DRBC Natural Gas Regulations

UDC Committee Briefing

February 10, 2011

50th Anniversary Delaware River Basin Commission 1961–2011

Delaware River Basin

Delaware River Basin Commission

- Founded in 1961
- Five Members:
  - Delaware
  - New Jersey
  - Pennsylvania
  - New York State
  - Federal Government

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What does the DRBC do?

- Manages resources on a watershed basis
- Regulates water quality and quantity
- Directs a fair distribution of water
- Plans for best use of water resources
- Coordinates/facilitates
- Educates about water resources

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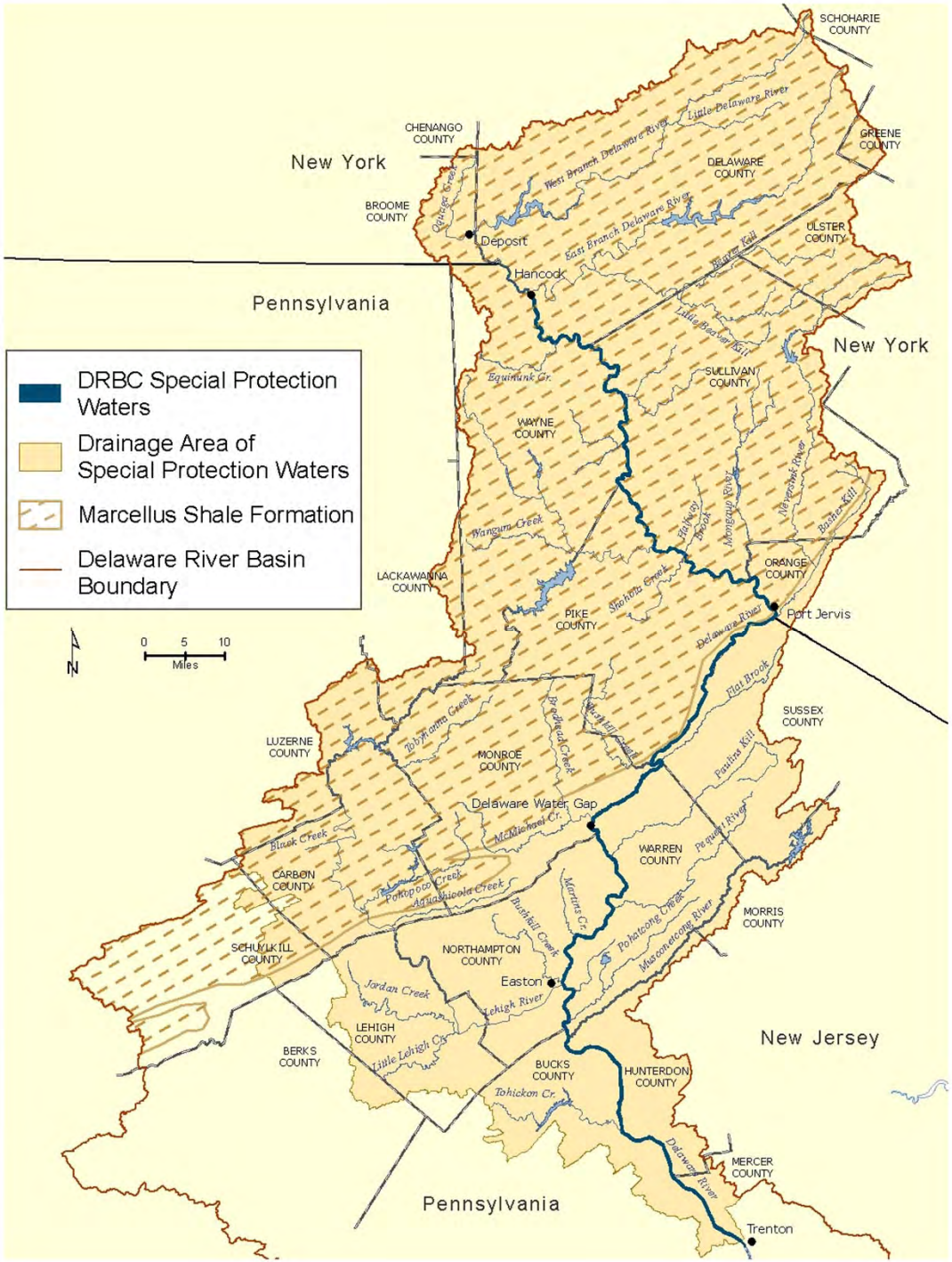
Purpose of Natural Gas Regulations

