

# Virginia's Oil and Gas Program – Legal and Regulatory Framework

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# ROADMAP

- ▶ Introduction to DMME
- ▶ Brief history of drilling in Virginia
- ▶ Brief history of drilling in Taylorsville Basin
- ▶ Overview of program requirements
- ▶ Overview of additional requirements applicable to Taylorsville Basin

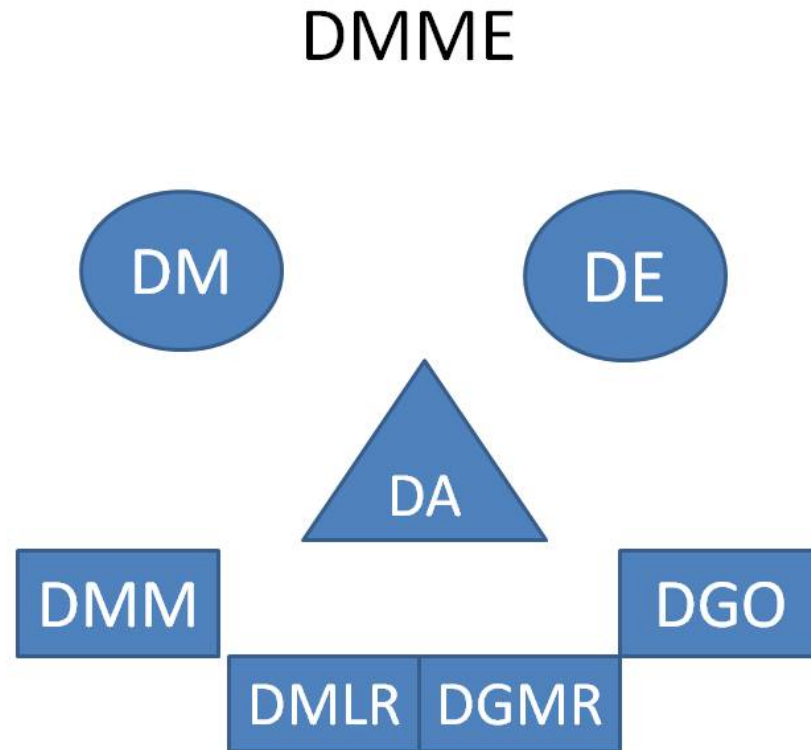


# DMME's MISSION

We enhance the development and conservation of energy and mineral resources in a safe and environmentally sound manner to support a more productive economy.



# ORGANIZATIONAL CHART



DA = Administration  
DE = Energy  
DGMR = Geology  
DGO = Gas & Oil  
DM = Mine Safety  
DMM = Mineral Mining  
DMLR = Mined Land Reclamation

