



North Dakota Update

October 12, 2022

WDEA Annual



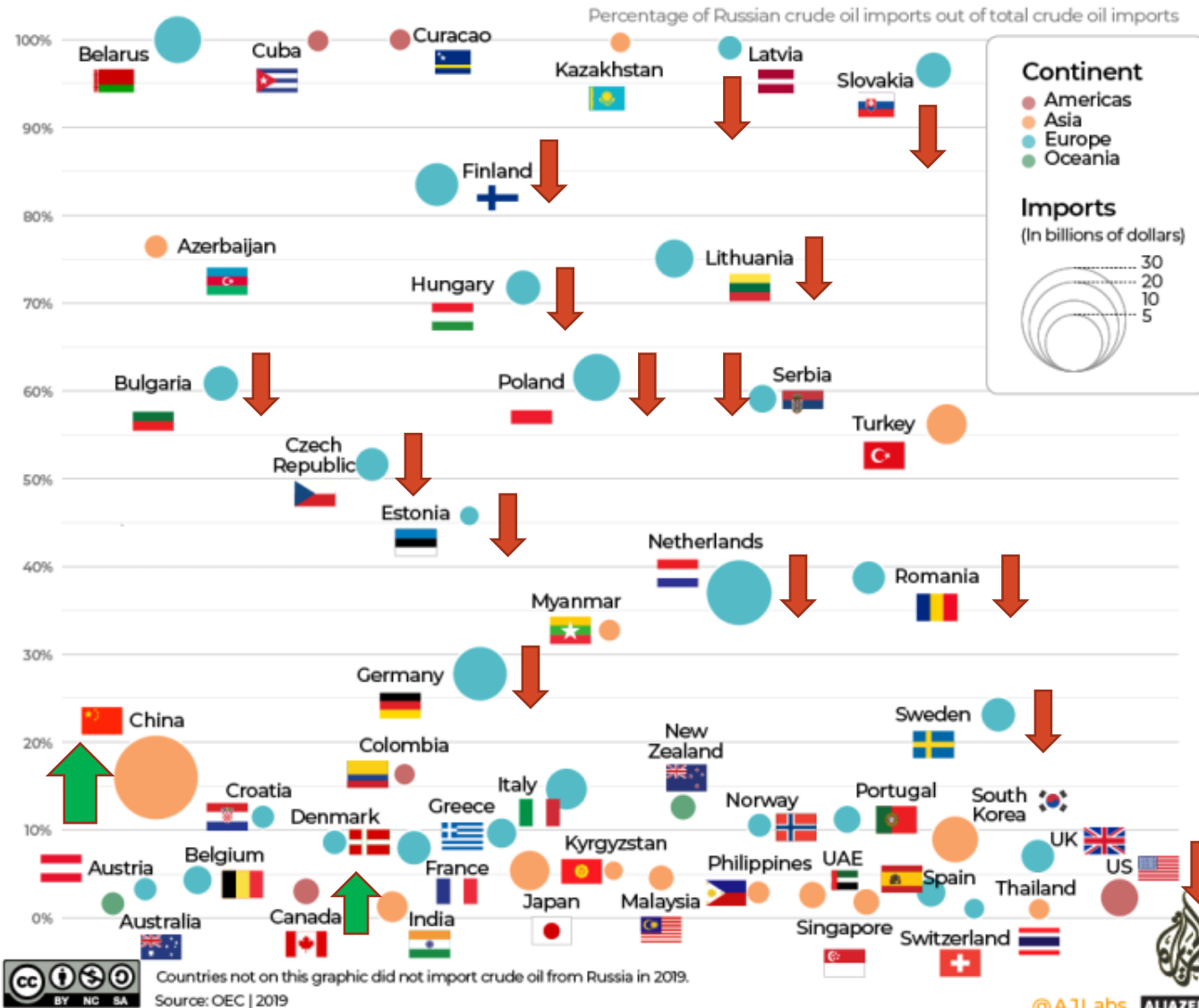
- **Statistics**
- **2023 Agency Legislation**
- **Bakken Development**
- **Non-Bakken EOR**
- **County projections**

UKRAINE-RUSSIA WAR

Which countries rely most on Russian oil?

Russia is the world's second highest exporter of crude oil, after Saudi Arabia.

In 2019, 48 countries bought Russian crude oil worth \$123bn.



Oil supply line
chaos

=

Oil and gas price
volatility



- **Statistics**
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Oil Production

July 1,069,786 barrels/day
August 1,069,073 barrels/day (all-time high 1,519,037 BOPD Nov 2019)
1,027,761 barrels/day or 96% from Bakken and Three Forks
41,312 barrels/day or 4% from legacy pools

NM = 1,521,715

Gas Production and Capture

July Production 3,102,446 MCF/day
94% Capture 2,911,763 MCF/day
August Production 2,978,111 MCF/day (all-time high 3,143,445 MCFD Nov 2019)
94% Capture 2,790,688 MCF/day (all-time high 2,911,763 MCFD July 2022)

July Gas Capture

Statewide	94%
Statewide Bakken	94%
Non-FBIR Bakken	94%
FBIR Bakken	94%
Trust FBIR Bakken	95%
Fee FBIR	87%

Permits 2022

June 77 drilling and 0 seismic
July 53 drilling and 0 seismic
August 102 drilling and 0 seismic
Sep 65 drilling and 0 seismic (all-time high 370 in 10/2012)

Rig Count 2022

July 45
August 46 (all-time high 218 on 5/29/12)
Federal surface 0
NM 113

Permits 2021

June 75 drilling and 0 seismic
July 40 drilling and 0 seismic
August 79 drilling and 0 seismic
Sep 69 drilling and 2 seismic (all-time high 370 in 10/2012)

Rig Count 2021

July 23
August 28 (all-time high 218 on 5/29/12)
Federal surface 0
NM 82

Permits 2020

June 72 drilling and 0 seismic
July 92 drilling and 0 seismic
August 47 drilling and 0 seismic
Sep 51 drilling and 0 seismic (all-time high 370 in 10/2012)

Rig Count 2020

July 11
August 12 (all-time high 218 on 5/29/12)
Federal surface 0
NM 82

Wells Waiting on Completion

July 483
August 477

Inactive Wells

July 1,655
August 2,432

Completions

July 74
August 66
Sep 81

Producing Wells

July 17,377
August 17,593 (preliminary)(NEW all-time high)
15,356 wells or 87% are now unconventional Bakken – Three Forks wells
2,237 wells or 13% produce from legacy conventional pools



- Statistics
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POTENTIAL LEGISLATION

AGENCY

Amend 38-22-06 (6) to streamline mineral owner notice requirement

Amend 57.51.1-02.2 to streamline application process and allow for tank vapor capture technologies

Agency budget funding to move website and data from on site servers to cloud

LEGISLATORS

Create royalty owner ombudsman program similar to pipeline ombudsman

Amend 38-08-04 to clarify NDIC authority over all equipment located on well sites

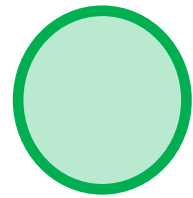
INDUSTRY

Amend 38-08-04 (1) (a) (12) EOR idle well category for low production multi-well pad Bakken wells

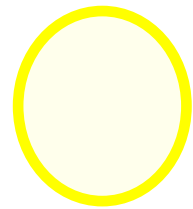
Amend 38-08-04 (2) spill reporting for “fully contained” secondary containment



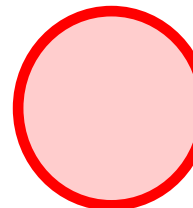
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Core=Tier 1
 80-85% developed
 +3,000 wells
 5% growth = 55 rigs = 2 years
 1-2% growth = 35 rigs = 4 years
 EOR

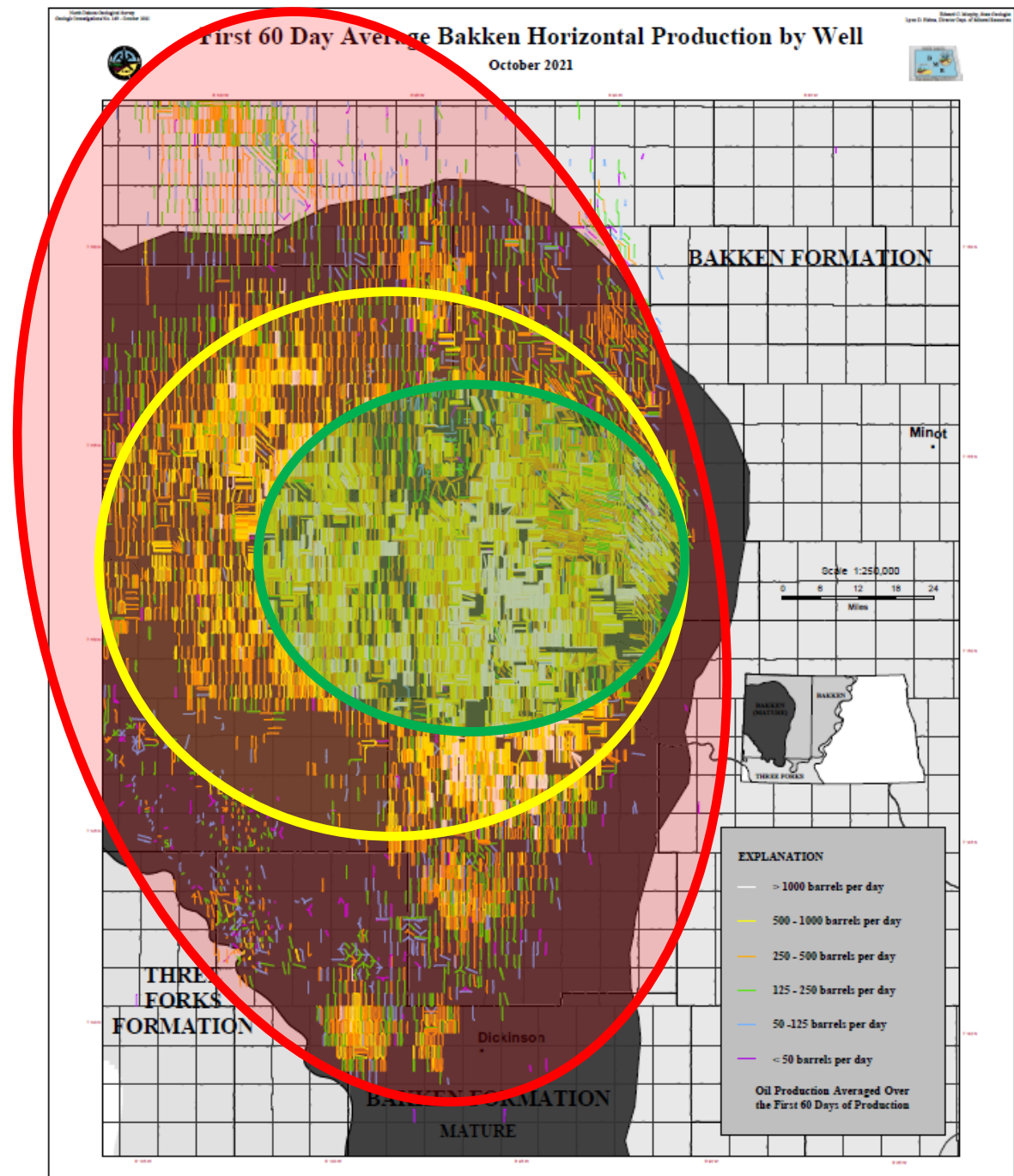


Tier 2
 50% developed
 +10,000 wells
 5% growth = 100 rigs = 4 years
 1-2% growth = 50 rigs = 8 years

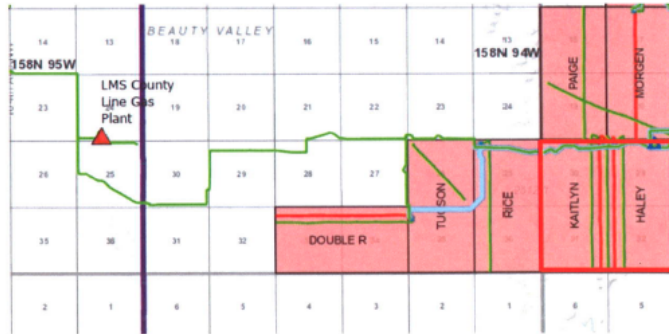


Tier 3
 25% developed
 +10,000 wells
 5% growth = 150 rigs = 3 years
 1-2% growth = 75 rigs = 6 years

Total = +23,000 wells & 10-20 years
 Current 17,000 wells in 16 years



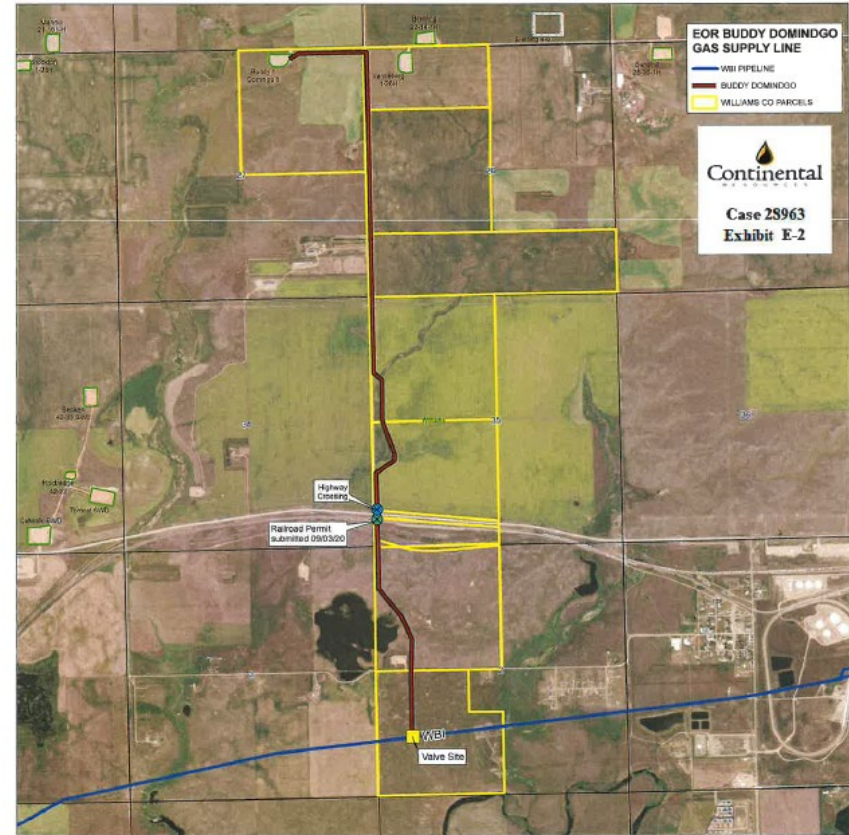
Features of Project Location



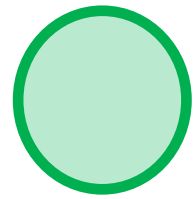
- 2560-acre Spacing Unit of Interest
- Existing Middle Bakken Horizontal
- Existing Three Forks Horizontal
- Existing Gas Pipeline (LMS)
- Existing Water Pipeline (LMS)

- Location selected based on results and learnings from prior Bakken EOR pilots, specifically the “Stomping Horse” pilot documented in NDIC Case No. 27926.
- Utilizes more recently completed infill wells (August ‘19); limited depletion.
- Accesses rich gas via connection to the gas plant gathering line.
- Liberty operates most of the offsetting DSUs.
- Well & completion design provides for favorable conformance along the horizontal interval using cemented liners with “Plug & Perf” completions.
- Jet pump operations ease well conversion to injection.
- Offset well configuration allows for surveillance and boundaries.