- Manage the Water Resources of the Basin
  - Basin provides water to over 15 million people
  - Incredible natural resource to mid-Atlantic metropolitan area
  - Three quarters of the non-tidal river is designated in the National Wild and Scenic Rivers System
  - Exceptional water quality is protected by the DRBC Special Protection Waters Program

- Comply with Compact Requirements
  - Regulations implement statutory authority that is granted in the **DRBC Compact** by the signatory parties
  - Supplements Commission's **Comprehensive Plan**
  - Fulfills requirements of existing Commission Regulations
    - Groundwater Section 3.40 - Special Protection Waters
    - Flood Plains - Water Withdrawal and Water Quality



Marcellus Shale and Special Protection Waters

36% (4,937 mi^2) of the Delaware Basin is underlain by the Marcellus Shale

Vertical vs. Horizontal Drilling

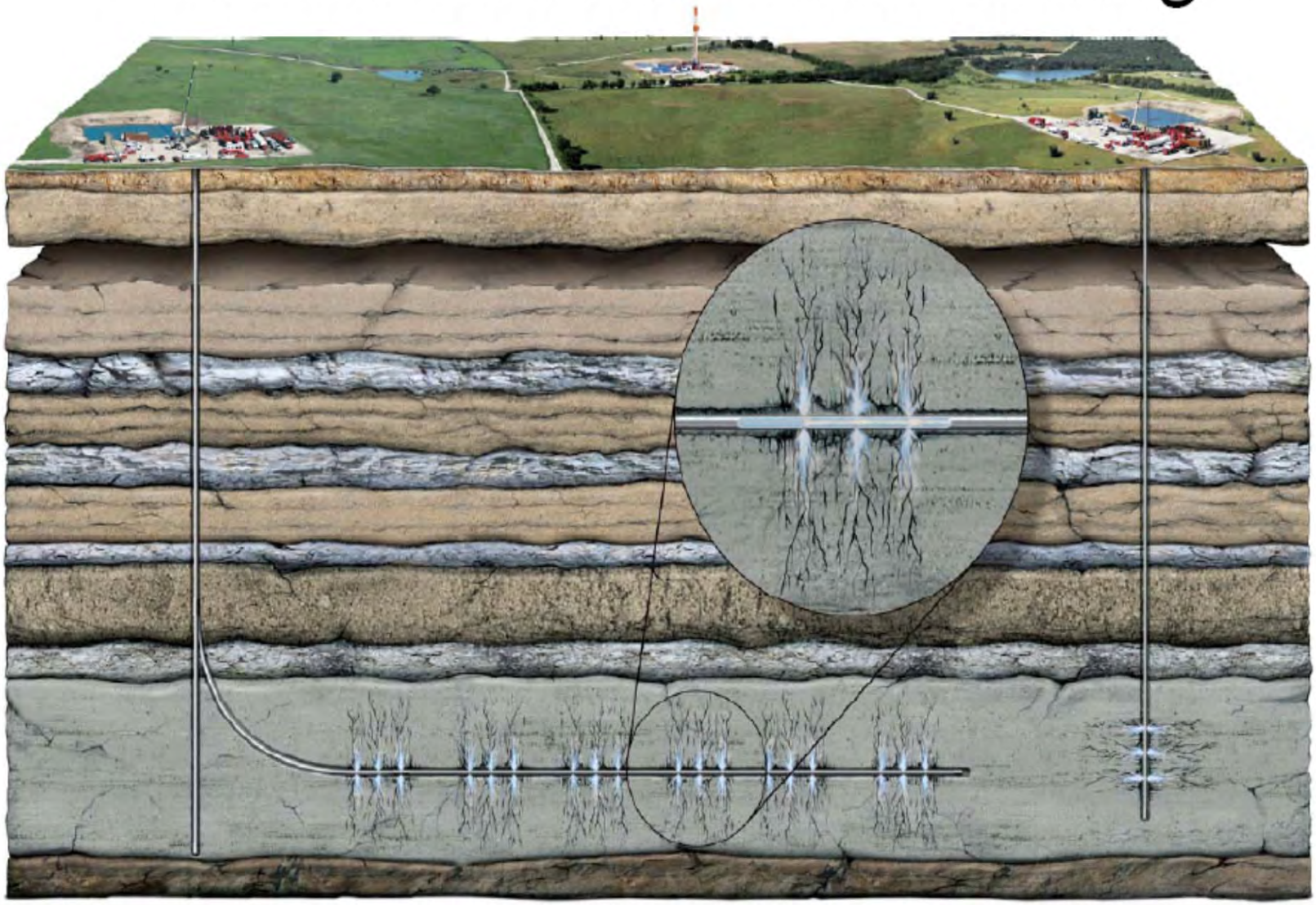
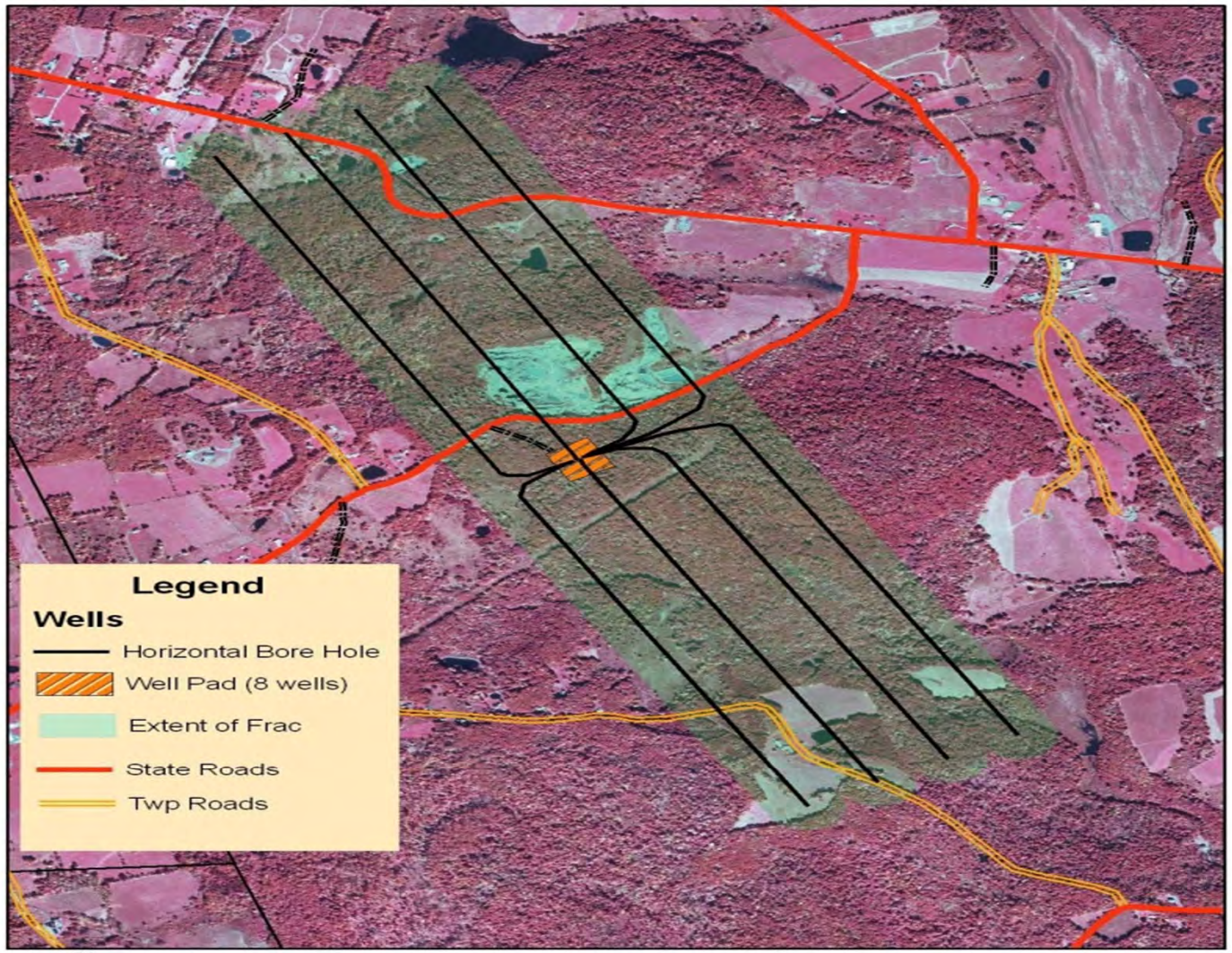


Illustration retrieved from: Independent Oil and Gas Association of Pennsylvania's *Drilling & Developing the Marcellus Shale*

Well Pad Drilling Site

Generic Single Pad Drilling Unit

8 Wells, 5,000 ft. horizontals, 640 acres



Woodland
Management Services, Inc.