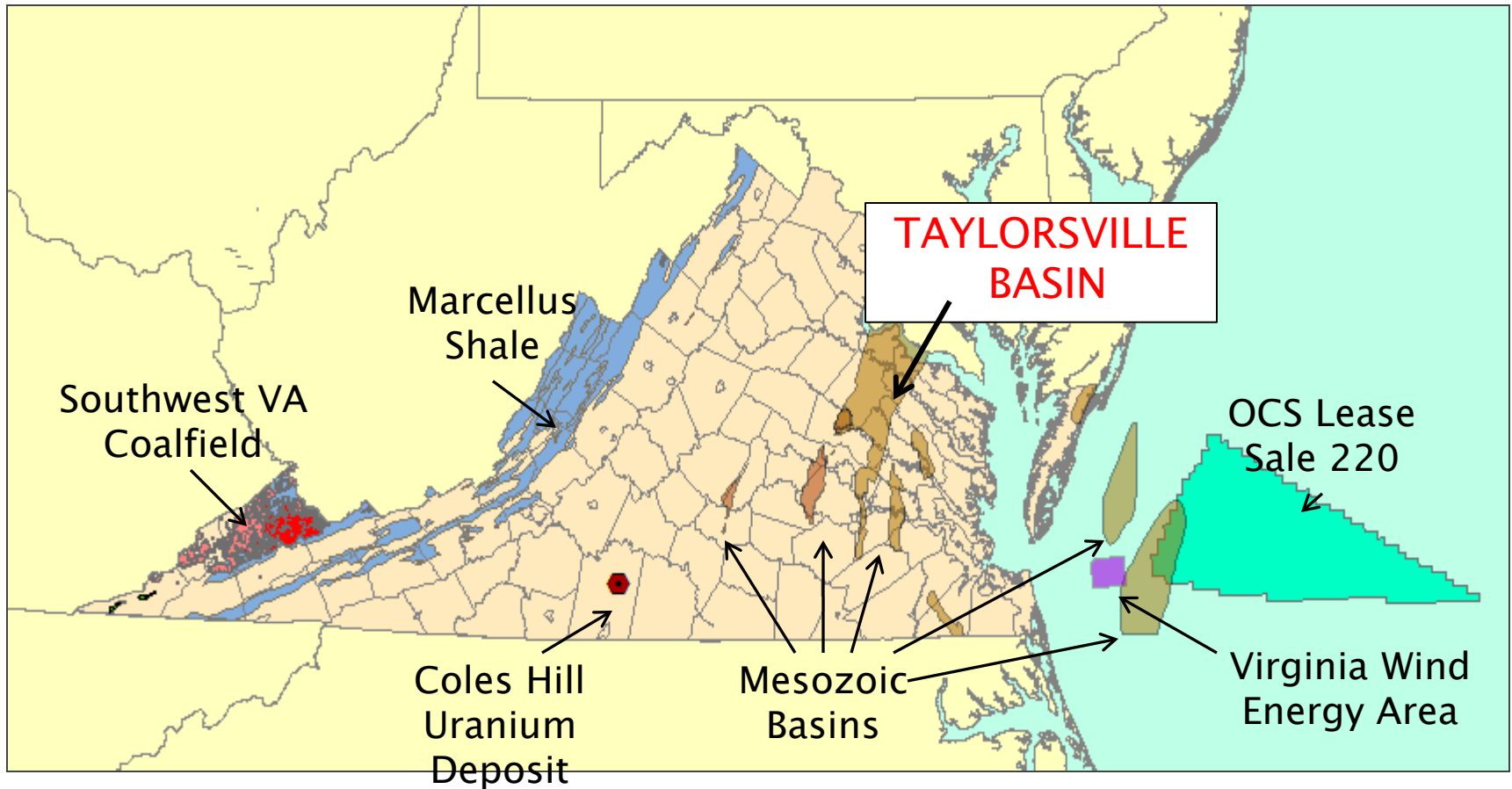


# DMME STRATEGIC PLAN

- ▶ Goal 1:
  - Provide for safe and environmentally sound mineral and fossil fuel extraction.
- ▶ Goal 2:
  - Encourage economic development through our customers' wise management of Virginia's resources.
- ▶ Goal 3:
  - Enable DMME personnel to perform at their full potential.