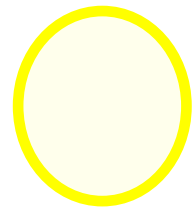
INDUSTRIAL COMMISSION
 STATE OF NORTH DAKOTA
 DATE 6-17-21 CASE NO. 28830
 Prepared by Liberty
 Exhibit E-2
 Identified By Pospisil



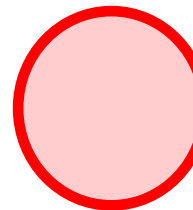
INDUSTRIAL COMMISSION
 STATE OF NORTH DAKOTA
 DATE 9-30-21 CASE NO. 28963
 Prepared by Continental
 Exhibit E2
 Identified By Bennett



Core=Tier 1
 75-85% developed
 +3,000 wells
 5% growth = 55 rigs = 2 years
 1-2% growth = 35 rigs = 4 years
 EOR

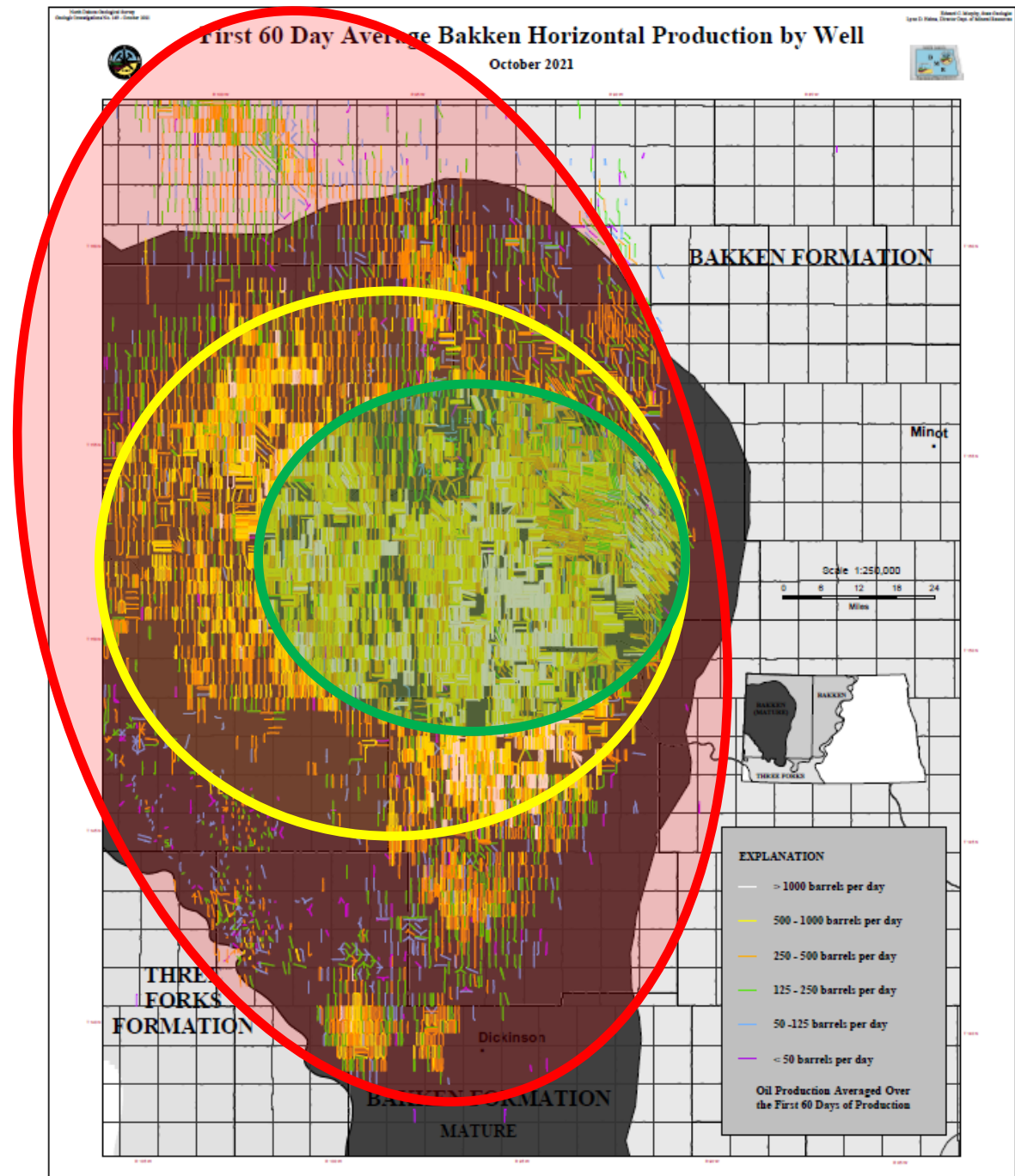


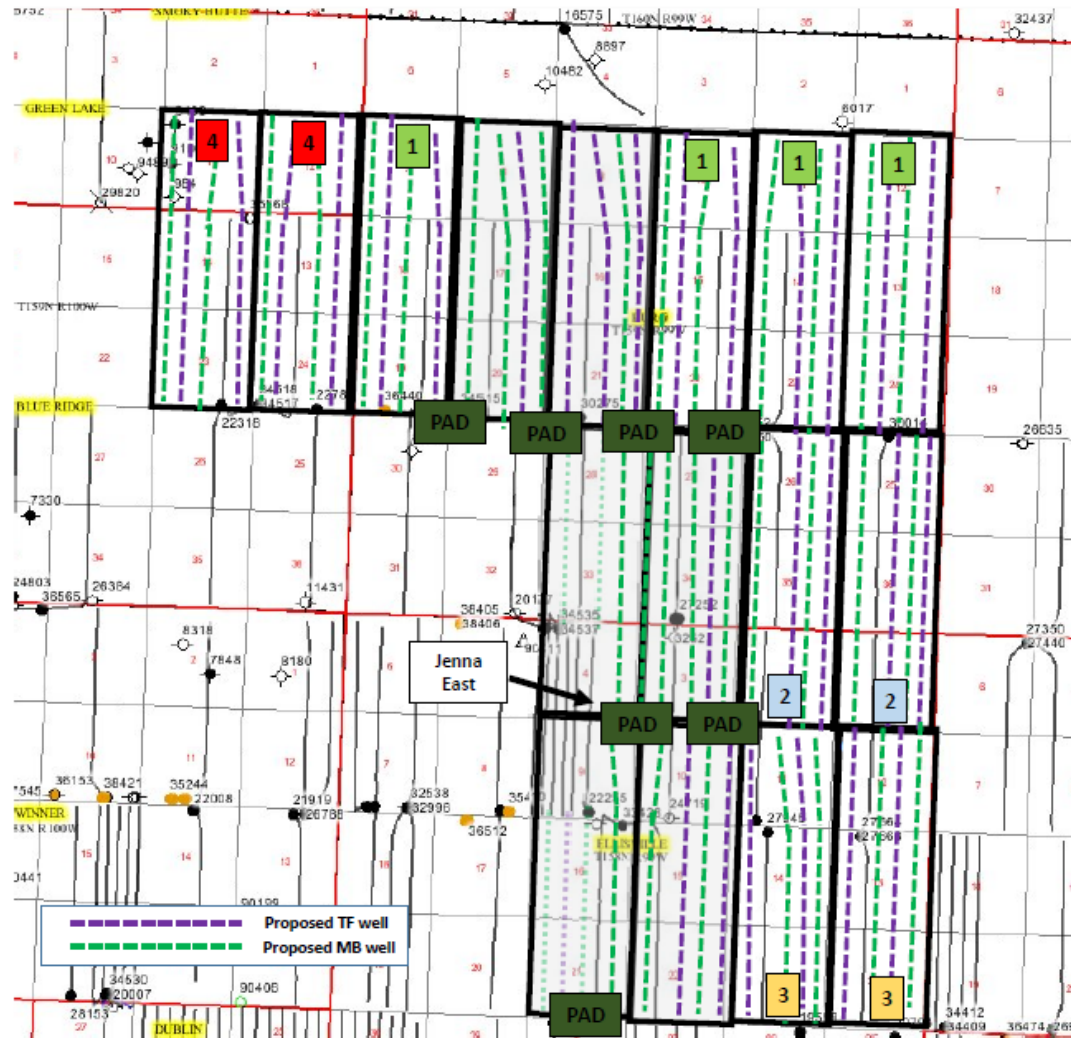
Tier 2
 50% developed
 +10,000 wells
 5% growth = 100 rigs = 4 years
 1-2% growth = 50 rigs = 8 years



Tier 3
 25% developed
 +10,000 wells
 5% growth = 150 rigs = 3 years
 1-2% growth = 75 rigs = 6 years

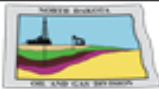
Total = +23,000 wells & 10-20 years
 Current 17,000 wells in 16 years



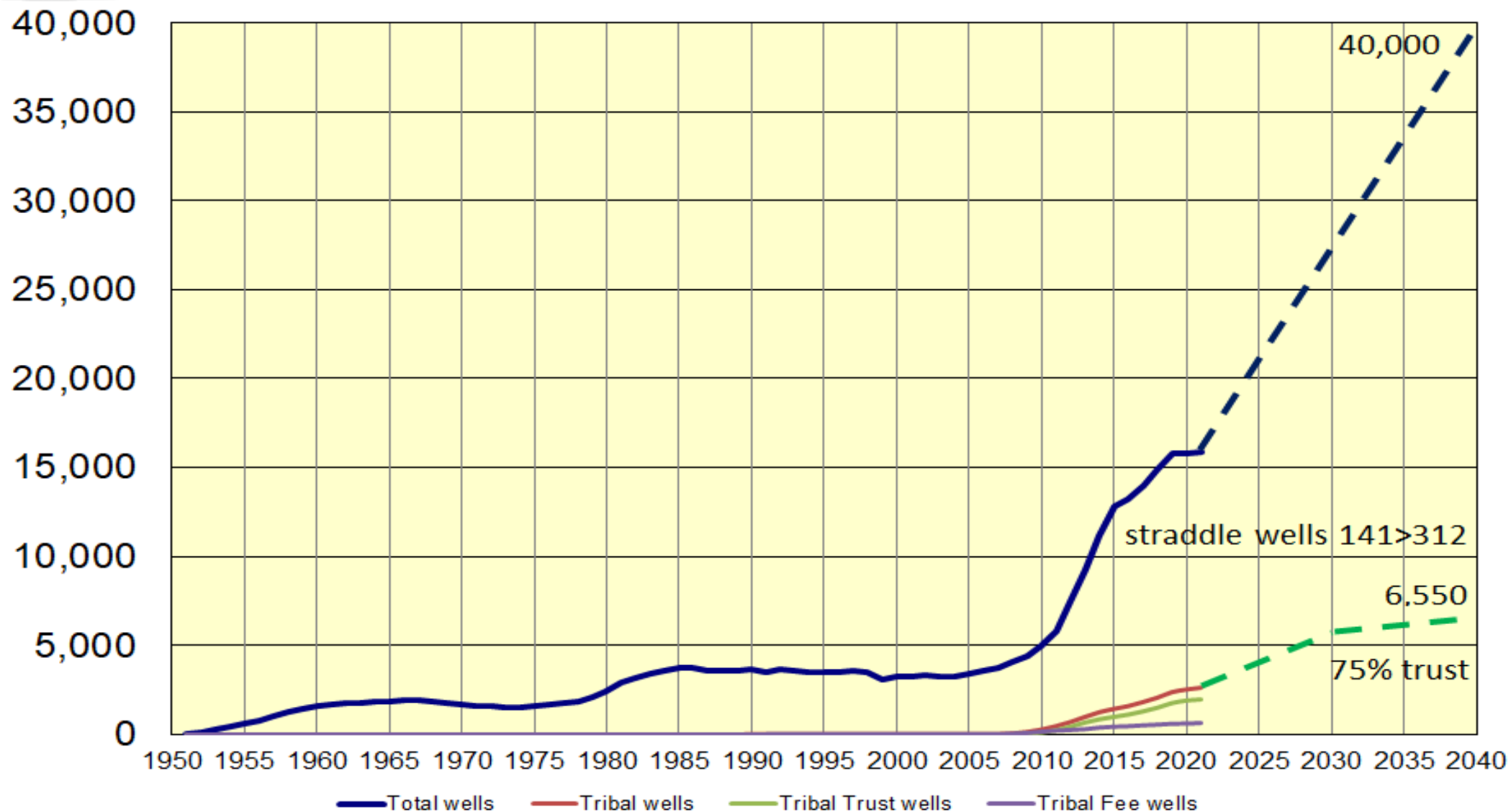


Legend	Case Status
	Heard in May/June 2021
1	28855
2	28856
3	28857
4	28858

Kraken Operating, LLC
Case Nos. 28855, 28856,
28857, 28858
July 28, 2021
Supp. Exhibit A