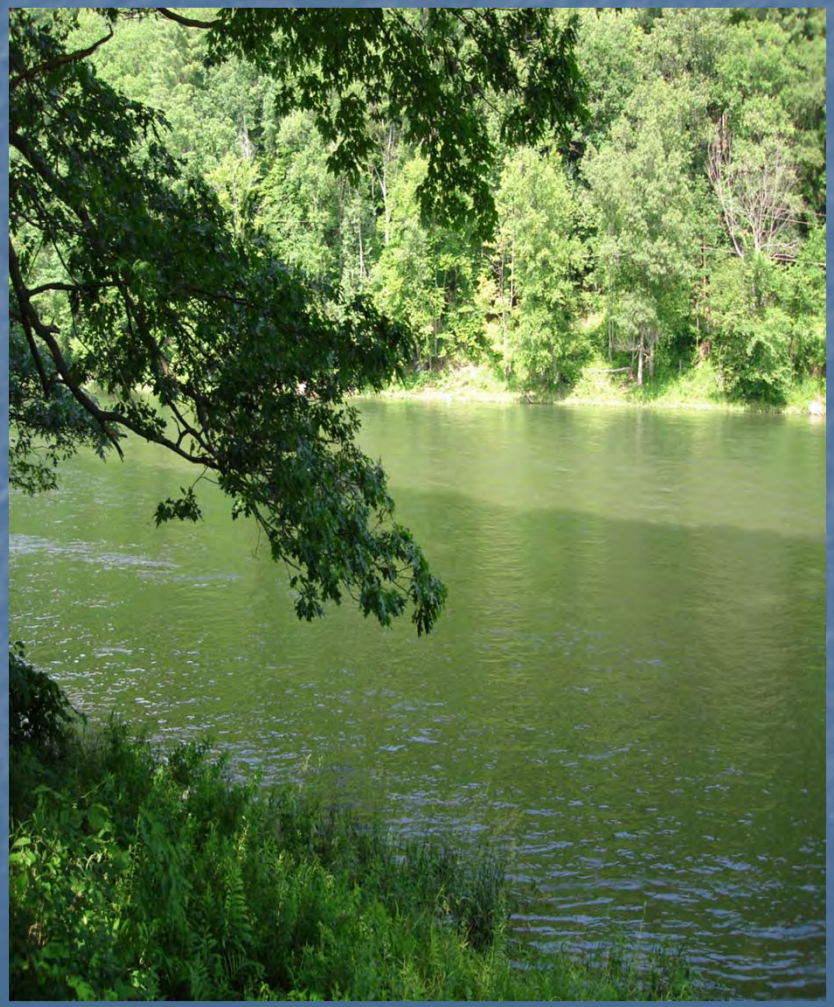
Concerns of the Commission

1. Water Withdrawals, Use, and Tracking
2. Well Pads and Ancillary Infrastructure
3. Wastewater Tracking and Disposal

Expected Natural Gas Well Development

- 15,000-18,000 horizontal wells
- Does not include vertical wells
- 2,000-2,200 well pads
- 10,000-12,000 acres (well pads)
- Additional acres for support infrastructure

Expected Water Needs



- 5 million gallons per horizontal well stimulated
- 90 BG - no reuse
- 72 BG – 90% reuse
- Over 10-20 year development