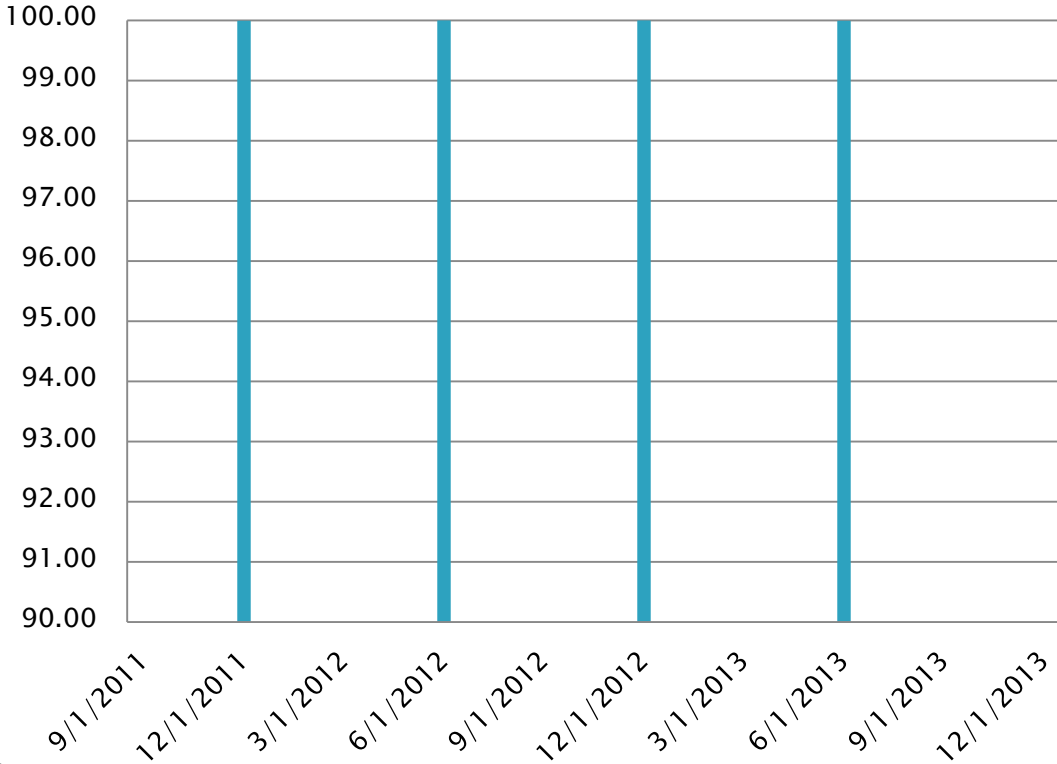


# Virginia's Energy Resources



# DMME PERFORMANCE MEASURES

## Percentage of sites with no adverse off-site environmental damage or public safety hazards

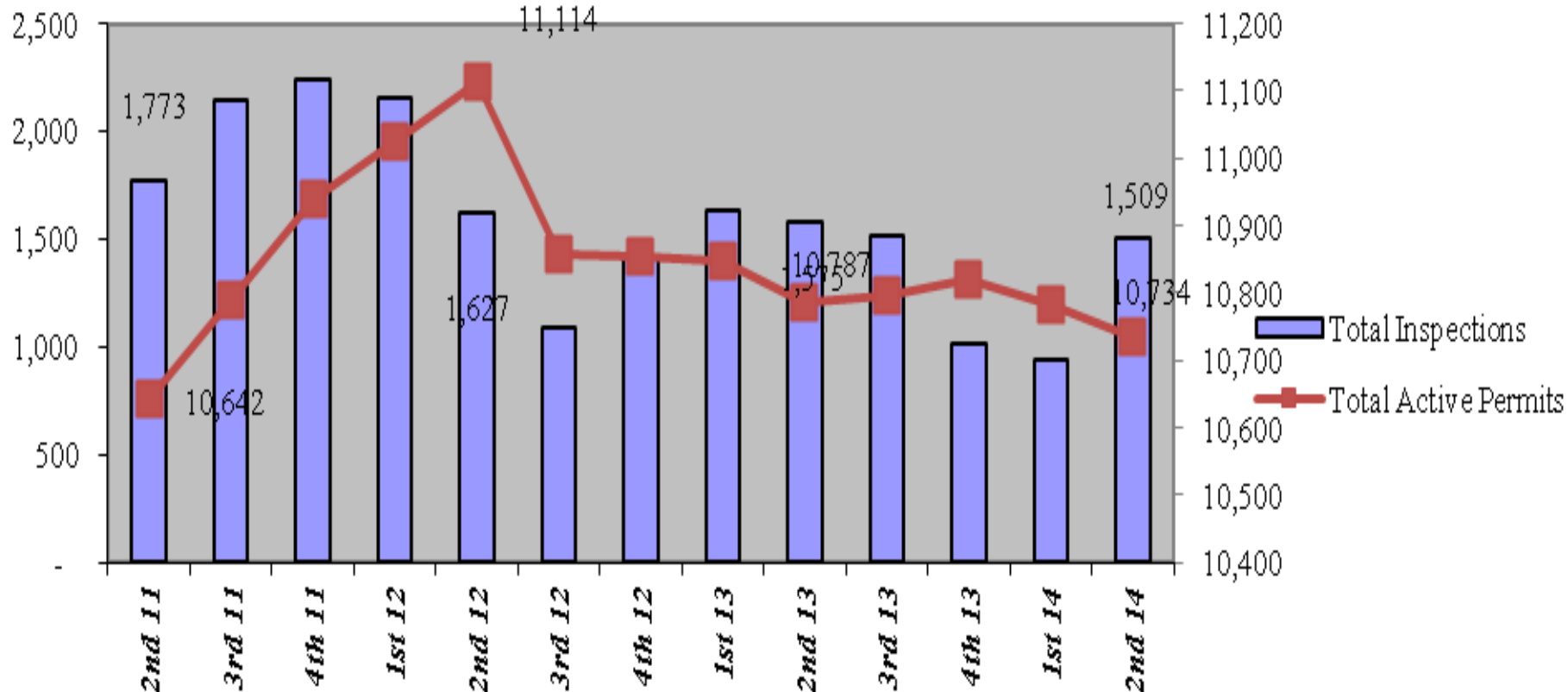


■ Percentage of sites with no adverse off-site environmental damage or public safety hazards



