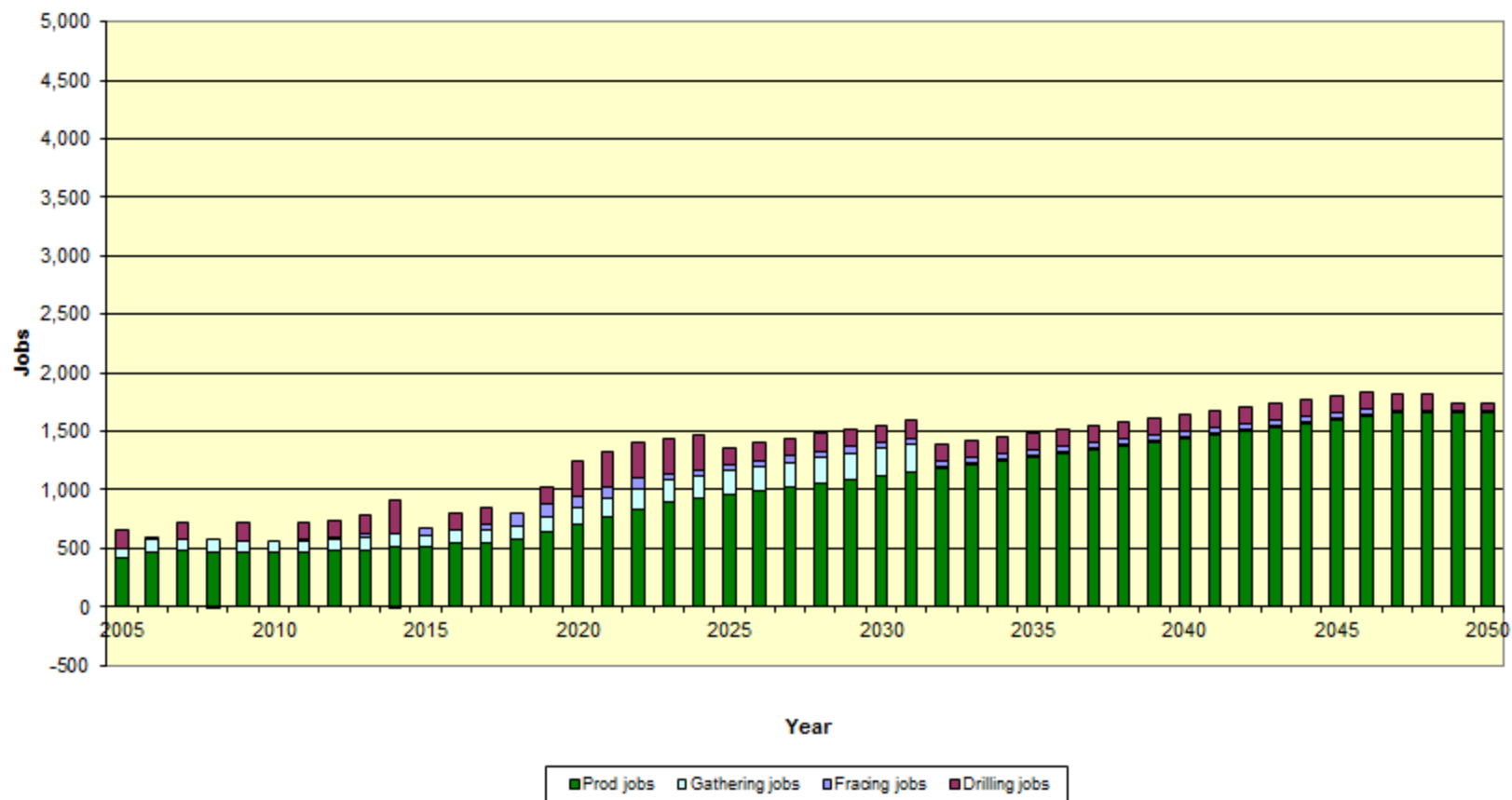
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