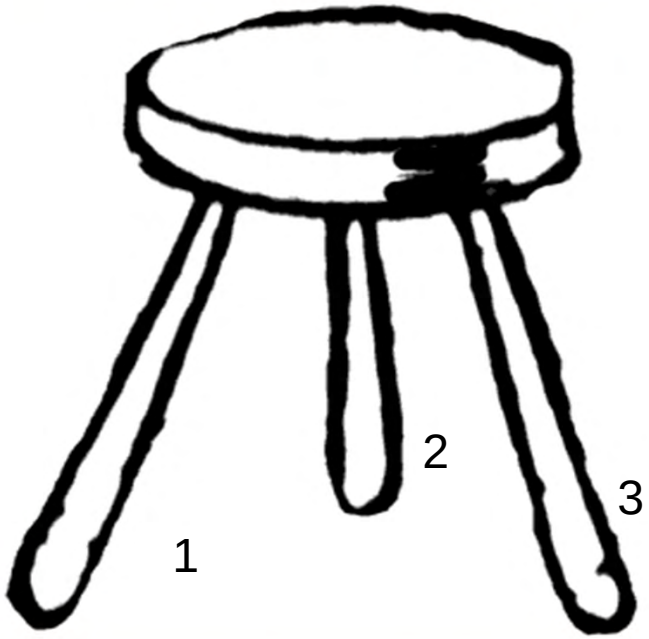
Wastewater Treatment & Disposal

- Flowback – water 20% frac volume
- 1 MG per well
- 18 BG over 10-20 years
- Treatment capacity and capability

Natural Gas Regulations

- Consolidate requirements in one WQR Section- Article 7 of Part III- Basin Regulations
- Include rules for water withdrawals; well pads and natural gas development plans; wastewater disposal
- Provide certainty to the industry
- Include approval by rule process for water sources and well pads
- Rely on NY/PA programs and expertise to regulate well construction and operations
- Applies to all natural gas target formations

DRBC Natural Gas Regulatory Strategy



1. Water Withdrawal

- Protect surface and groundwater supplies
- Preserve ecological flows
- Ensure assimilative capacity for discharges

2. Well Pads and Ancillary Infrastructure

- Natural Gas Development Plan
- Manage water use & disposal
- Monitor and protect surface water & groundwater

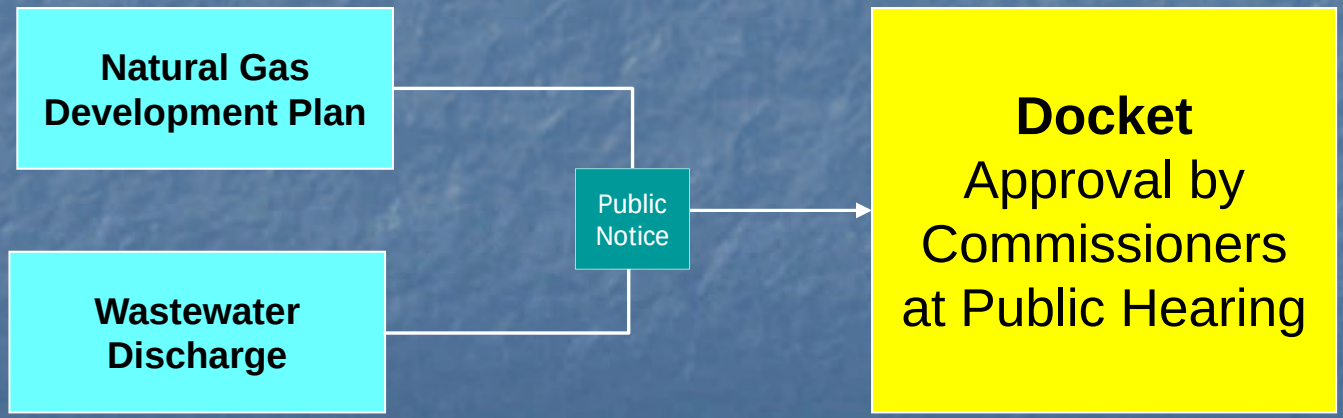
3. Wastewater Disposal

- Protect receiving water bodies
- Track wastewater production, reuse, and disposal
- Ensure adequate treatment is available for expected waste stream

Framework of Natural Gas Regulations

- **Section 7.1** Purpose, Authority, Scope and Relationship to other Requirements and Rules
- **Section 7.2** Definitions
- **Section 7.3** Administration
- **Section 7.4** Water Sources for Uses Related to Natural Gas Development
- **Section 7.5** Well Pads for Natural Gas Activities
- **Section 7.6** Wastewater Generated by Natural Gas Development
- **Appendix:** Wording of Financial Assurance Instruments