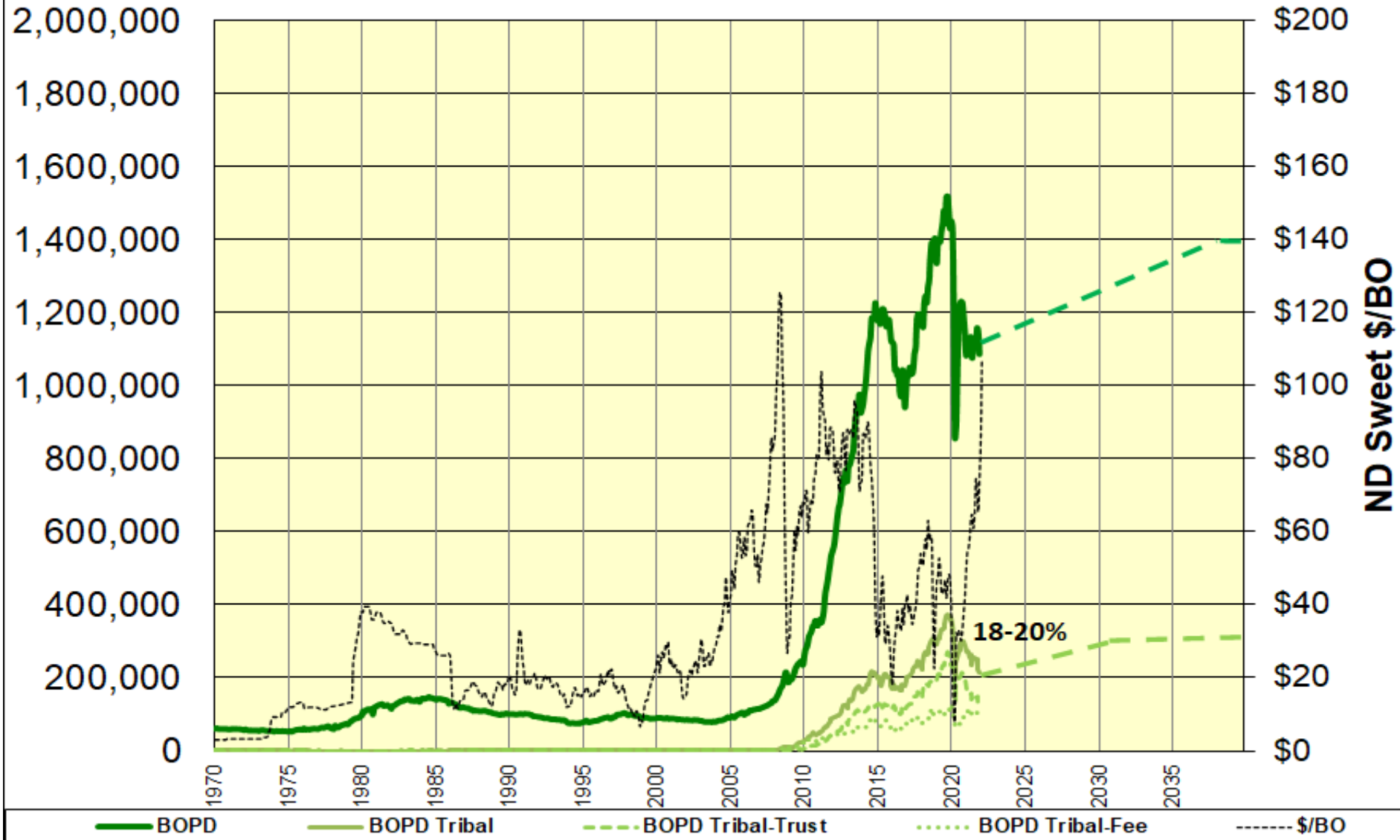


North Dakota Wells Producing

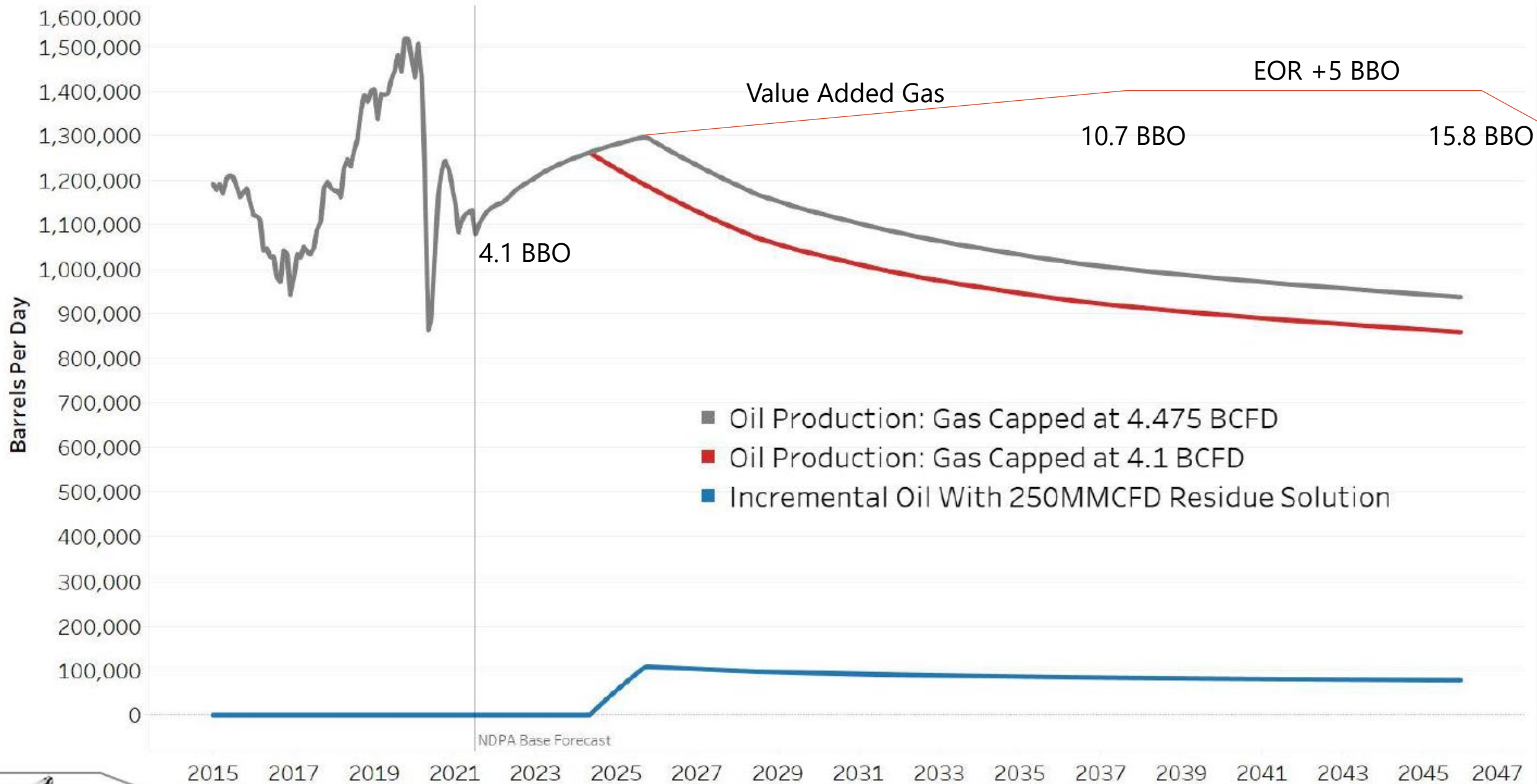




North Dakota Daily Oil Produced and Price



Gas Transmission Expected to Limit Oil Production





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- 2023 Agency Legislation
- Bakken Development
- **Non-Bakken EOR**
- County projections

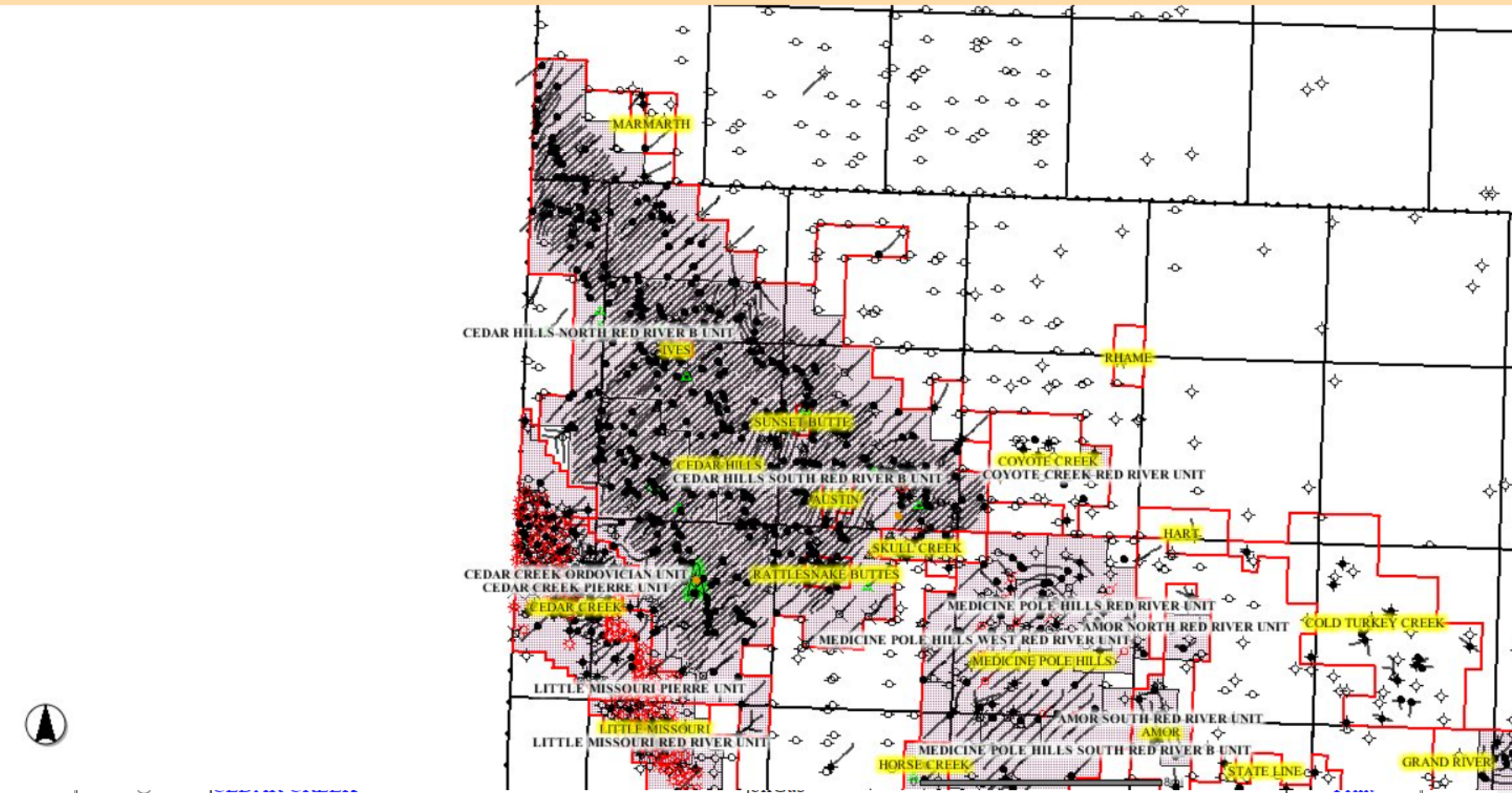
Oil and Gas : ArcIMS Viewer

- Legend / Layers
- Overview Map
- View Entire State
- Previous View
- Clear Selection
- Search
- Create PDF

- Zoom In
- Zoom Out
- Pan
- Rect Identify
- Select Object
- Buffer
- Distance

- Find Well
- Find Field / Unit
- Find Section

- Browser Settings
- Suggestion



- ### ND OIL & GAS LAYERS
- Oil and Gas
 - Wells
 - Permit Status Before Spud
 - Rig Location
 - Directional Surveys
 - Directional Legs
 - Horizontal Surveys
 - Horizontal Legs
 - Cases Docketed
 - Oil Fields
 - Unit Boundaries
 - Inspector Areas
 - Drilling / Spacing
 - Seismic
 - Gas Plants
 - Other

Refresh Map

Auto Refresh

Help:

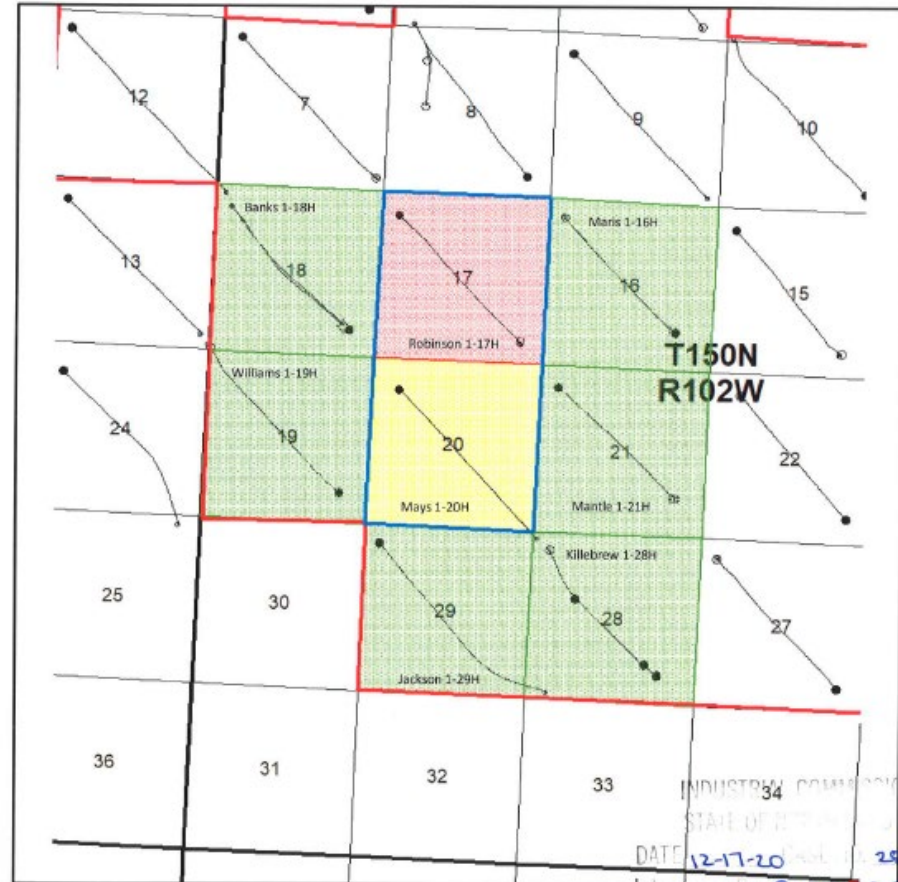
- A closed group, click to open.
- An open group, click to close.
- A map layer.
- A hidden group/layer, click to make visible.
- A visible group/layer, click to hide.
- A visible layer, but not at this scale.
- A partially visible group, click to make visible.
- An inactive layer, click to make active.
- The active layer.