# INSPECTION DATA

## TOTAL INSPECTIONS





# FRACKING IN VIRGINIA

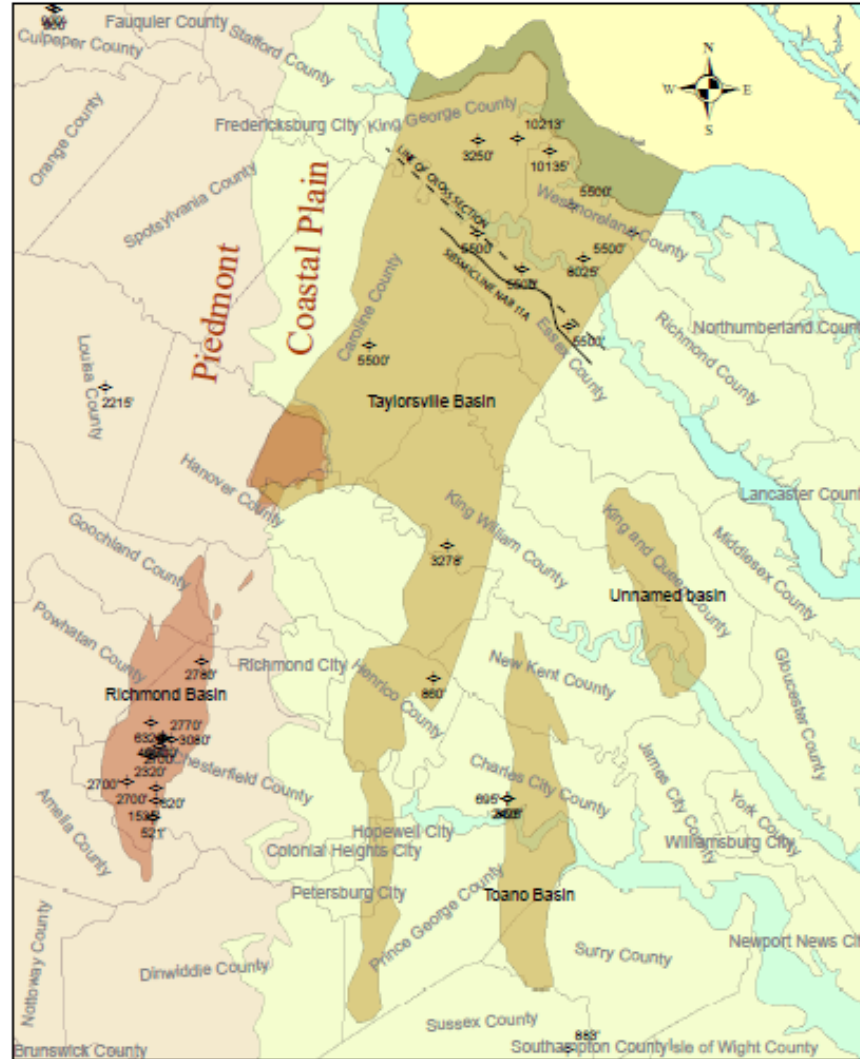
- ▶ Technique has been utilized in the Commonwealth since the 1960s.
- ▶ Over 8,000 wells have been fracked in Southwest Virginia.
- ▶ There have been no documented instances of surface or groundwater degradation from fracking in Virginia.