Types of Approvals



Water Withdrawal and Use Approvals

New Source

Groundwater withdrawal

Surface water withdrawal

Treated wastewater

Non-contact cooling water

Mine drainage water

Existing Approved DRBC Source

Groundwater withdrawal

Surface water withdrawal

Treated wastewater

Non-contact cooling water

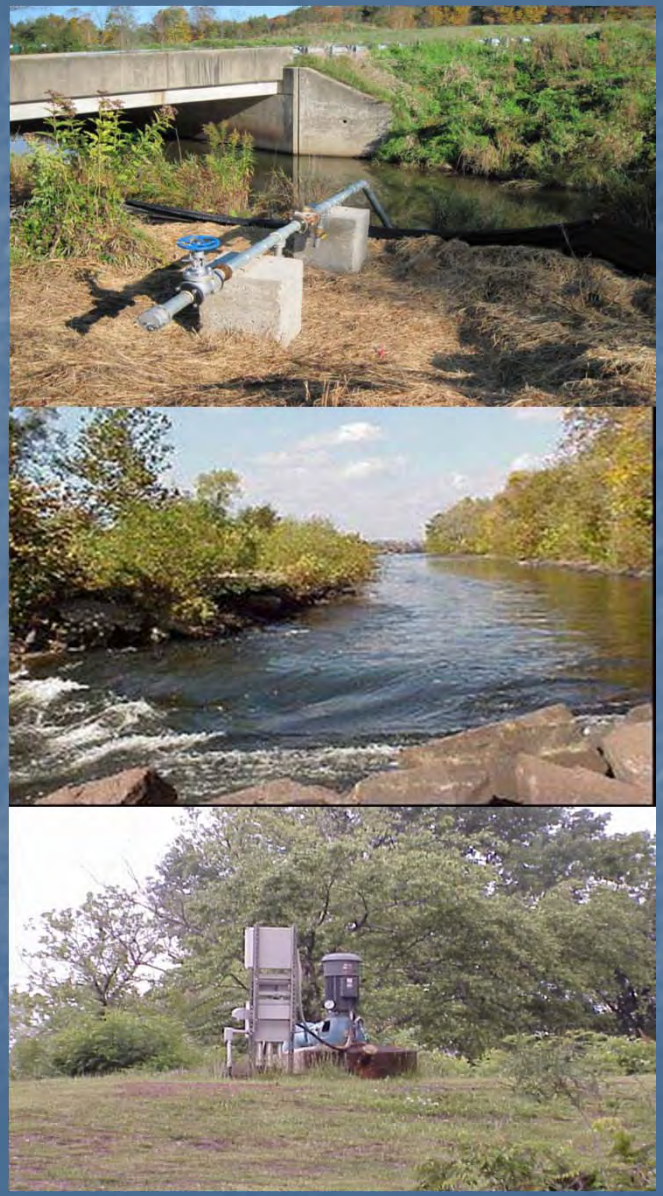
Reuse of Recovered Flowback or Production Water

Imported Water or Imported Mine Drainage Water

Water Withdrawal and Use Approvals

Rule Features

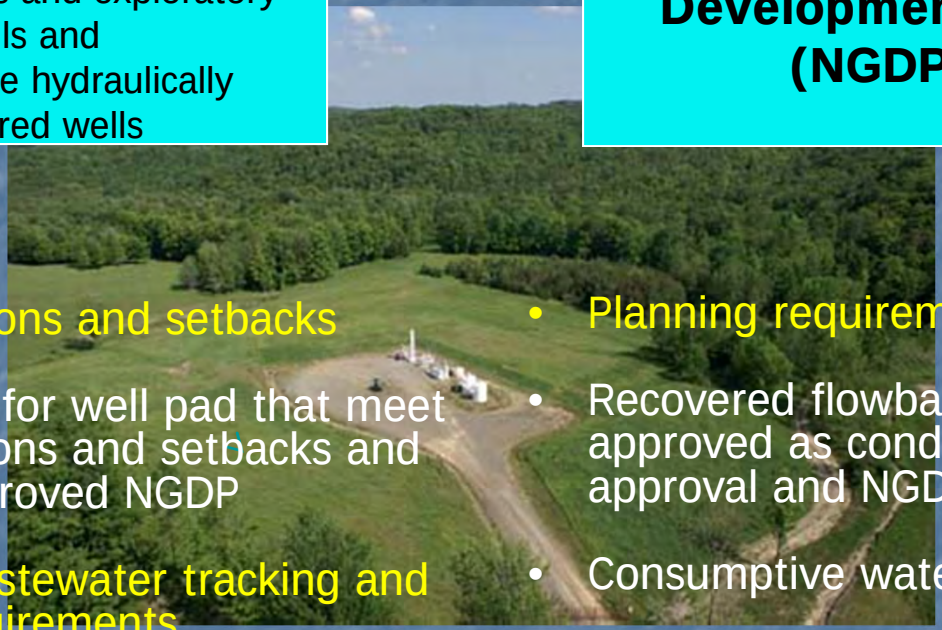
- On-site new water sources and recovered flowback reuse can be approved as condition in Natural Gas Development Plan (NGDP)
- Existing approved sources can get ABR to provide water for natural gas development
- Water tracking and reporting requirements
- Aquifer testing requirements
- Pass-by flow requirements