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<input type="radio"/>	CENTENNIAL	oilGas	Print
<input type="radio"/>	CHAMA	oilGas	Print
<input type="radio"/>	CHARBONNEAU	oilGas	Print
<input type="radio"/>	CHARLIE BOB	oilGas	Print

Find

Mays Waterflood Test Plat

Foreman Butte Field: Madison Pool

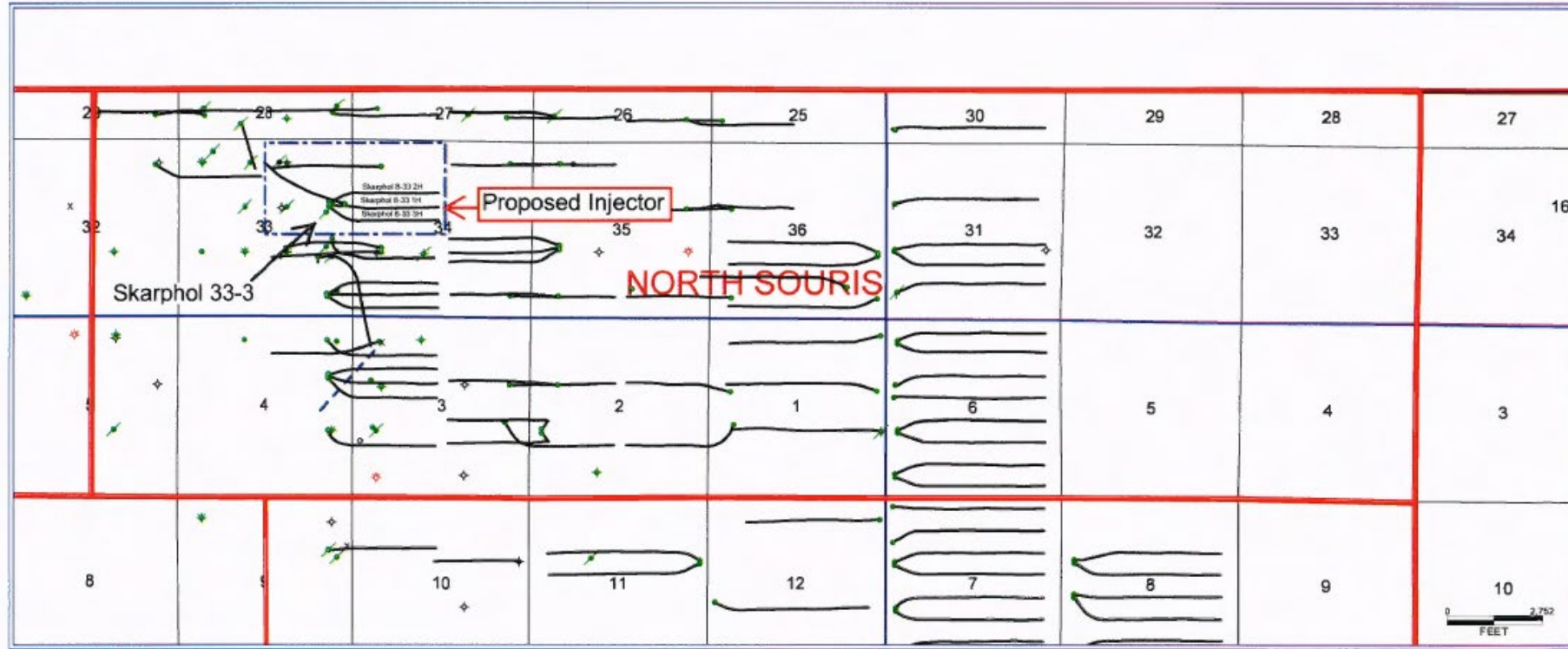


INDUSTRIAL COMMISSION
STATE OF OREGON
DATE 12-17-20
INDEXED
EXHIBIT 4
IDENTIFIED BY Hatcher

Mays 1-20H – Injector		Mays/Robinson Unit	
Robinson 1-17H – Producer			
6 Monitoring Wells			

Exhibit: 4
Docket Case No. 28572

Proposed horizontal water injection well location and offset vertical type well



Spacing Unit - Case 21763, Ballantyne Oil, LLC leasehold



North Souris Field Boundary

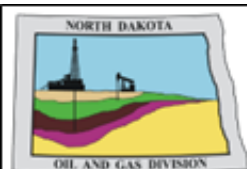
INDUSTRIAL COMMISSION
 STATE OF NORTH DAKOTA
 DATE 8/20/21 CASE NO. 28924
 Introduced By Ballantyne
 Exhibit 2
 Identified By Jennings

Ballantyne Oil, LLC
 Case No. 27266
 Exhibit 2

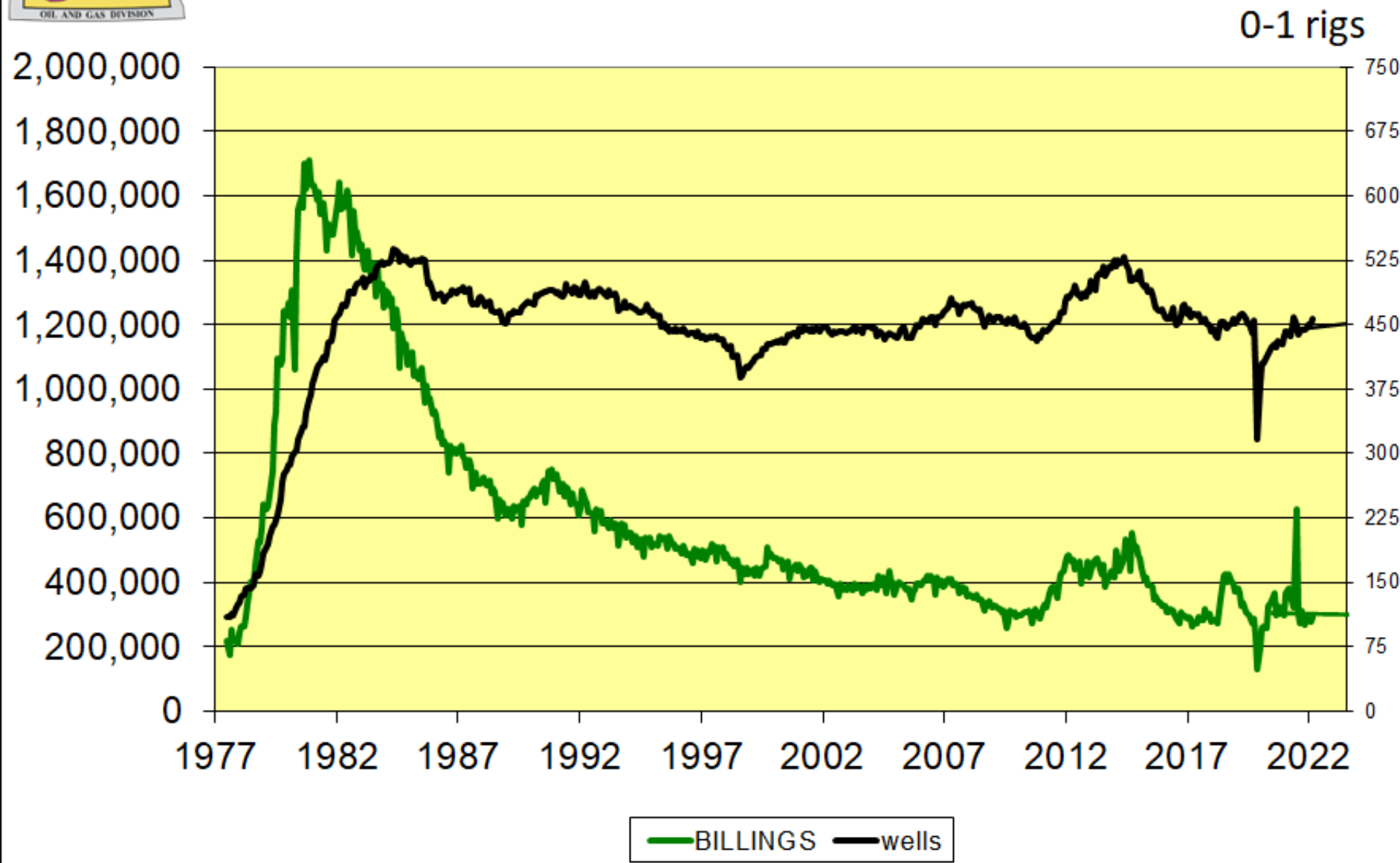


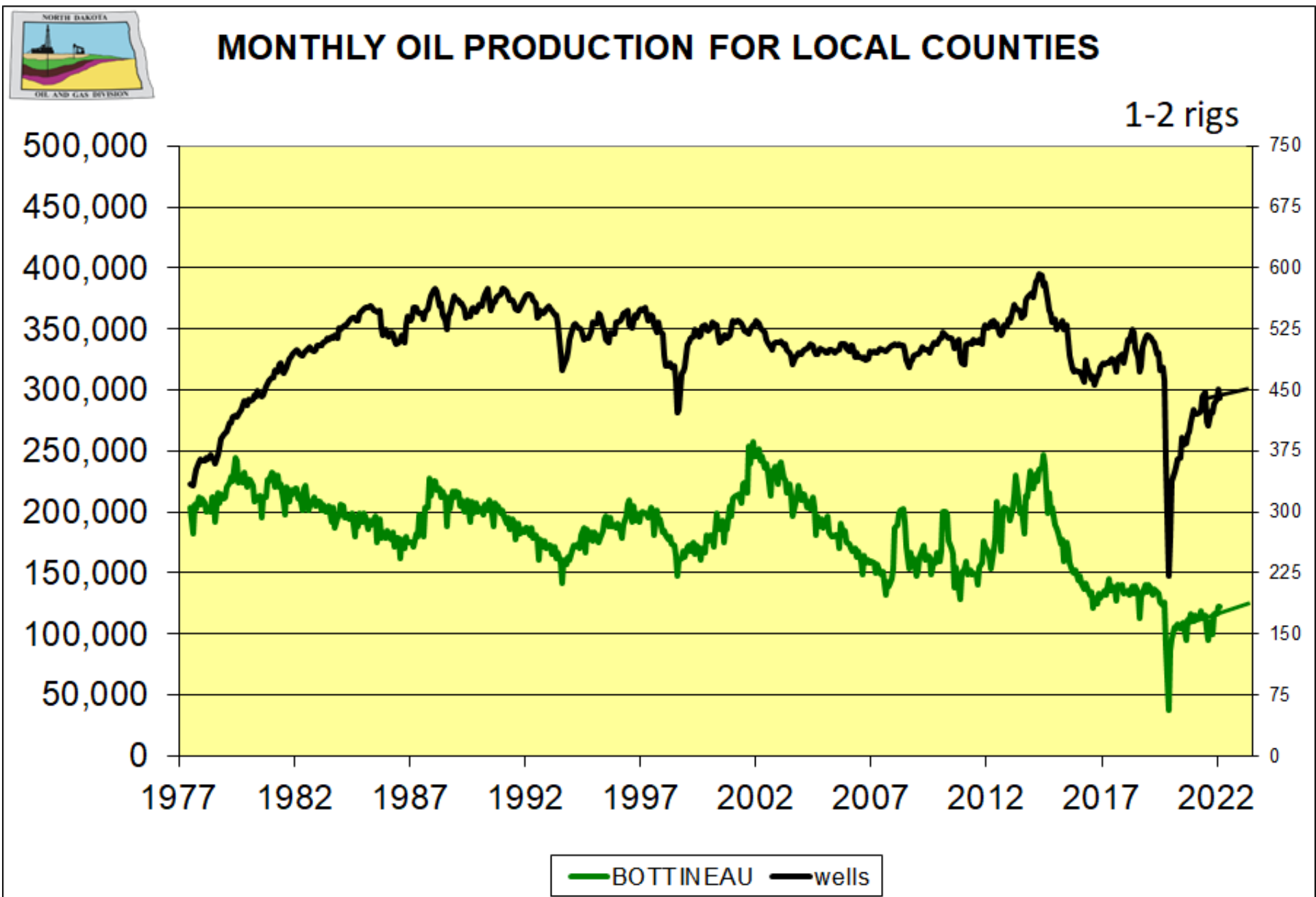
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Federal lands ???