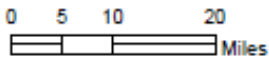
# FRACKING IN VIRGINIA

- ▶ Hydraulically fracked wells in Virginia typically require 0–300,000 gallons of water.
- ▶ Increasingly, operators are utilizing nitrogen-based foam to frack wells.
- ▶ By contrast, fracked wells in the Marcellus shale can use 4–5 million gallons of water.

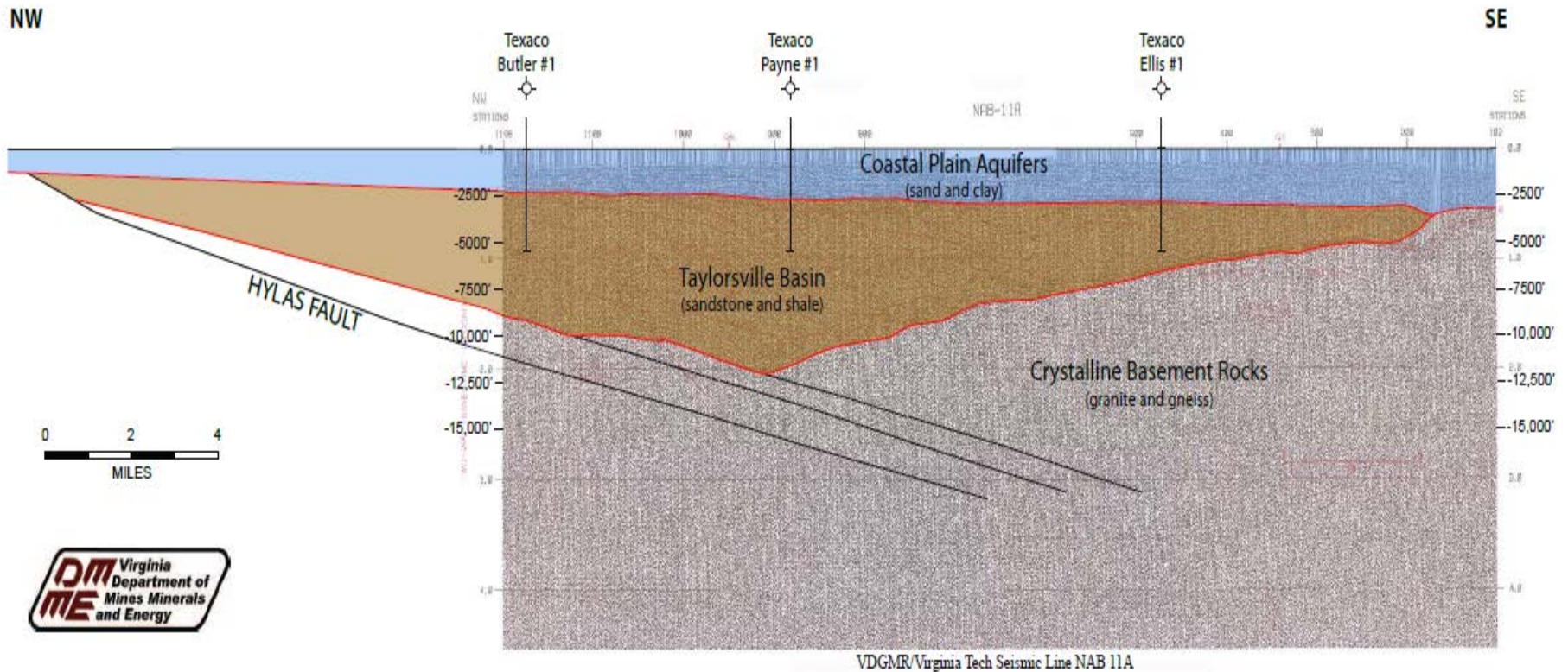
## Virginia Portion of the Taylorsville Mesozoic Basin



- ⬮ Plugged Oil and Gas Wells
- Buried Mesozoic Basins
- Exposed Mesozoic Basins



# Generalized Geologic Cross-section and Partial Seismic Profile across the Taylorsville Mesozoic Basin King George, Caroline, and Essex Counties, Virginia