Renville Rigs and Wells

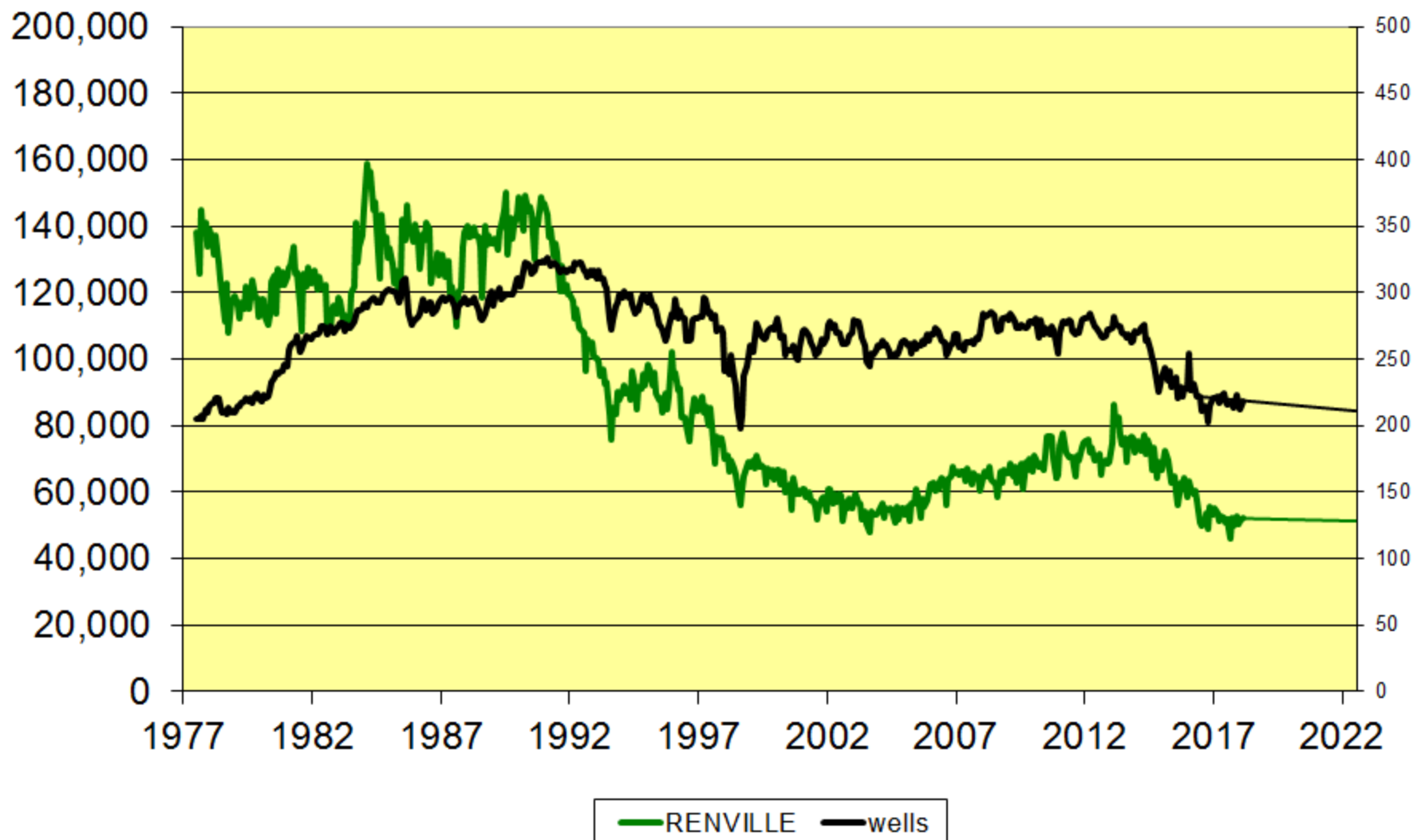


Renville Oil Industry Jobs

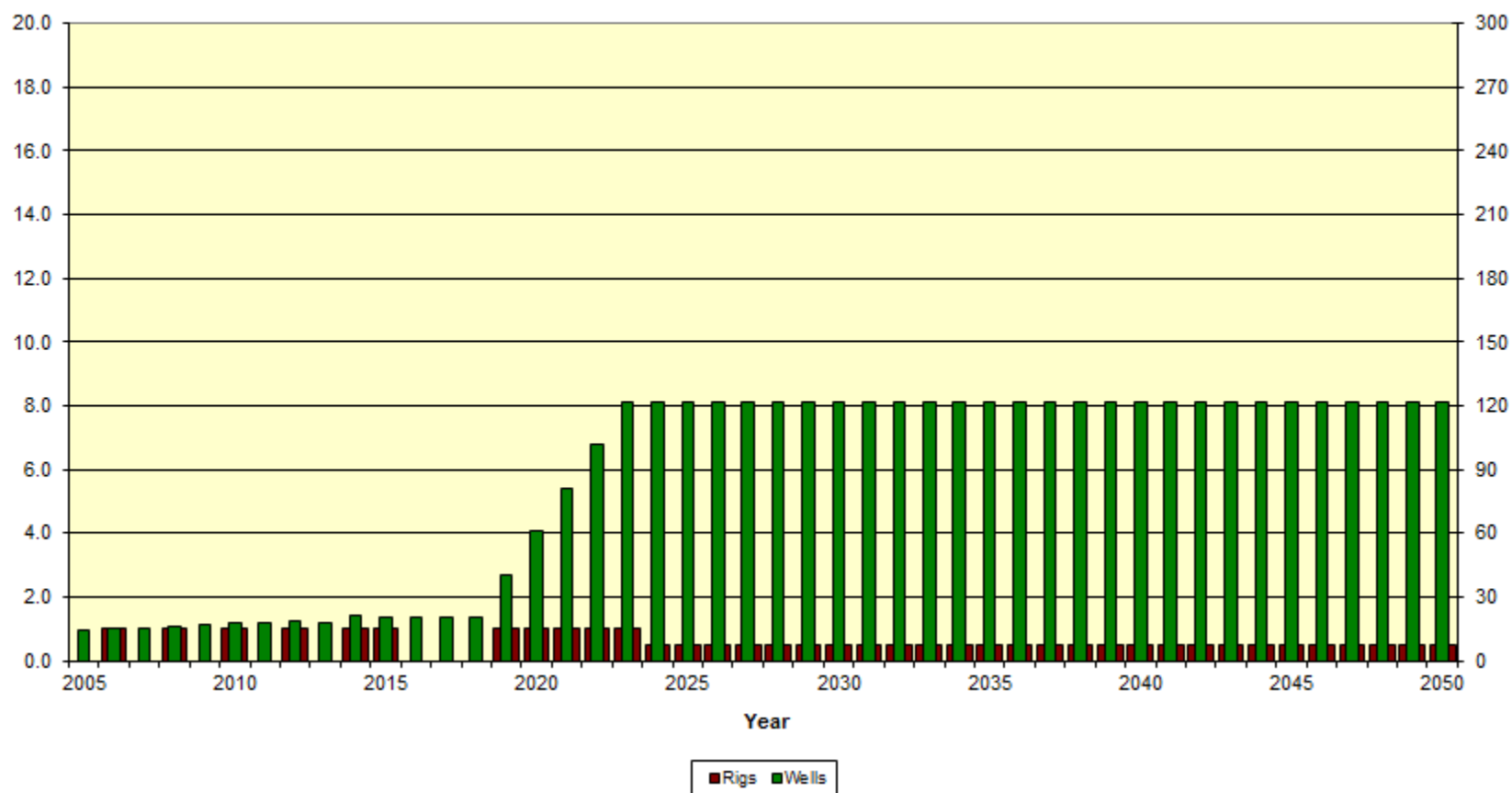




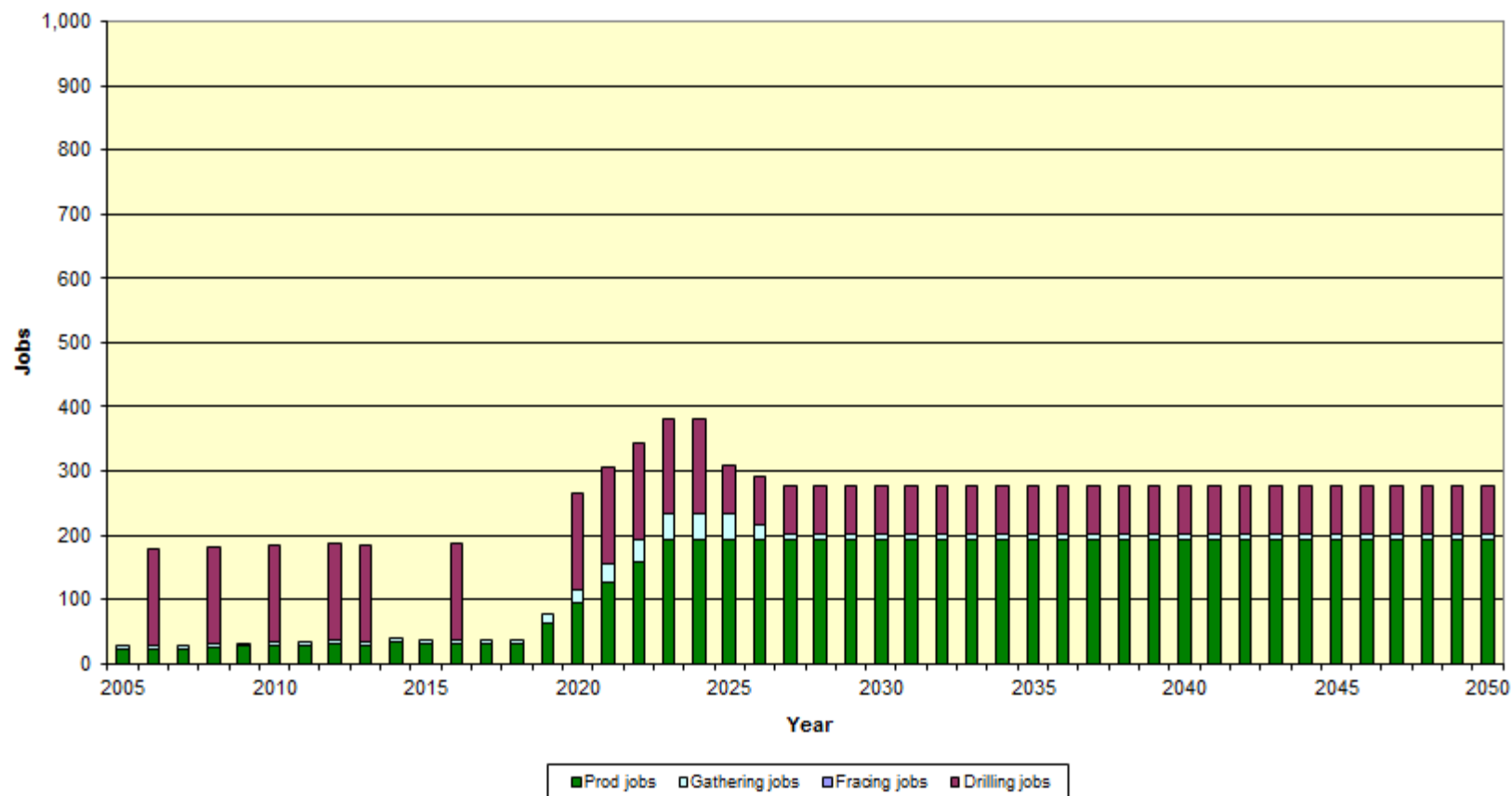
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