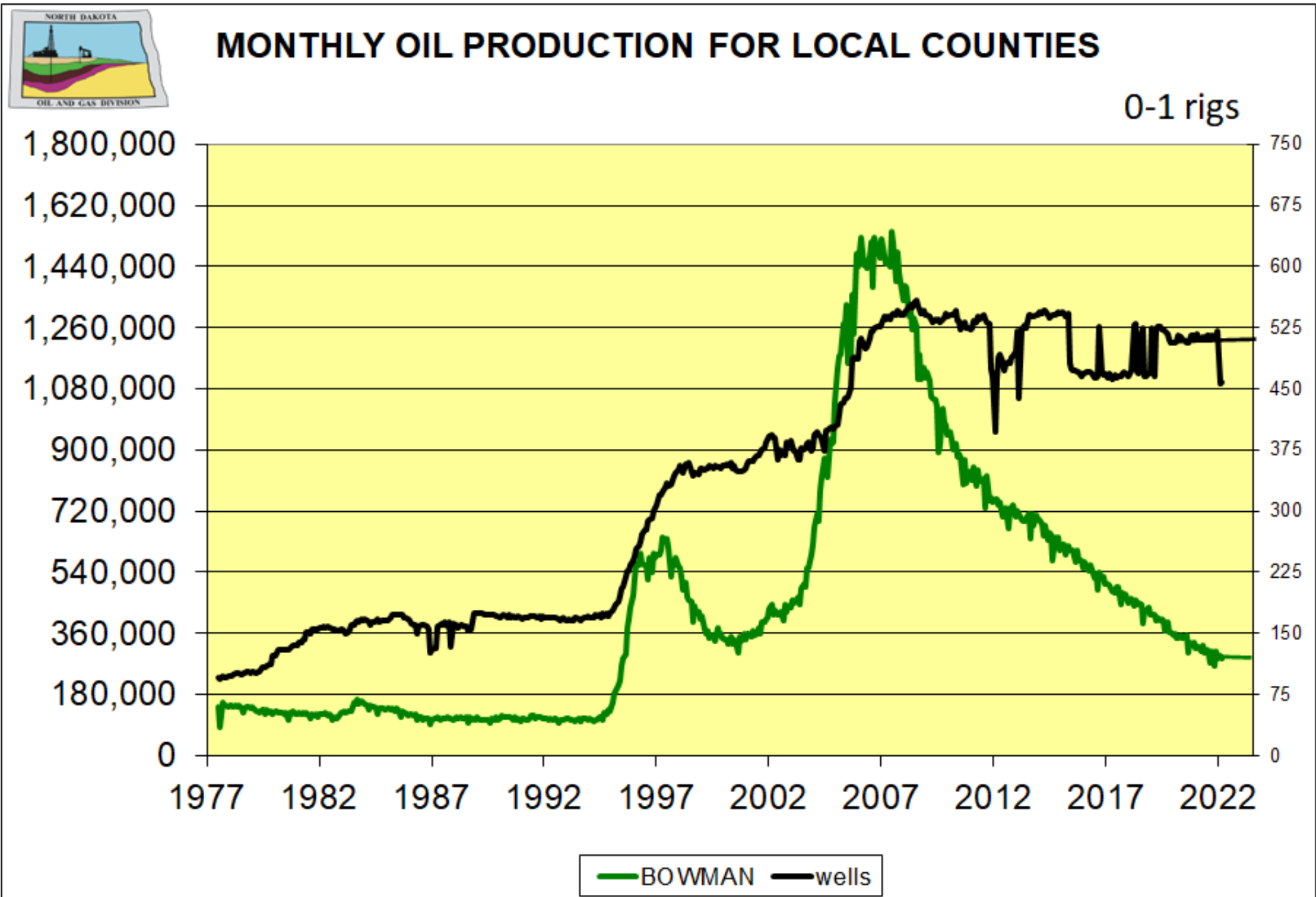


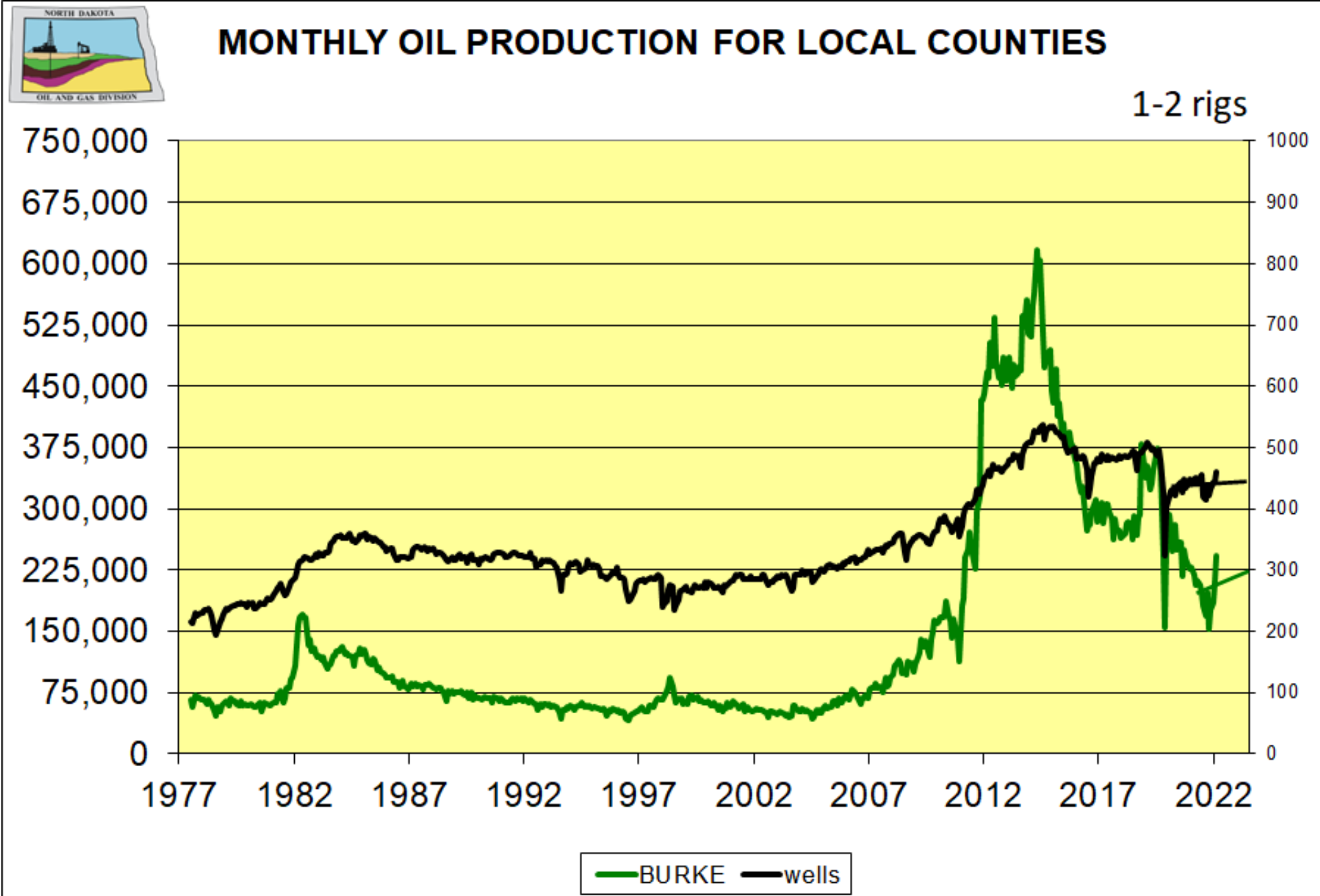
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