Total Petroleum System (TPS) and Assessment Unit (AU)	Field type	Total undiscovered resources											
		Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
		F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
<b>Taylorville Basin Composite TPS</b>													
Taylorville Basin Continuous Gas AU	Gas					516	985	1,880	1,064	16	34	71	37
<b>Richmond Basin Composite TPS</b>													
Richmond Basin Continuous Gas AU	Gas					99	194	382	211	4	10	20	11
<b>Newark Basin Composite TPS</b>													
South Newark Basin Continuous Gas AU	Gas					363	785	1,698	876	1	4	10	4
<b>Deep River Basin Composite TPS</b>													
Deep River Basin Continuous Gas AU	Gas					779	1,527	2,990	1,660	35	75	158	83
<b>Dan River-Danville Basin Composite TPS</b>													
Dan River-Danville Basin Continuous Gas AU	Gas					17	42	106	49	0	0	1	0
<b>Total continuous resources</b>						<b>1,774</b>	<b>3,533</b>	<b>7,056</b>	<b>3,860</b>	<b>56</b>	<b>123</b>	<b>260</b>	<b>135</b>

USGS assigned 1.06 trillion cubic feet of gas to the Taylorville Basin.

That's about 2 ½ times Virginia's total annual consumption of natural gas.

For comparison, the USGS assigned 410 Tcf to the Marcellus Shale in Pennsylvania, New York, and West Virginia.