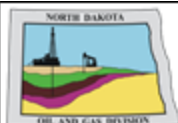


Slope non-Tyler Rigs and Wells

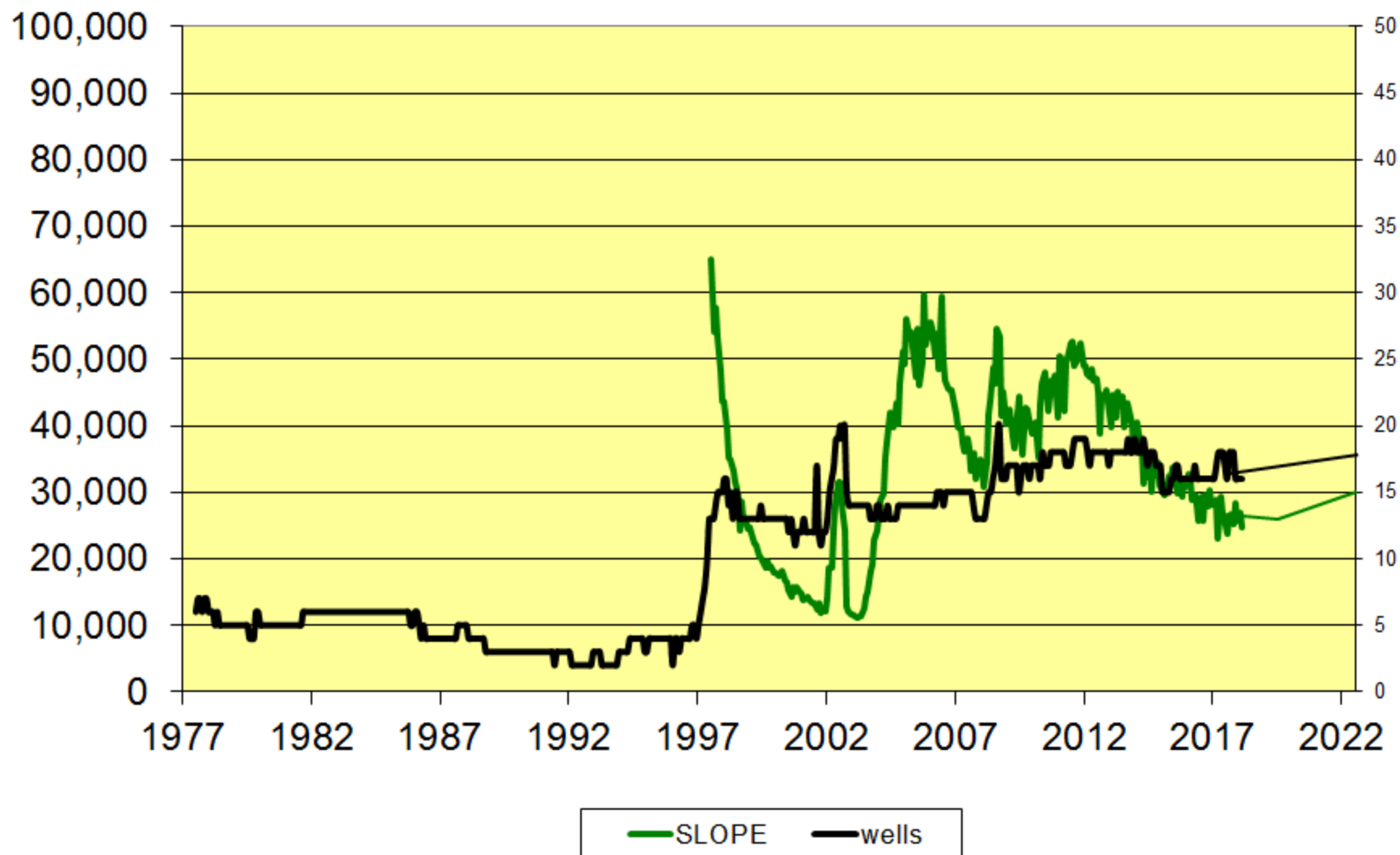


Slope non-Tyler Oil Industry Jobs