Well Pad and Natural Gas Development Plan Approvals

Well Pad
Low volume hydraulically fractured wells and exploratory wells and
High volume hydraulically fractured wells

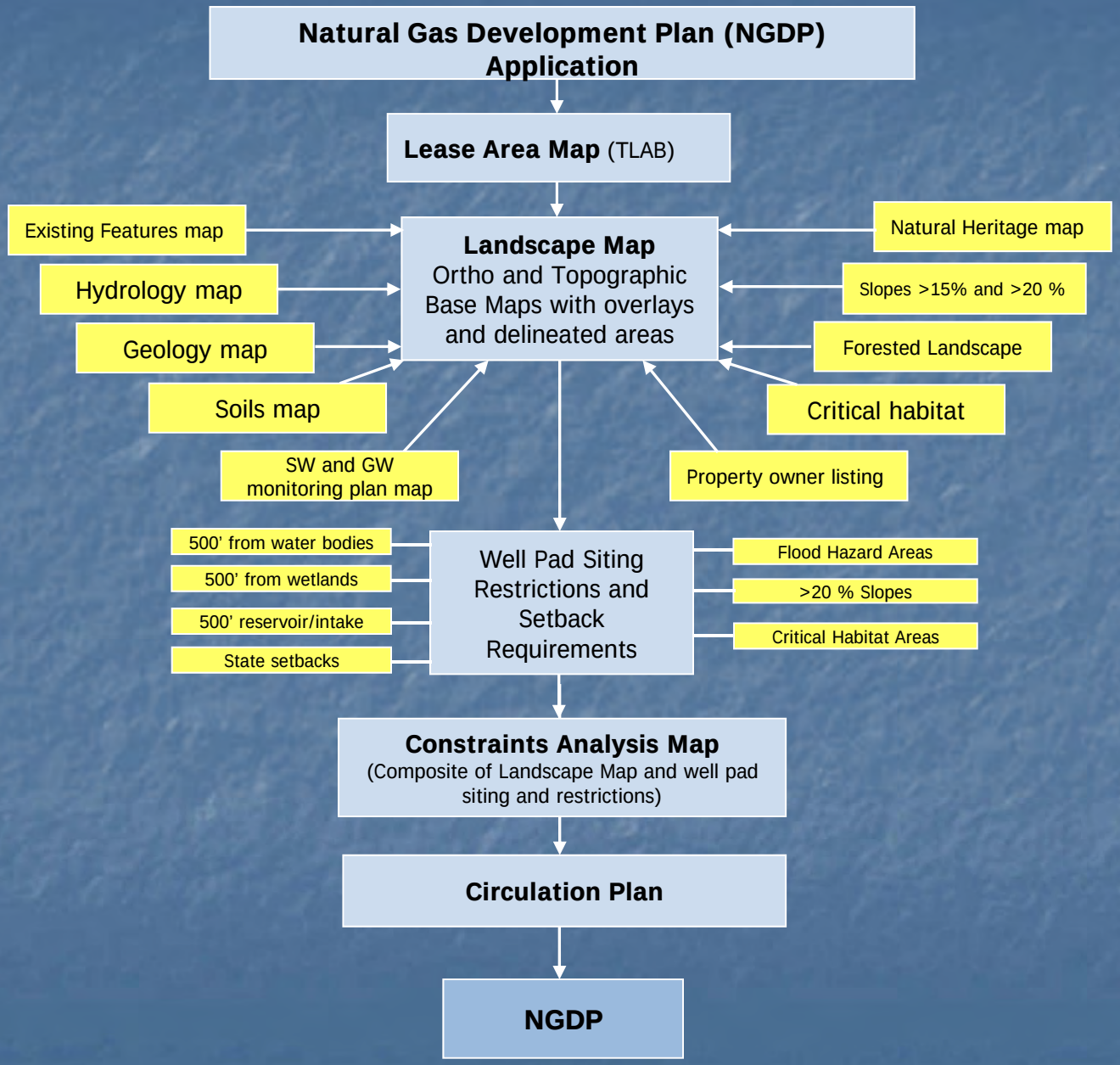
Natural Gas Development Plan (NGDP)