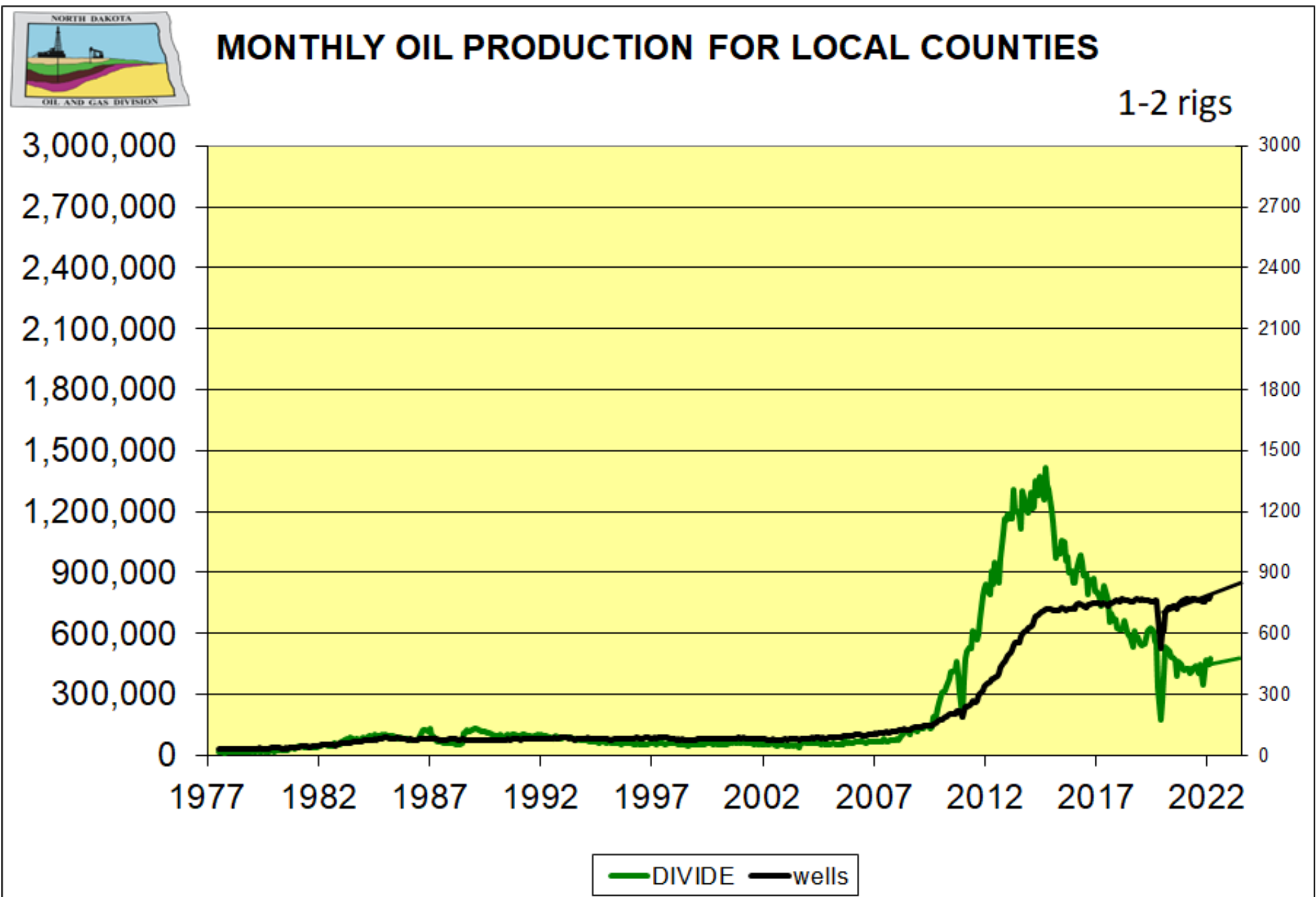




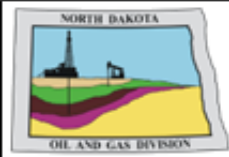
Cedar Hills CO2



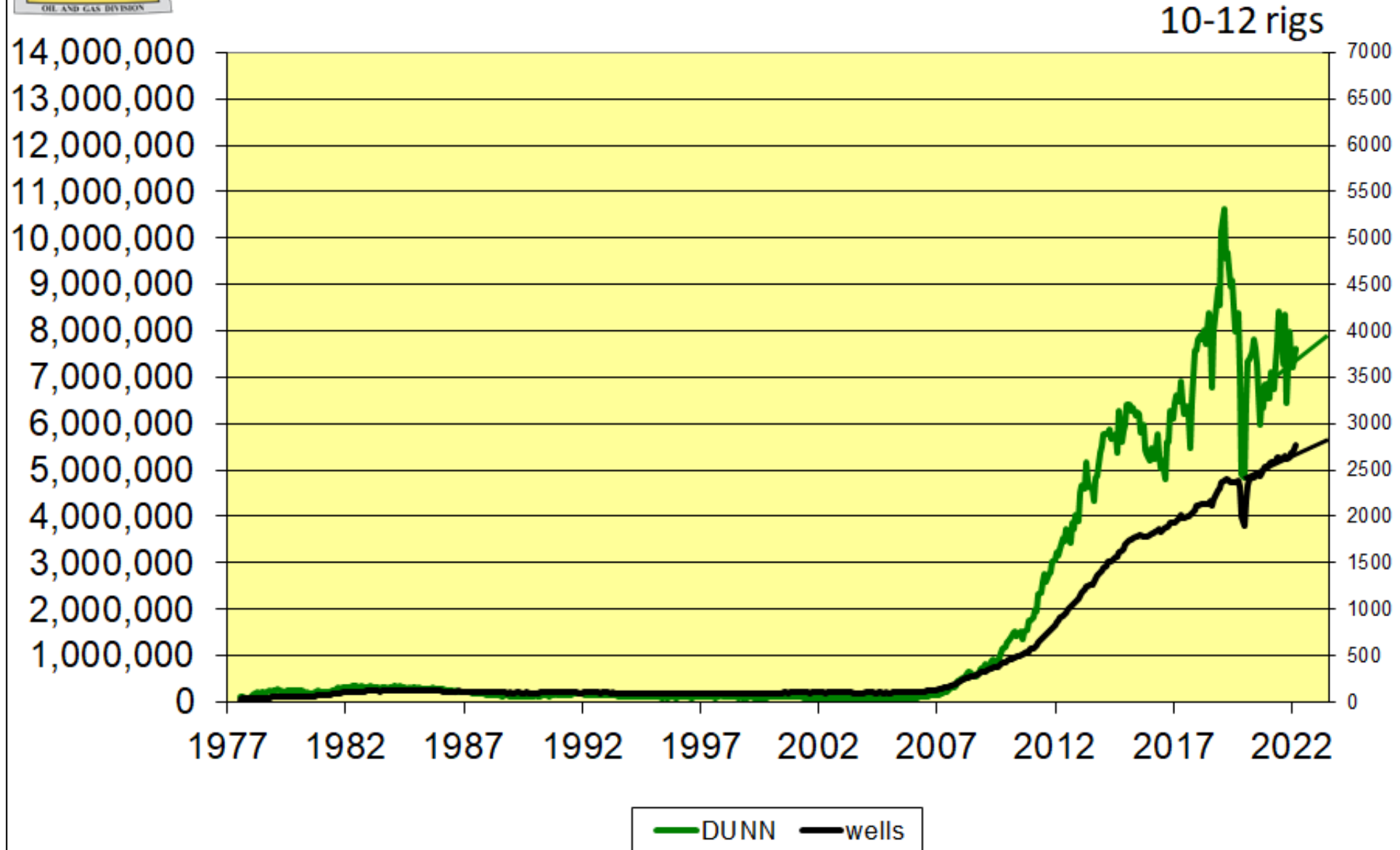




Tier 1 and 2 development and gas capture

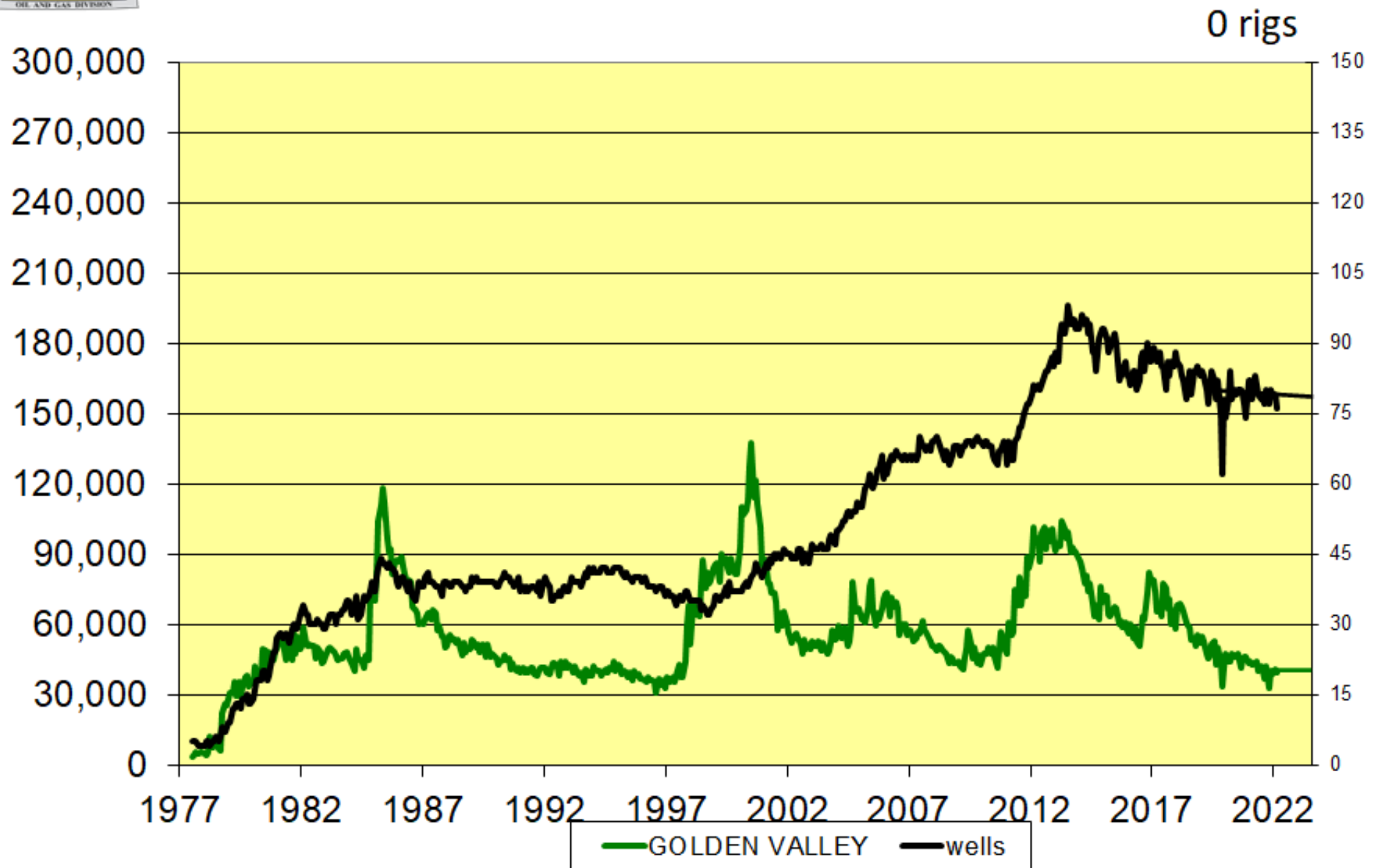


MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



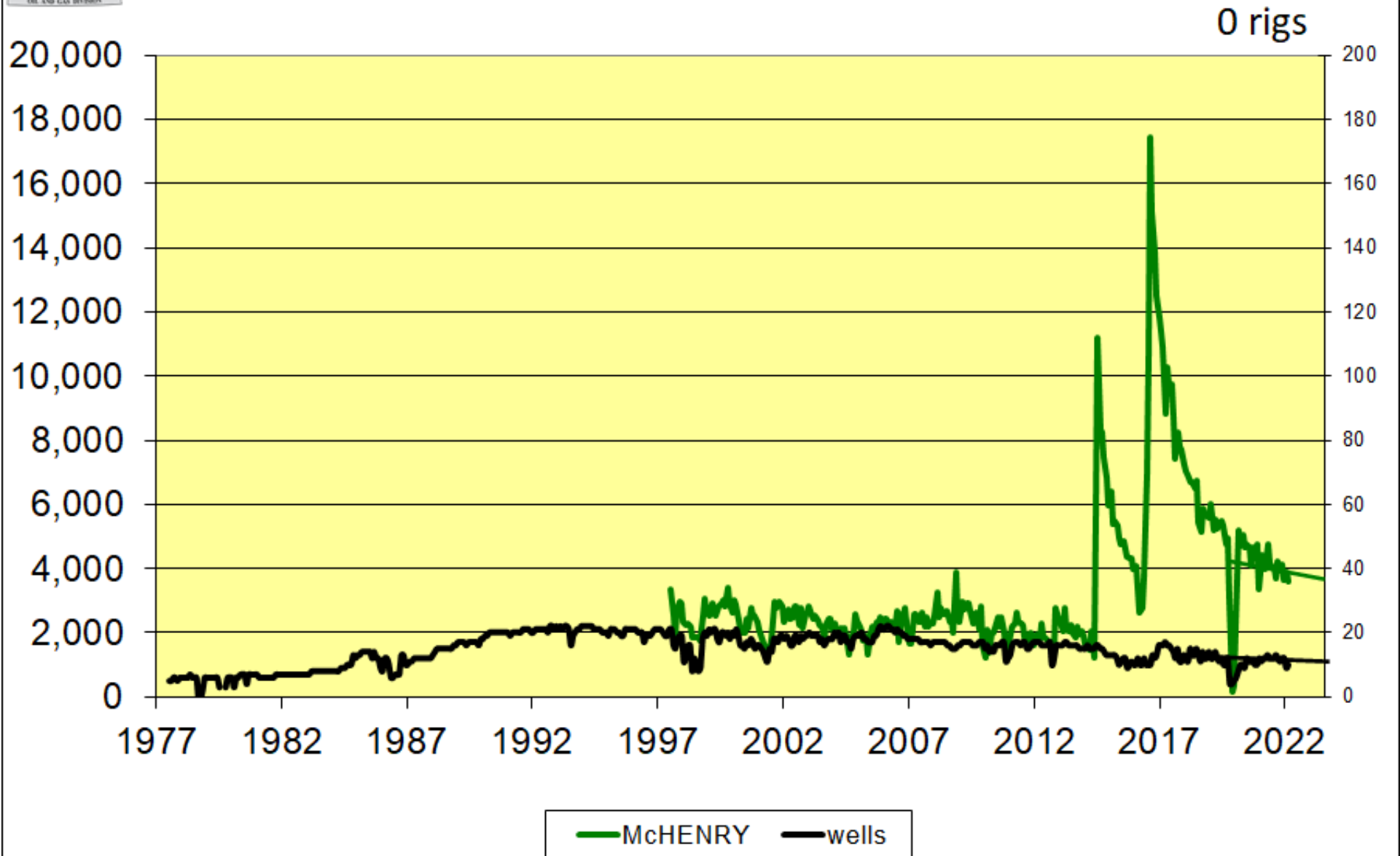


MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

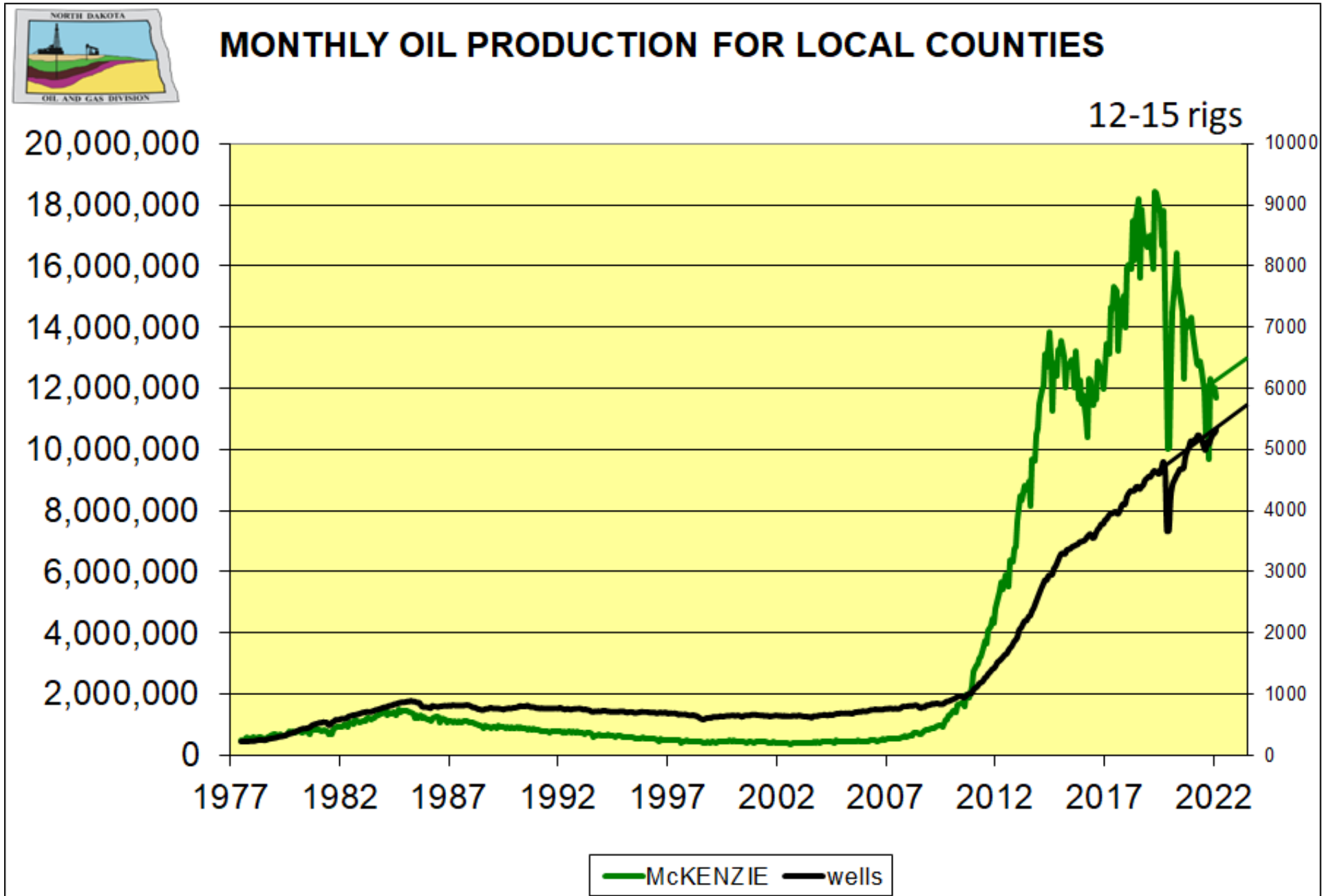




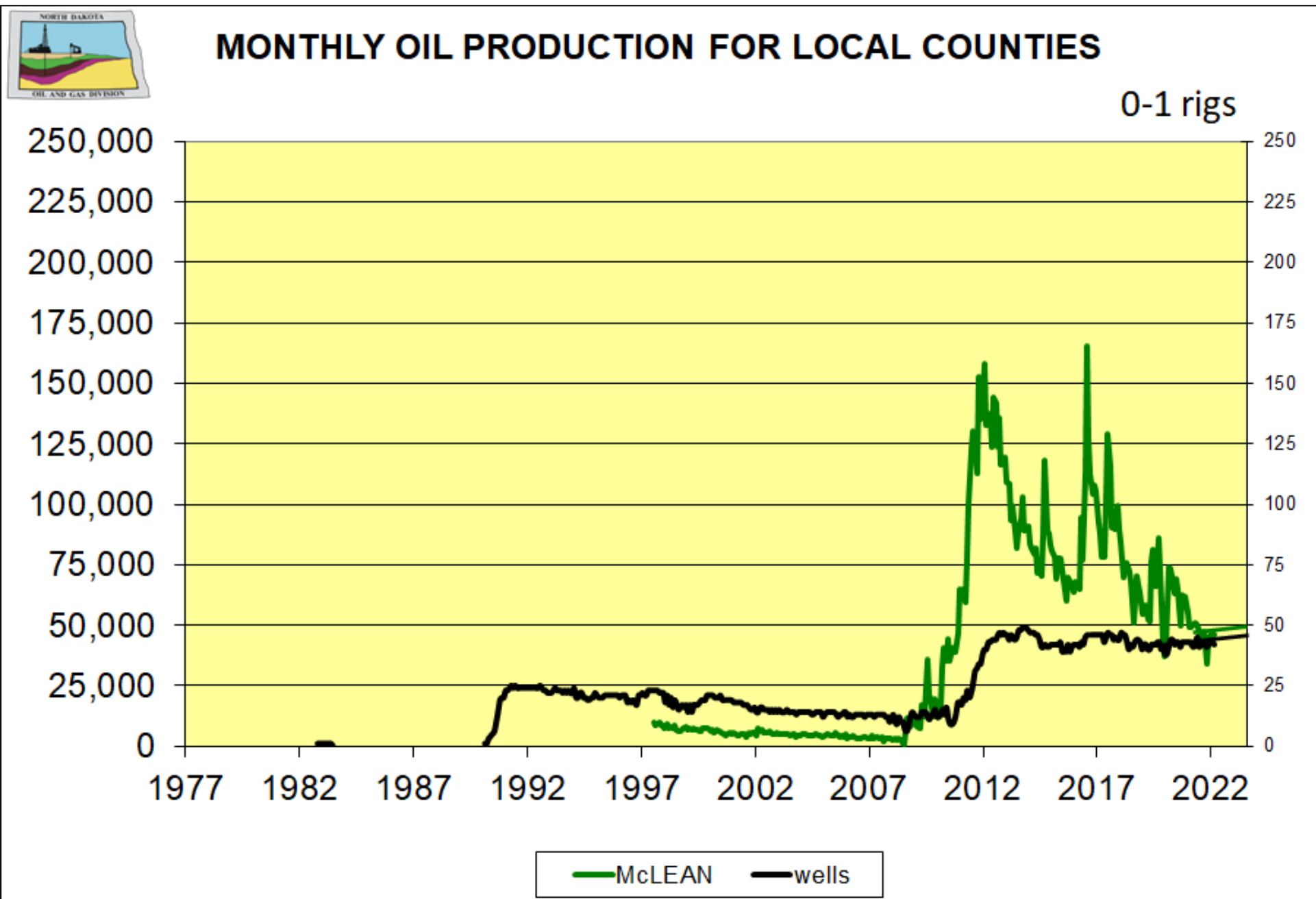
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES



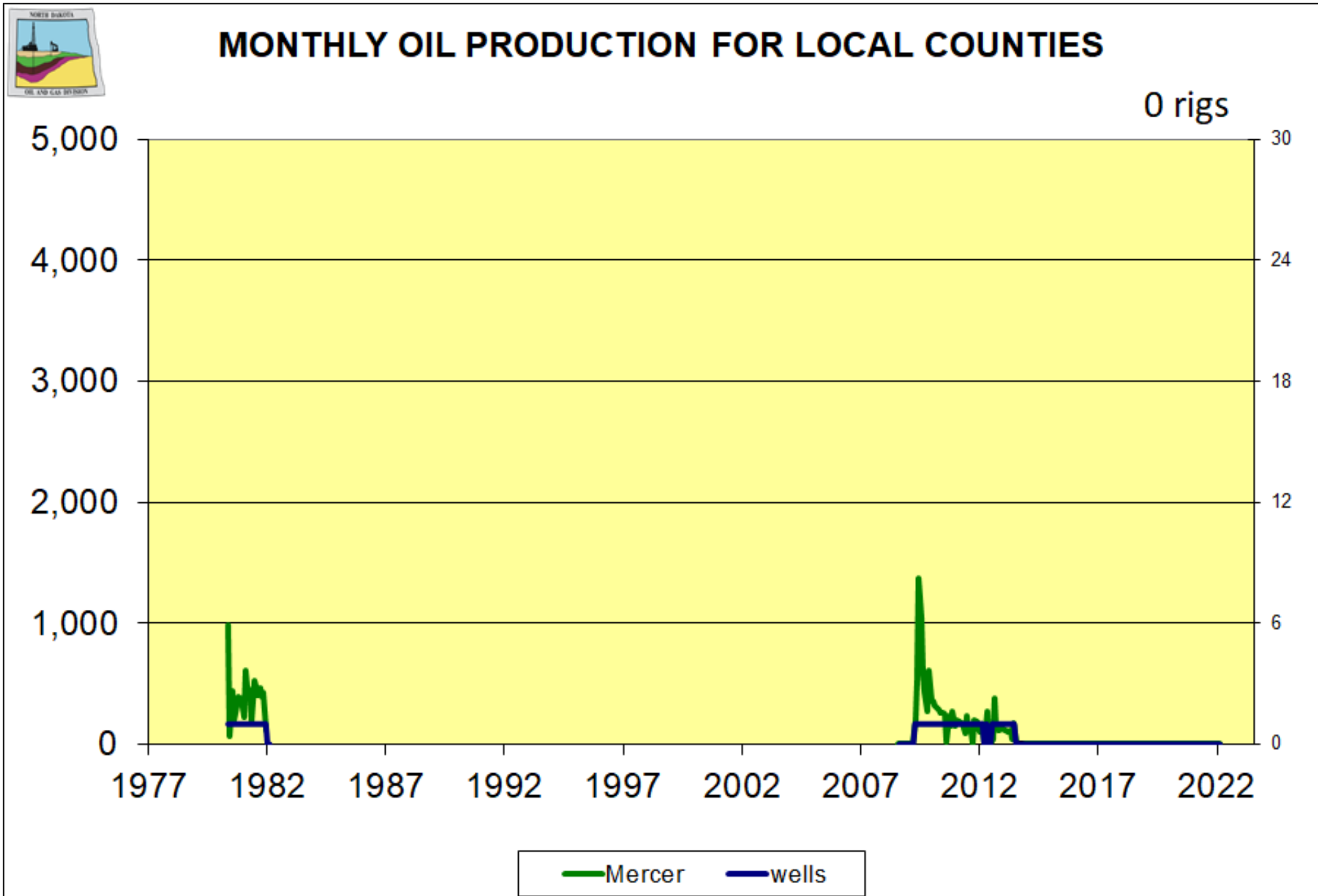
Tier 1 1280 and Tier 2 1920 development



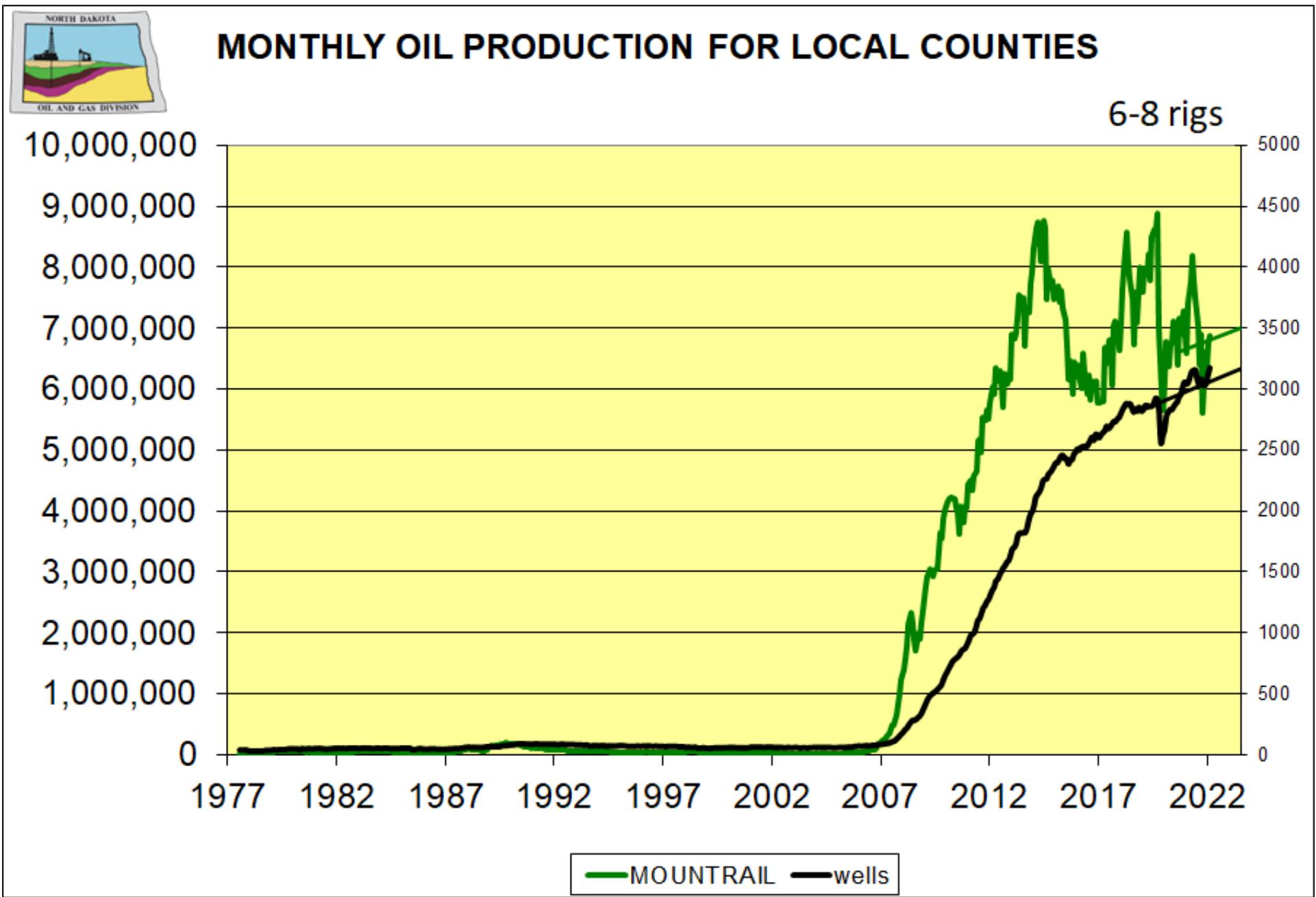
Tier 2 1920 development



Lodgepole requires sustained \$100+ oil price



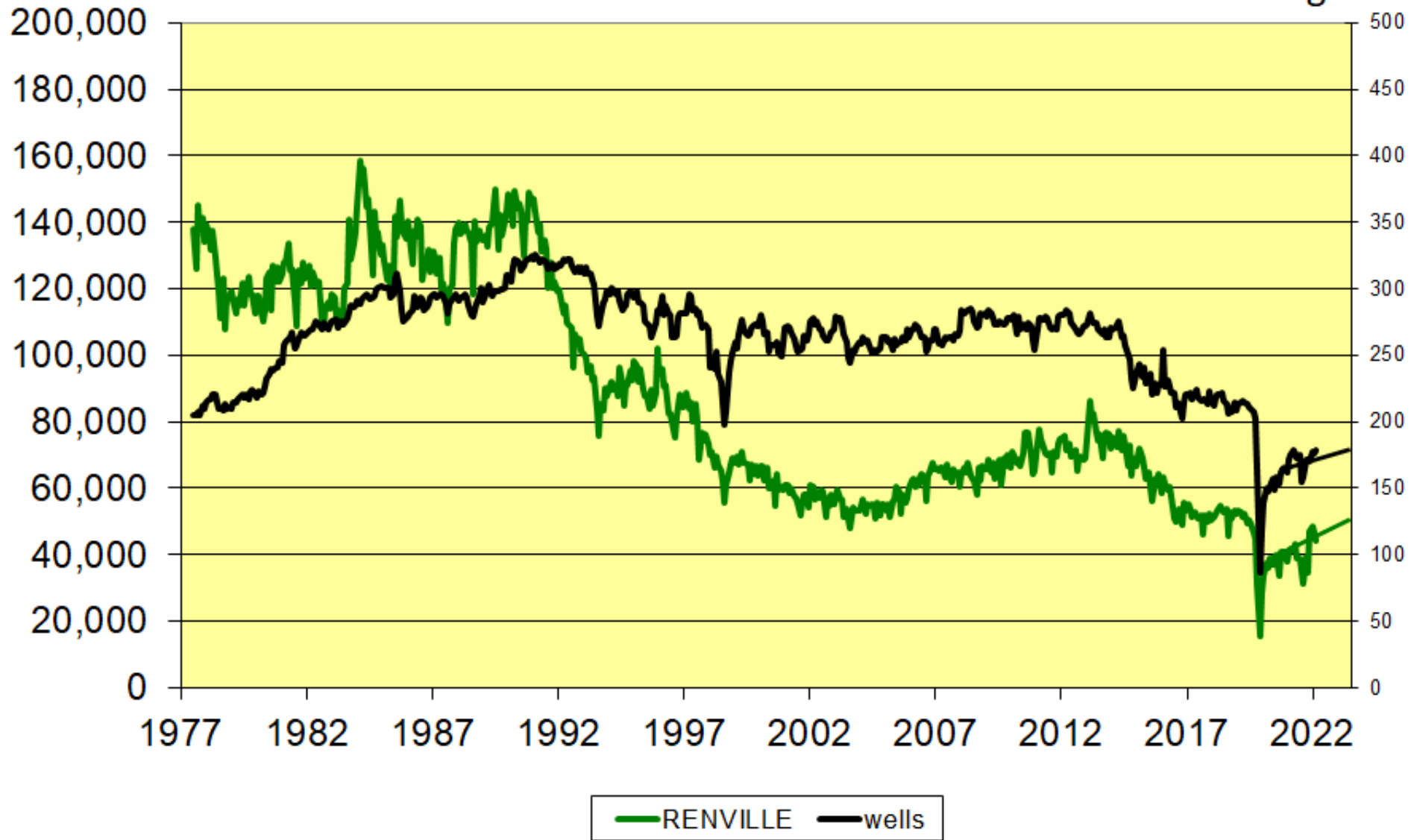
Tier 2 1920 development



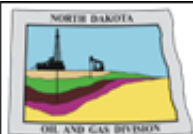


MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES

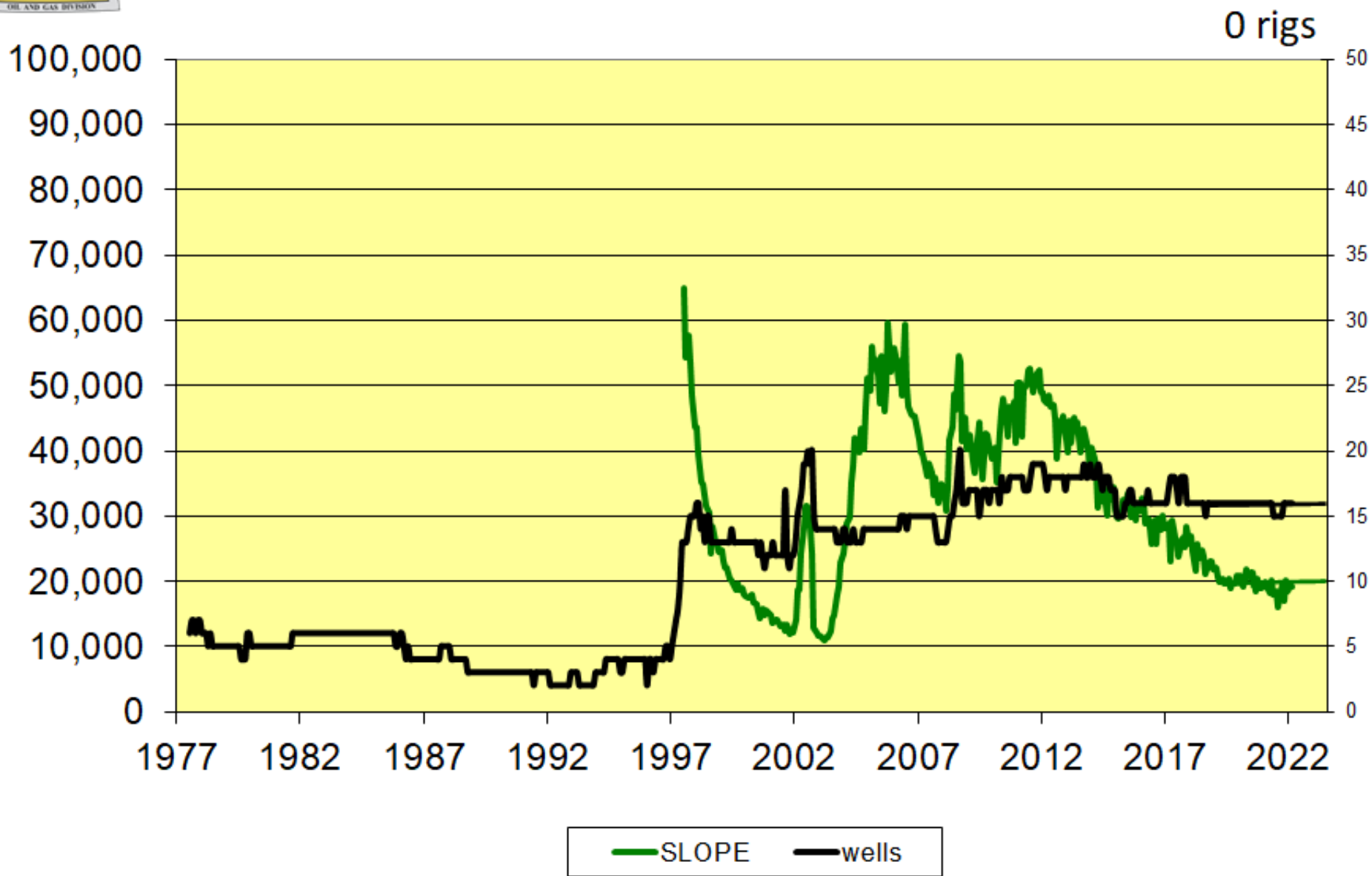
0-1 rigs