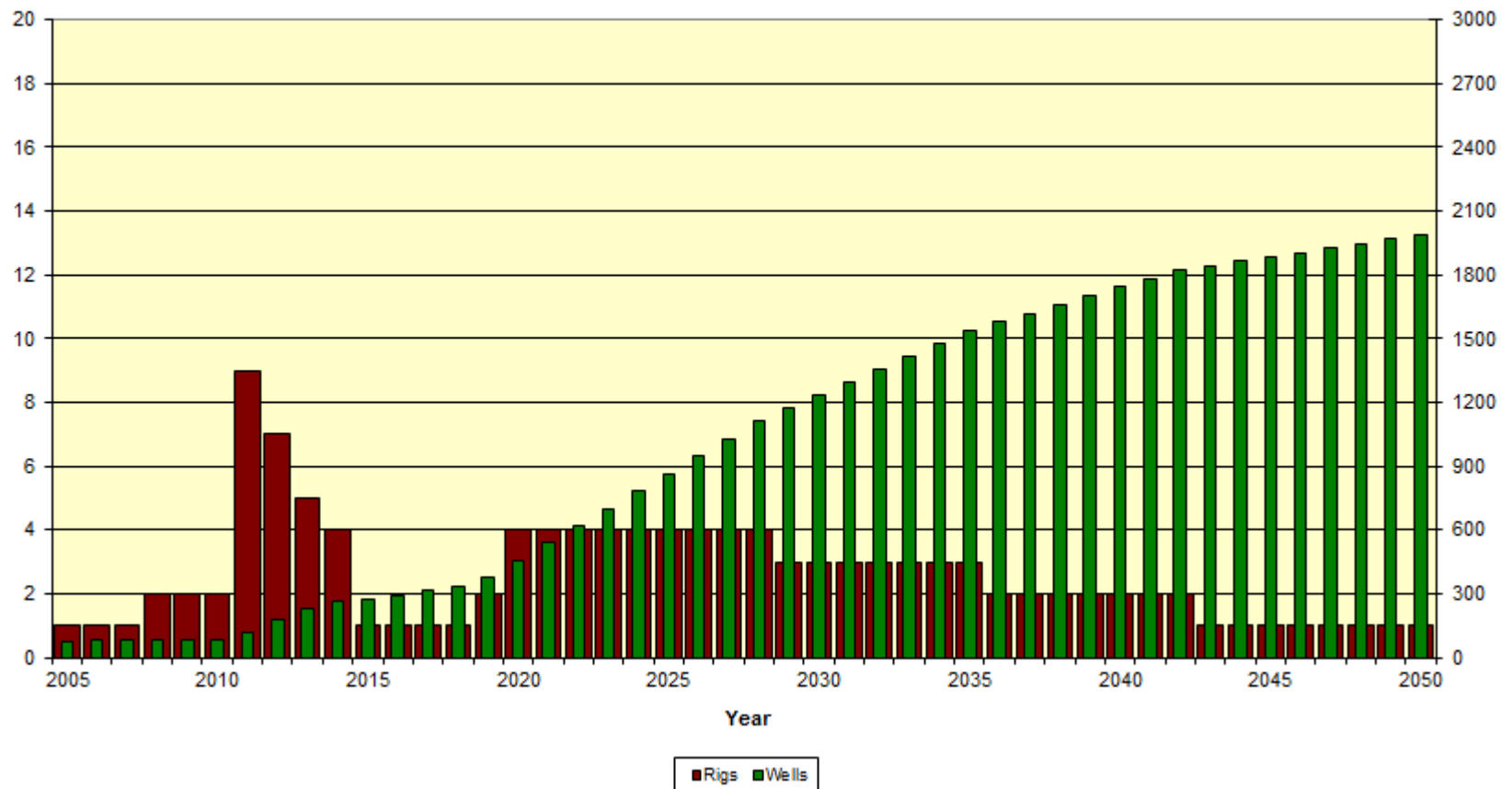




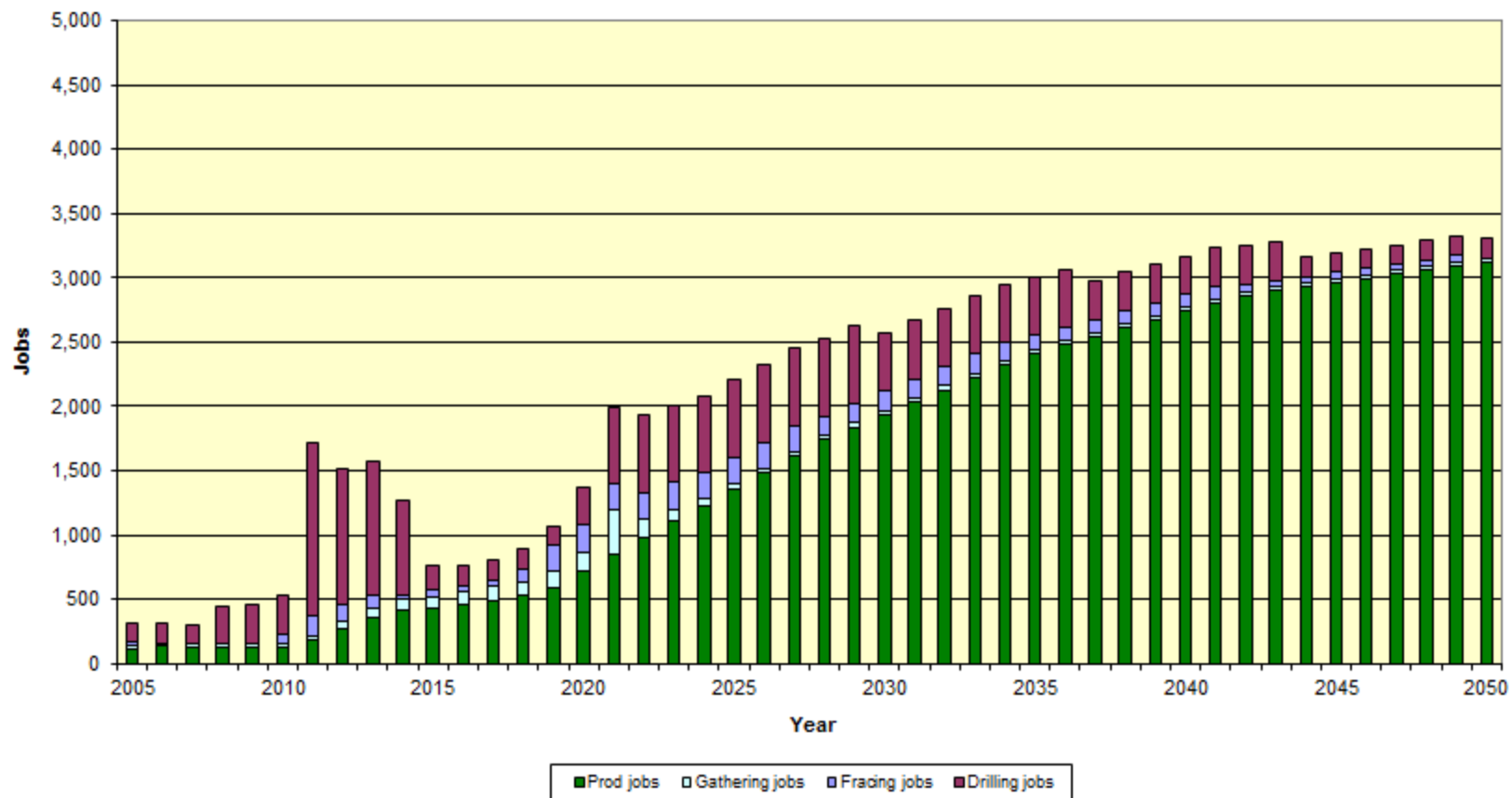
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