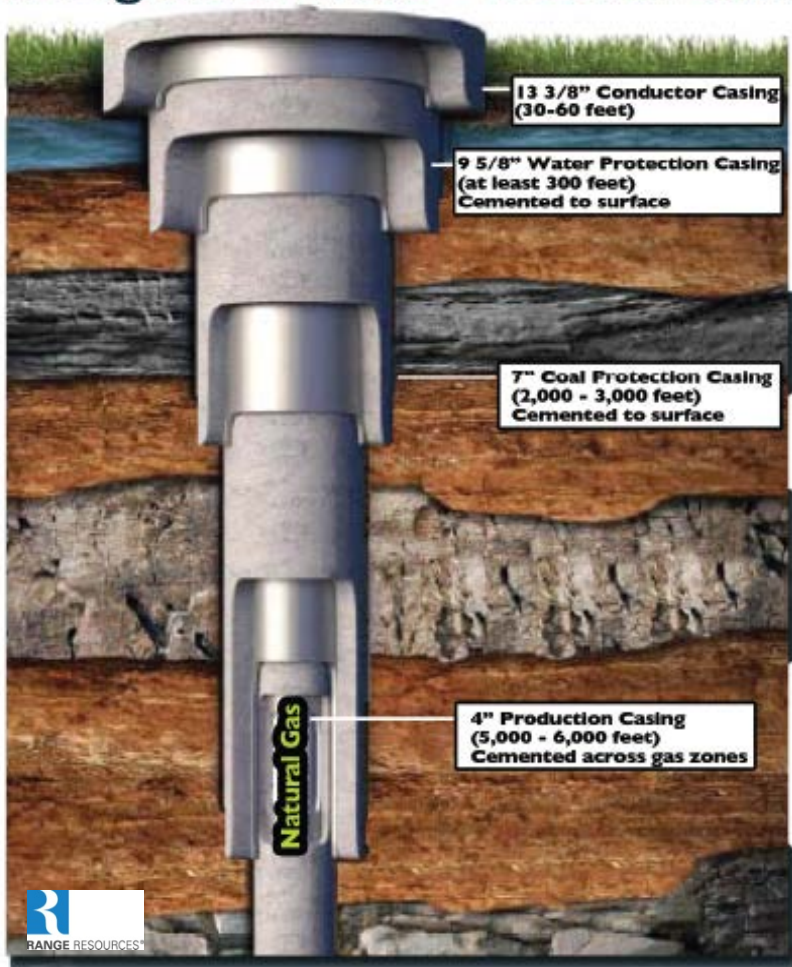


# Well Information in the Taylorsville Basin

File Number	Operation Name	Operator Name	County	Type	Status	Drilled	Plugged	Depth
CC-0002	1-B	A & R Oil	CHESTERFIELD	Oil	Plugged/Abandoned	09/06/68	10/22/68	521
CC-0003	CONT CAN 1	Merrill Natl Resc	CHESTERFIELD	Oil	Plugged/Abandoned	06/02/82	06/02/82	2680
CC-0004	TURNER 1	Merrill Natl Resc	CHESTERFIELD	Oil	Plugged/Abandoned	06/29/81	06/05/82	2690
CC-0006	HUDGINS 1	Merrill Natl Resc	CHESTERFIELD	Oil	Plugged/Abandoned	05/30/81	06/07/82	2700
CC-0007	CONT CAN 4	Merrill Natl Resc	CHESTERFIELD	Oil	Plugged/Abandoned	06/30/81	06/04/82	2700
CC-0008	HORNER 1	Cornell Oil Company	CHESTERFIELD	Oil	Plugged/Abandoned	12/05/81	12/03/81	6329
CC-0010	BAILEY 1	Cornell Oil Company	CHESTERFIELD	Oil	Plugged/Abandoned	11/11/81	11/12/81	7443
CC-0011	CHESAPEAKE 1	Shore Exp.	CHESTERFIELD	Oil	Plugged/Abandoned	04/20/82	10/24/86	3080
CC-0012	ADAMSON 1	Merrill Natl Resc	CHESTERFIELD	Oil	Plugged/Abandoned	03/03/82	06/07/82	2780
CC-0014	TURNER 2	Merrill Natl Resc	CHESTERFIELD	Oil	Plugged/Abandoned	04/25/82	06/06/82	2770
CC-0015	GA PAC 1	Merrill Natl Resc	CHESTERFIELD	Oil	Plugged/Abandoned	05/12/82	06/14/83	2320
CC-0016	JR 1	Shore Exp.	CHESTERFIELD	Oil	Plugged/Abandoned	10/30/85	10/27/86	4568
CH-0001	1A	Ernest L Lippert	CHARLES CITY	Gas	Plugged/Abandoned	04/04/72	06/18/72	850
ES-0001	1 PAYNE	Texaco Inc	ESSEX	Gas	Plugged/Abandoned	05/15/86	07/20/86	5500
ES-0002	1 ELLIS	Texaco Inc	ESSEX	Gas	Plugged/Abandoned	07/18/86	07/19/86	5500
HE-0001	1	Tidewater Oil and Gas	HENRICO	Oil	Plugged/Abandoned	06/01/17	06/01/17	860
KW-0001	1	Roberts Drilling	KING WILLIAM	Oil	Plugged/Abandoned	03/04/61	05/13/61	3278
LU-0001	FURNO 1	Energy USA	LOUISA	Gas	Plugged/Abandoned	05/05/87		2215
MA-0001	1	Elkins Oil & Gas	MATHEWS	Gas	Plugged/Abandoned	07/21/29	07/21/29	2325
CC-0001	1-A	A & R Oil	CHESTERFIELD	Oil	Released	10/22/68	10/22/68	620
CC-0020	TOLER #2	Daugherty Petroleum	CHESTERFIELD	Gas	Plugged/Abandoned	09/30/95		1535
CA-0001	1 BUTLER	Texaco Inc	CAROLINE	Gas	Plugged/Abandoned	05/15/86	05/15/86	5500
CA-0002	1 CAMPBELL	Texaco Inc	CAROLINE	Gas	Plugged/Abandoned	05/14/86	05/14/86	5550
KG-0001	1	J S C Drilling Co	KING GEORGE	Gas	Plugged/Abandoned	12/20/68	01/27/69	3250
KG-0002	Thorn Hill #1	Texaco Inc	KING GEORGE	Gas	Plugged/Abandoned	04/17/92		10213
WM-0004	Gouldman #1	Texaco Inc	WESTMORELAND	Gas	Plugged/Abandoned	01/28/92		8025
WM-0001	1 BOWIE-FOGG	Texaco Inc	WESTMORELAND	Gas	Released		07/19/86	5500
WM-0002	1 ROBERTS	Texaco Inc	WESTMORELAND	Gas	Released		07/12/86	5500
WM-0003	WILKINS #1	Texaco Inc	WESTMORELAND	Gas	Released		11/13/89	10135

# Typical Casing Design

## Casing Schematic - Not to Scale



Rock Formations containing natural gas are several thousand feet deep. Multiple casings are cemented to surface to protect water resources.