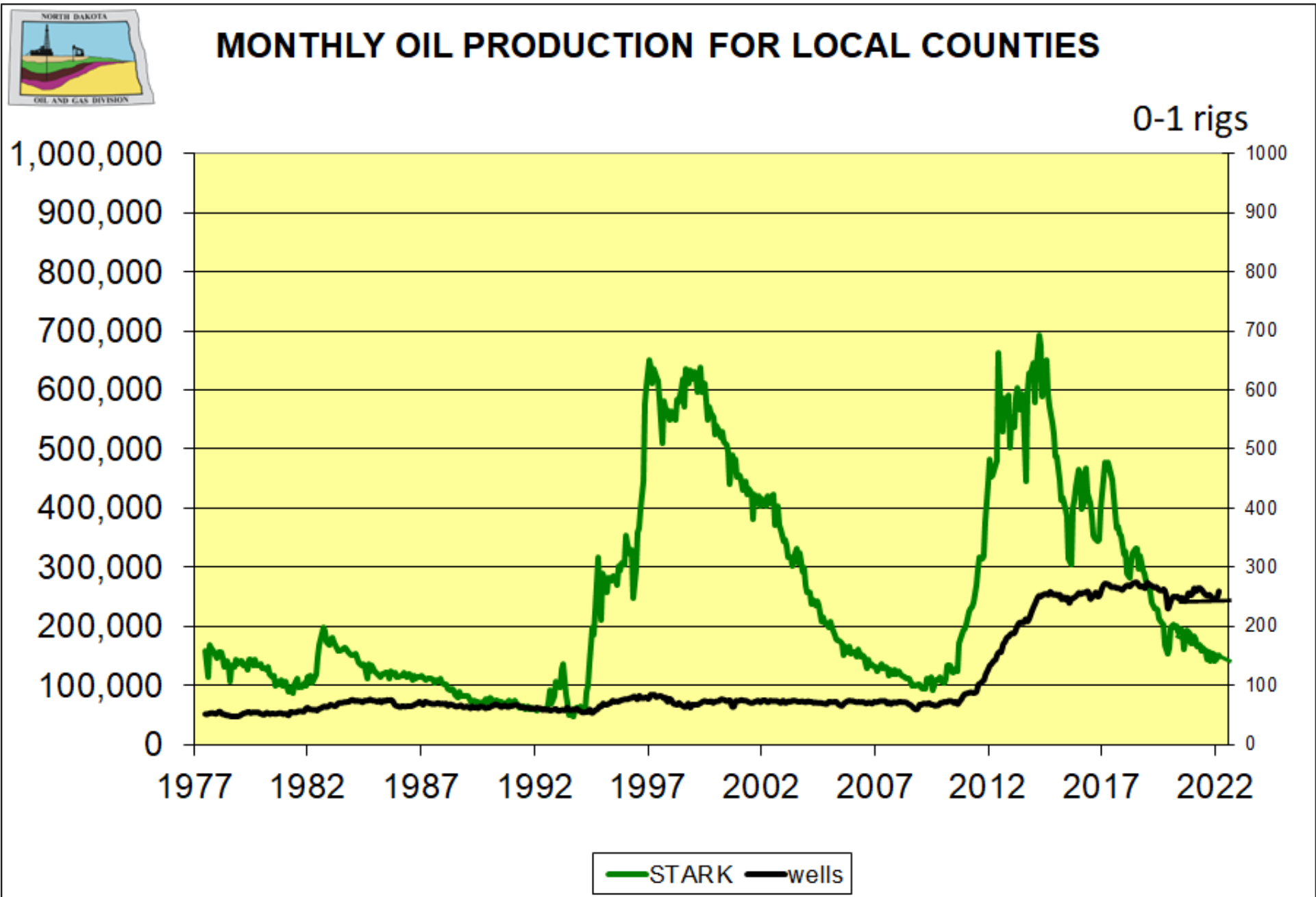


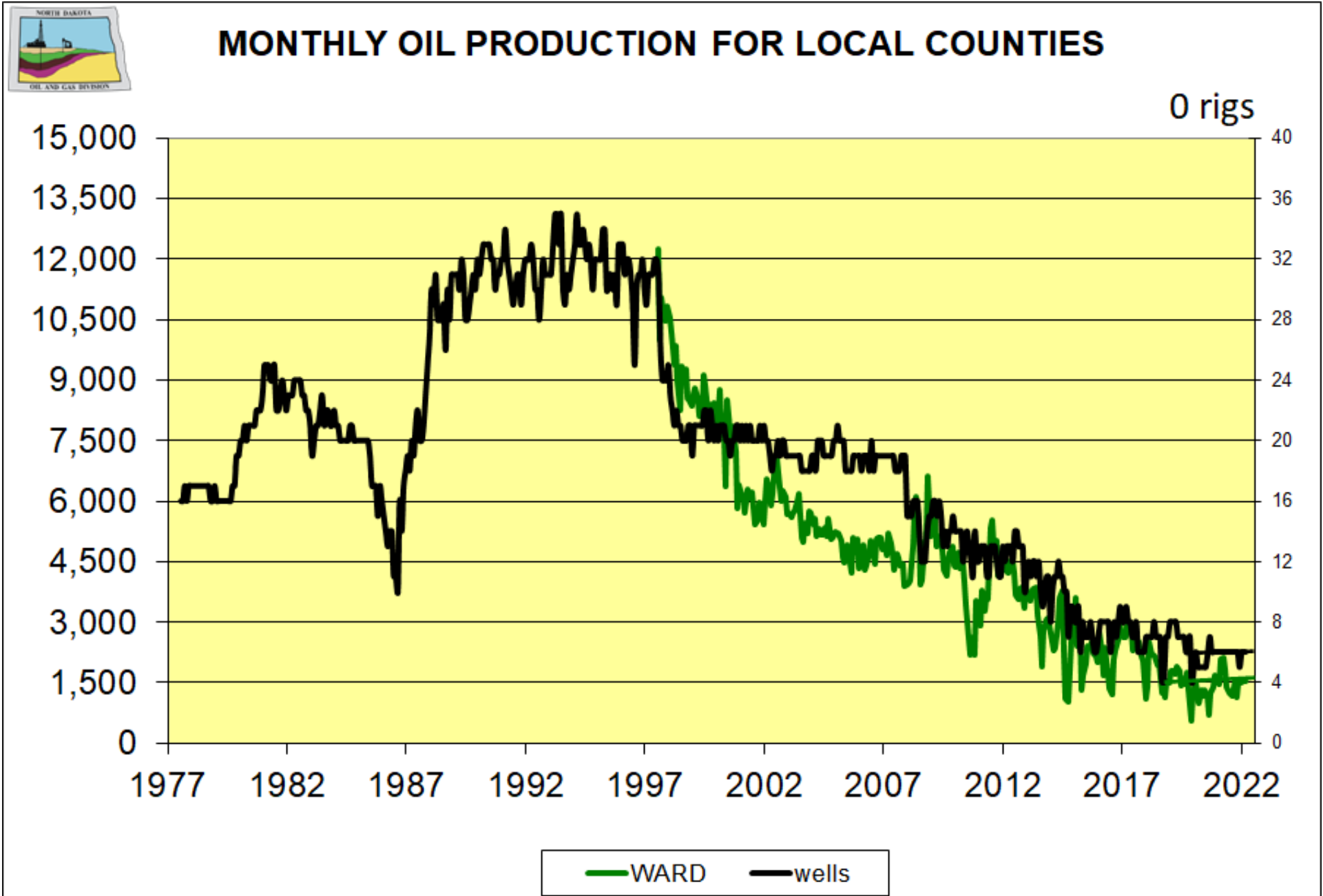
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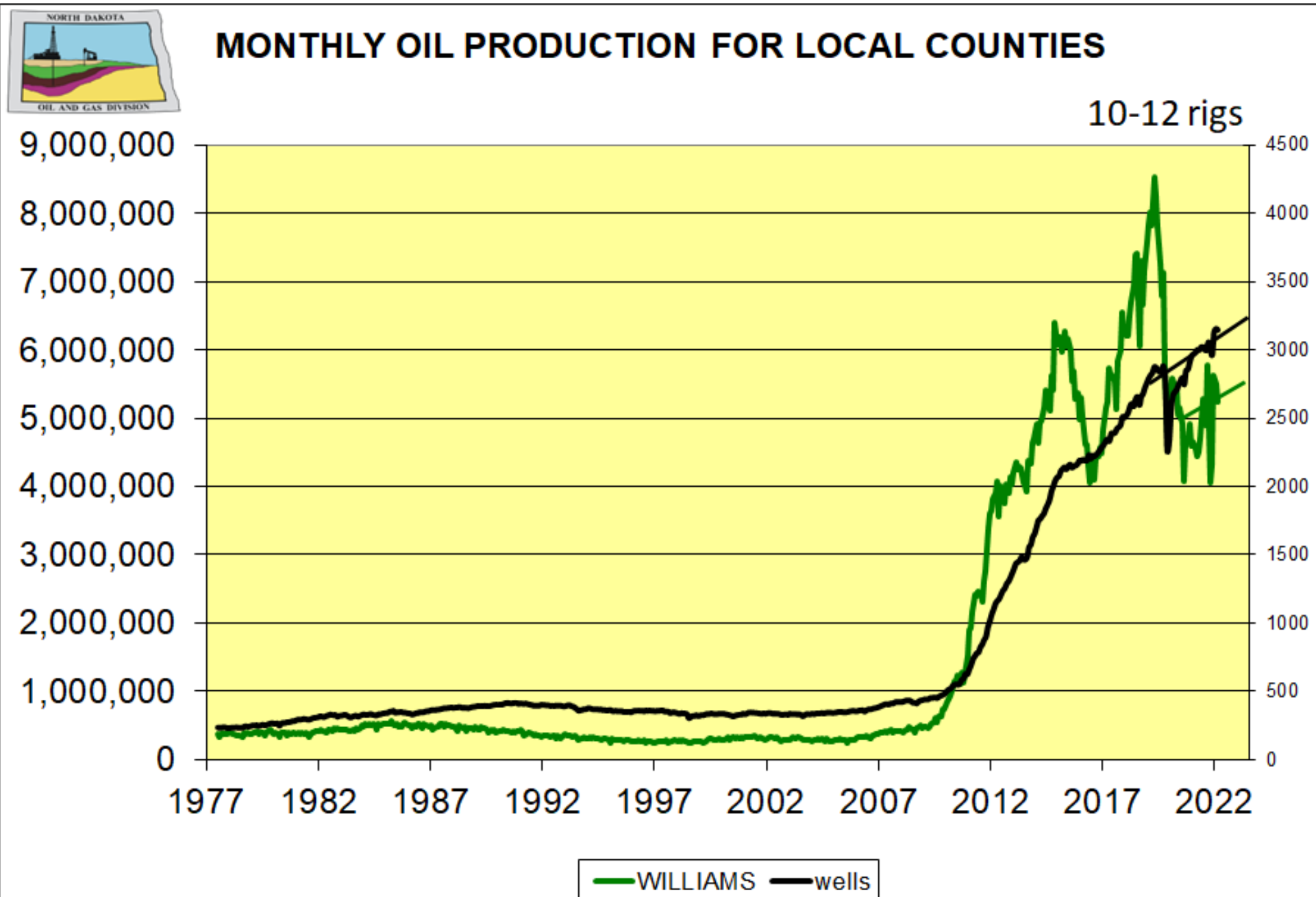
MONTHLY OIL PRODUCTION FOR LOCAL COUNTIES







Tier 2 1920 development





North Dakota
Department of Mineral Resources
www.dmr.nd.gov

Phone: 701.328.8020

Email: oilandgasinfo@nd.gov

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