Stark Rigs and Wells

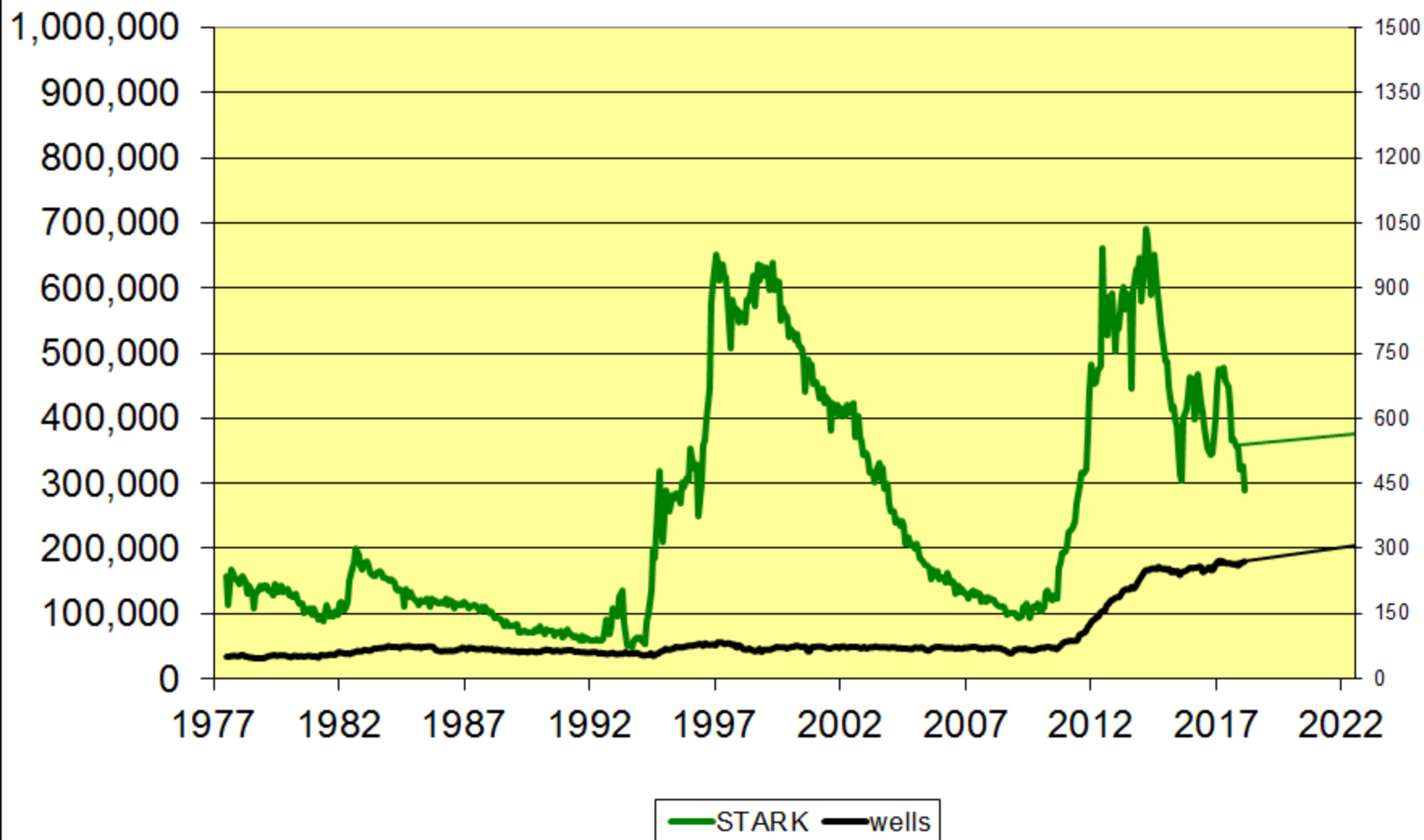


Stark Oil Industry Jobs

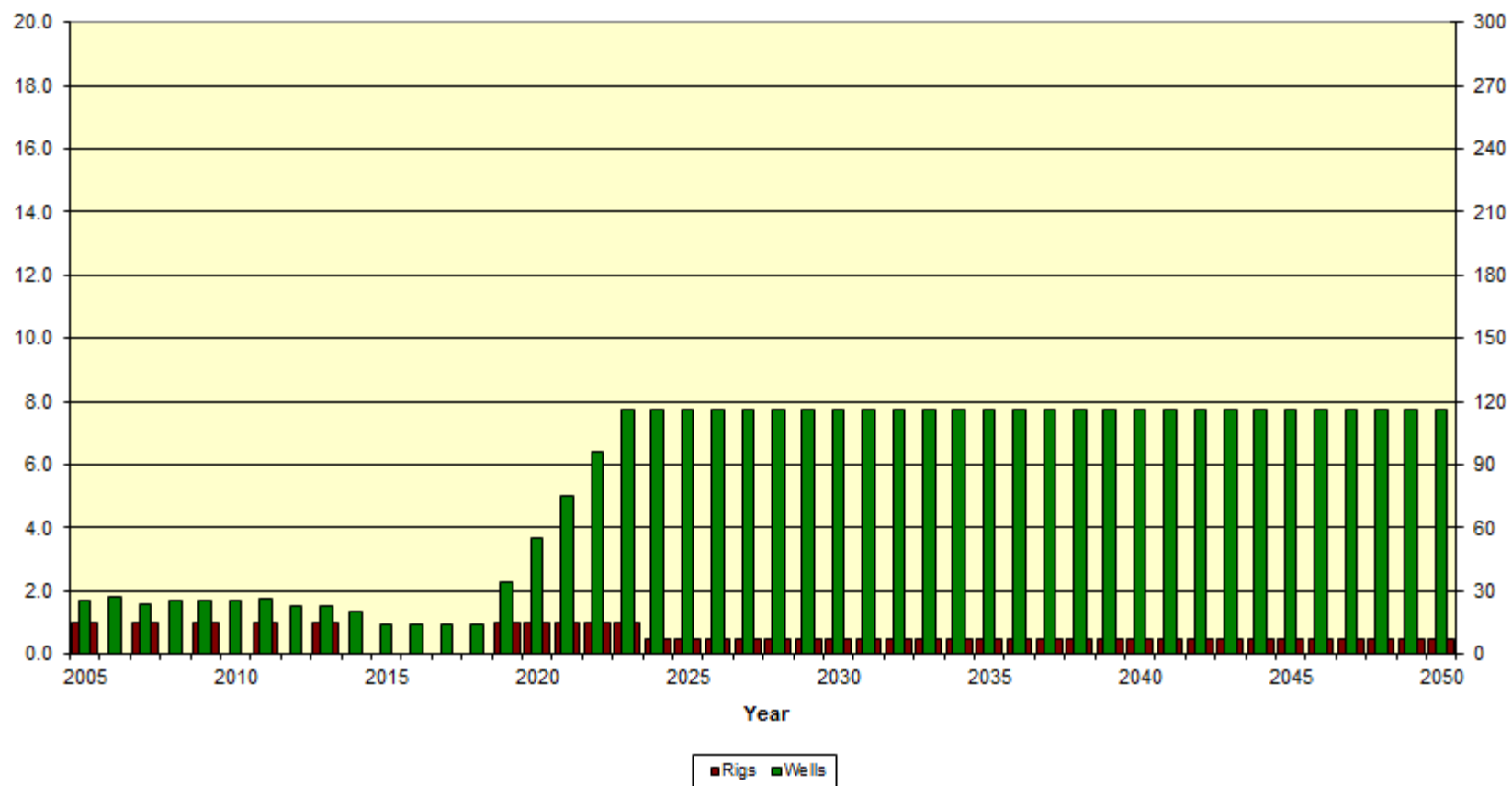