# PROGRAM REQUIREMENTS

- ▶ All operators must comply with:
  - The Virginia Gas and Oil Act of 1990
  - Virginia Gas and Oil Regulation
  - Virginia Gas and Oil Board Regulations
  - State Water Control Law
  - Virginia Pollution Discharge Elimination System Regulations
  - Additional requirements for the Tidewater Region



# PERMIT REQUIREMENTS

- ▶ Applicants are required to notify parties who may be directly affected by the proposed operation, including surface and mineral owners.
- ▶ These parties have the right to object to permits on specific grounds that are outlined in the law



# PERMIT REQUIREMENTS

- ▶ Applicants also must inform localities and publish notices in at least one newspaper of general circulation which is published in the locality where the well is proposed.
- ▶ Applications must contain operations plans that detail necessary construction, erosion and sediment control, drilling and stimulation plans, etc.



# PROGRAM REQUIREMENTS

- ▶ The Gas and Oil Act allows operators access to private water wells within 750 feet of a gas well operation for sampling purposes.
- ▶ The law requires operators to replace water supplies if water wells are contaminated or their supply is interrupted by a gas well operation within 750 feet.





# ADDITIONAL REQUIREMENTS FOR DRILLING IN TIDEWATER REGION

- ▶ Found in 62.1–195.1 of the Code of Virginia
  - Prohibits drilling in the Chesapeake Bay or its tributaries.
  - This prohibition also extends to the greater distance of:
    - Bay Resource Protection Areas
    - 500 feet from the shoreline of the waters of the Bay.

# ADDITIONAL REQUIREMENTS FOR DRILLING IN TIDEWATER REGION

- ▶ Before drilling can occur, an environmental impact assessment must be submitted to DMME and reviewed by DEQ.
- ▶ EIA must be submitted to all appropriate state agencies for their review.
- ▶ DMME must consider DEQ's findings before a permit can be issued.



# ADDITIONAL REQUIREMENTS FOR DRILLING IN TIDEWATER REGION

- ▶ For directional drilling, the operator must obtain the permission of all affected surface owners.
- ▶ Casing is set and pressure grouted from the surface to a point at least 2500 feet below the surface or 300 feet below the deepest known ground water, whichever is deeper.
- ▶ Multiple blowout preventers must be employed.

# ADDITIONAL REQUIREMENTS FOR DRILLING IN TIDEWATER REGION

- ▶ An oil discharge contingency plan must be submitted to and approved by the State Water Control Board.
- ▶ Operator must also demonstrate financial responsibility to implement plan.





# ADDITIONAL REQUIREMENTS FOR DRILLING IN TIDEWATER REGION

- ▶ Before an oil well can be placed into production:
  - Exploration must take place.
  - DMME must find that production is likely and imminent.
  - DMME must then notify the Secretaries of Commerce and Trade and Natural Resources.
  - The Secretaries shall produce a report to the Governor and General Assembly.



# ADDITIONAL REQUIREMENTS FOR DRILLING IN TIDEWATER REGION

- ▶ Before an oil well can be placed into production:
  - The Governor may recommend legislative and regulatory changes.
  - The General Assembly may accept those legislative changes or implement its own.
  - DMME cannot issue a permit for an oil production well until all of the above steps are completed.



# REGULATORY FRAMEWORK

- ▶ 4 VAC 25-150
- ▶ Sets out requirements for:
  - Permit applications
  - Hearing process for objections
  - Technical requirements
  - Reporting requirements
  - Enforcement procedures



# REGULATORY UPDATE

- ▶ Last fall, DMME initiated a regulatory action to review its requirements for drilling.
  - Chemical disclosure requirements
  - Review of current industry best practices
  - Review to determine if additional requirements are necessary for different regions of the Commonwealth



# REGULATORY UPDATE

- ▶ DMME will utilize a Regulatory Advisory Panel to assist in reviewing regulations.
- ▶ These meetings will be open to the public.
- ▶ At least one public hearing will be held after proposed regulations are published in the Virginia Register of Regulations.



# Thank You!

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