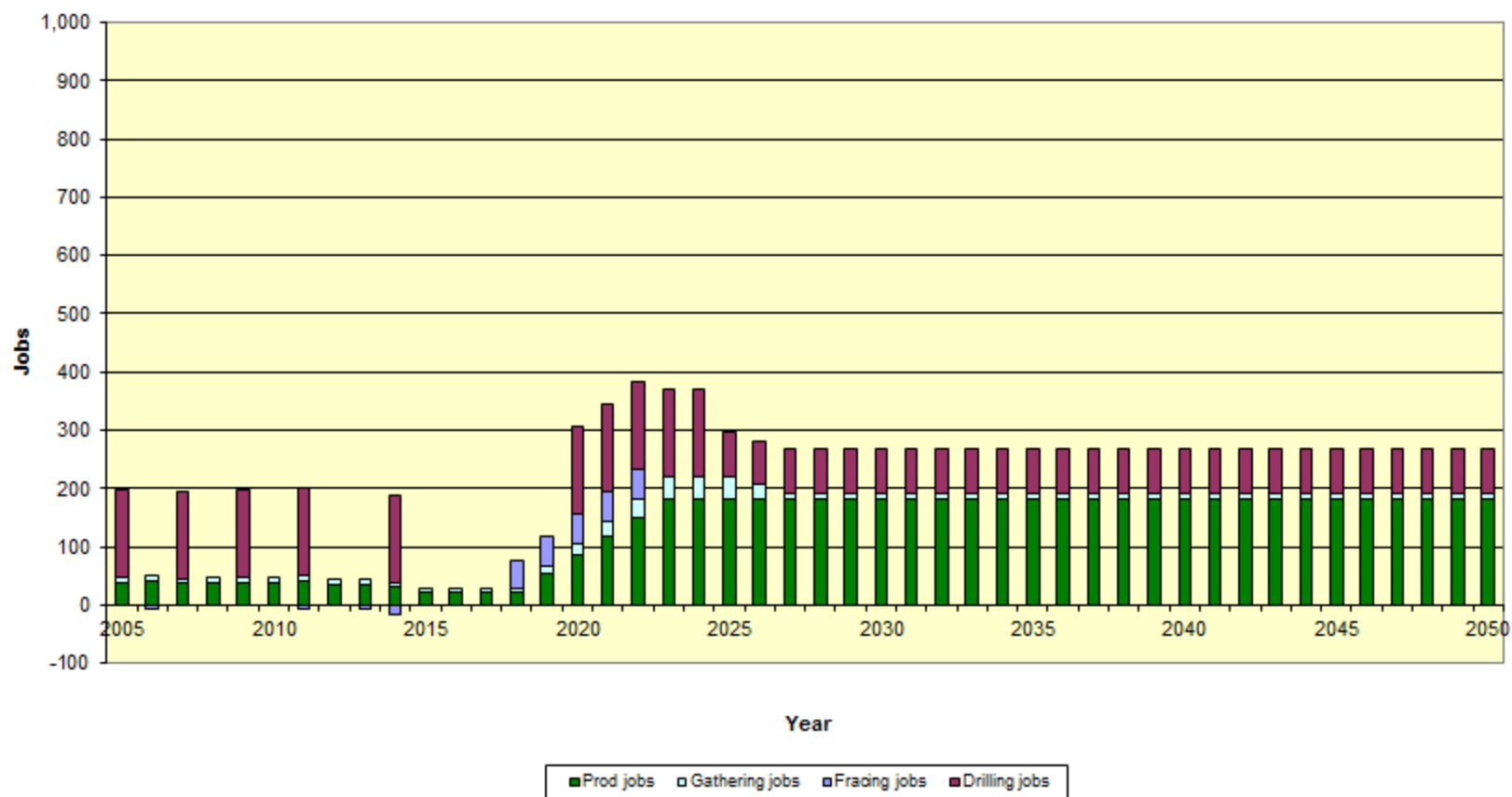
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

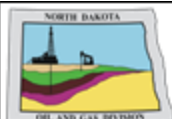


Ward Rigs and Jobs

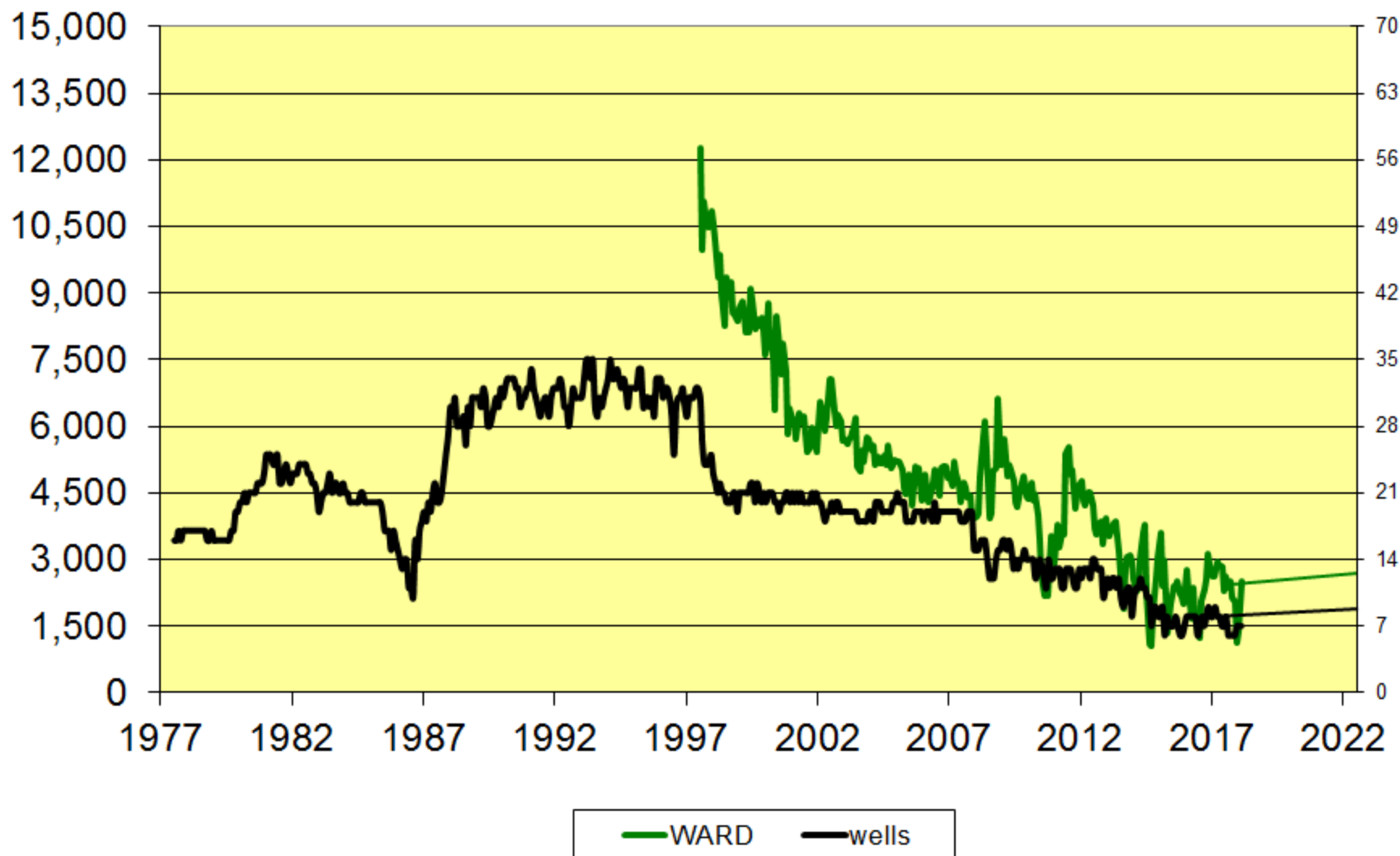


Ward Oil Industry Jobs

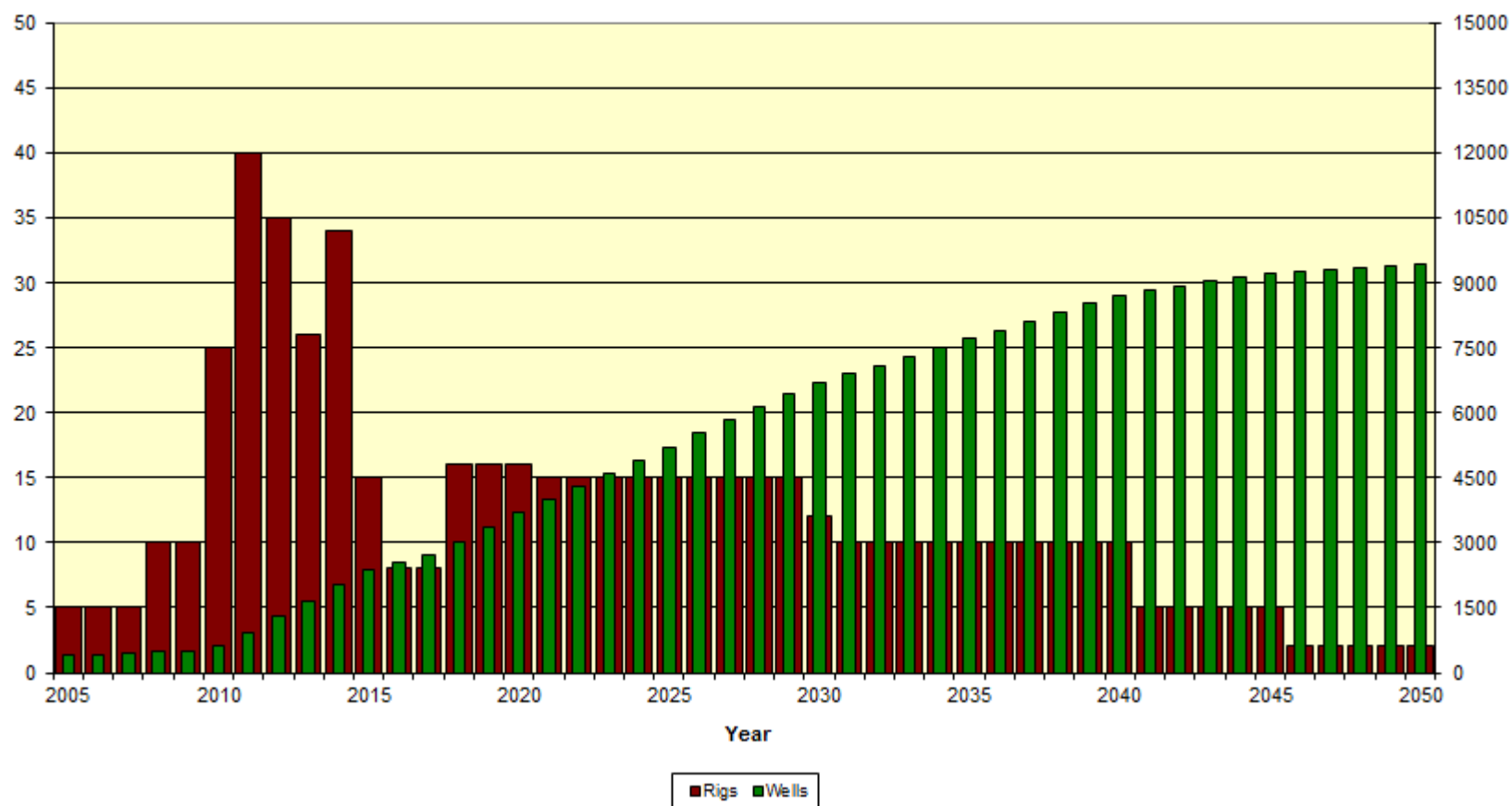




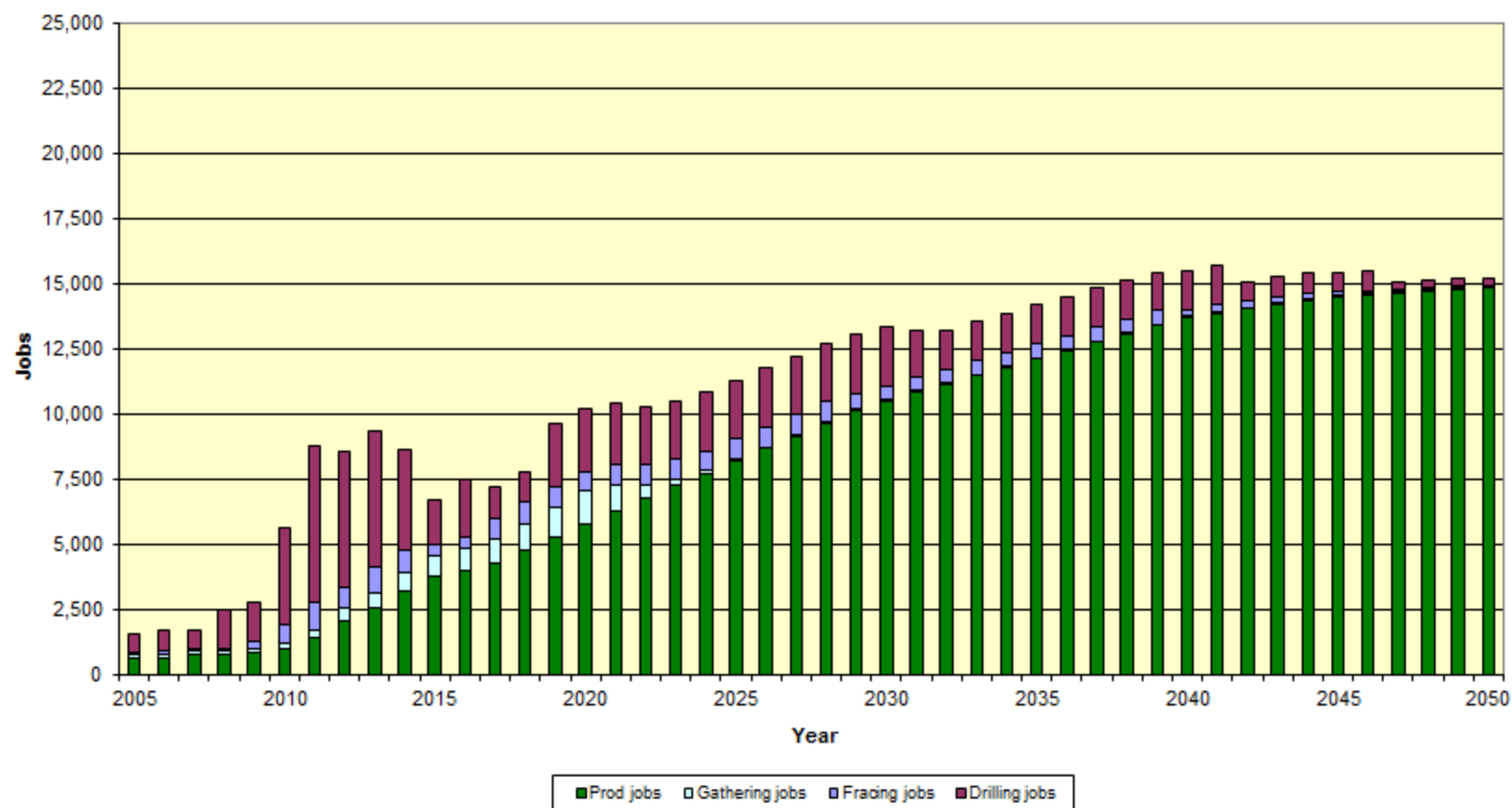
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

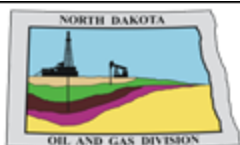


Williams Rigs and Wells

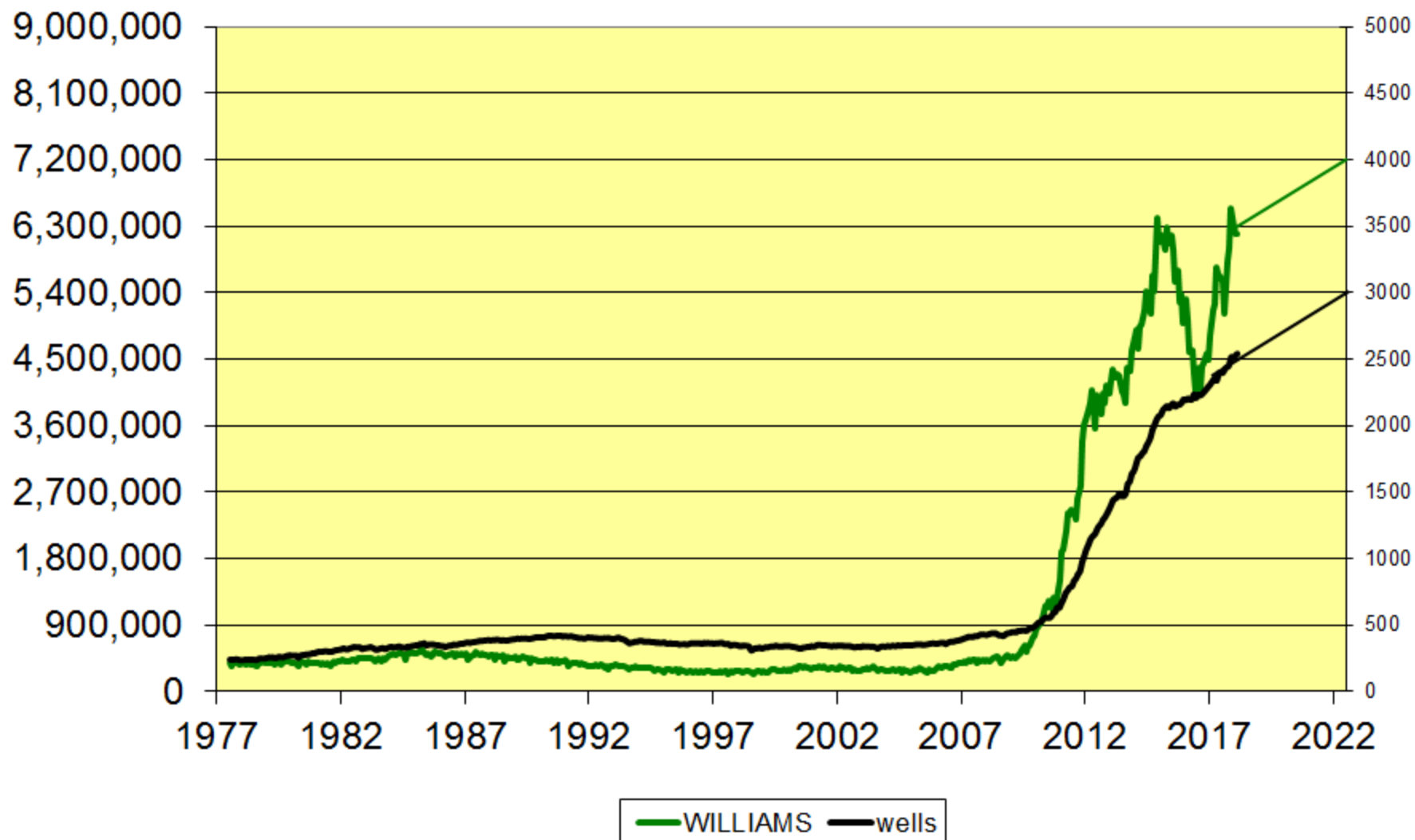


Williams Oil Industry Jobs





MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



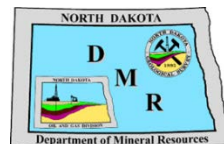
**NORTH DAKOTA
DEPARTMENT OF MINERAL RESOURCES**

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Bismarck, ND 58505**

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Email: oilandgasinfo@nd.gov



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