Rule Features

- Siting restrictions and setbacks
- ABR available for well pad that meet siting restrictions and setbacks and as part of approved NGDP
- Water and wastewater tracking and reporting requirements
- background groundwater and surface water monitoring and sampling
- Drought, metering, invasive species plans
- Planning requirements
- Recovered flowback reuse can be approved as condition in well pad approval and NGDP
- Consumptive water use charges
- Financial assurance requirements
- Flowback storage in tanks
- Off-site drill cuttings disposal
- Modified public noticing procedures

Natural Gas Development Plan Process



Wastewater Discharge Approvals

Rule Features

- Applies to all treatment facilities to accept non-domestic wastewaters
- Treatability study requirement
- Site specific discharge requirements
- Non-exceedance of EPA Primary and Secondary Drinking Water Standards
- Analysis for DRBC Zone Specific Water Quality Criteria – Tables 3 – 7 of the WQRs
- Analysis for Acute and Chronic Toxicity per Section 7.6 (e)(1)
- Analysis for TDS Stream Quality Objectives
- NMC to EWQ analysis required

Rule Hearings

Tuesday February 22

Honesdale High School
459 Terrace St.
Honesdale, PA 18431

Liberty High School
125 Buckley St.
Liberty, NY 12754

Thursday February 24

Patriots Theater at the War Memorial
1 Memorial Drive
Trenton, NJ 08608

Two sessions will be held at each venue

1st Session
1:30 pm - 2:00 pm Pre-hearing Comments & Brief Rule Summary
2:00 pm - 5:00 pm Hearing Session where testimony is received.

2nd Session
6:00 pm - 6:30 pm Pre-hearing Comments & Brief Rule Summary
6:30 pm - 9:30 pm Hearing Session where testimony is received.

90-day comment period, with written comments accepted through the close of business (5 p.m.) March 16, 2011, by the following two methods:

 **Electronic submission** using PEPC through www.drbc.net

 **Paper submission** mailed or delivered to: Commission Secretary, DRBC, P.O. Box 7360, 25 State Police Drive, West Trenton, NJ 08628. Please be sure to include the name, address, and affiliation (if any) of the commenter. Paper submissions will also be accepted at the three public hearings.

Due to the expected volume, comments that are faxed, telephoned, or emailed to individual DRBC Commissioners and staff will not be accepted for the rulemaking record.

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Questions?

Contacts at DRBC
Clarke Rupert ext. 260
or Chad Pindar
Bill Muszynski
David Kovach
Eric Engle
609-883-9500 ext. 216

Existing and proposed regulations, applications, and updates are available on the Commission's website:

www.drbc.net

Thank you.

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State Regulations

NYSDEC and PADEP have existing oil and gas programs and other authorities that cover various aspects of oil and gas drilling.

- New York State Environmental Conservation Law Article 23
- Oil, Gas & Solution Mining Law Regulations 6NYCRR Parts 550-559
- State Environmental Quality Review Act
- Guidance and special permit conditions limitations
- Water quality standards
- Discharge effluent limitations
- POTWs headworks analysis
- Stormwater and E & S
- Disposal wells
- Solid and Hazardous Materials
  - Cuttings disposal
  - NORM
- Impoundment construction specifications
- Beneficial use determinations for brine spreading
- Fish, Wildlife and Marine Resources
- Air Resources
- Oil and Gas Act
- Oil and Gas Conservation Law
- 25 Pa. Code Chapter 78 and mods.
- Pa Code Chapter 102
- Clean Streams Law
- Dam Safety and Encroachments Act
- Solid Waste Management Act
- Water Resources Planning Act
- Bonding requirements
- Permitting fees

DRBC Natural Gas Regulations were designed to:

a) Create rules to safely manage the water resources of the DRB and to fill gaps in state requirements.

b) Rely on host state where it has equal or more protective regulations.

Existing DRBC Regulations

1. Special Protection Waters
   - Non-Point Source Pollution Control Plans
     - Erosion & Sediment and Stormwater Controls
   - Non-degradation of Surface Water

2. Section 3.40 - Groundwater Protection
   - Injection and extraction

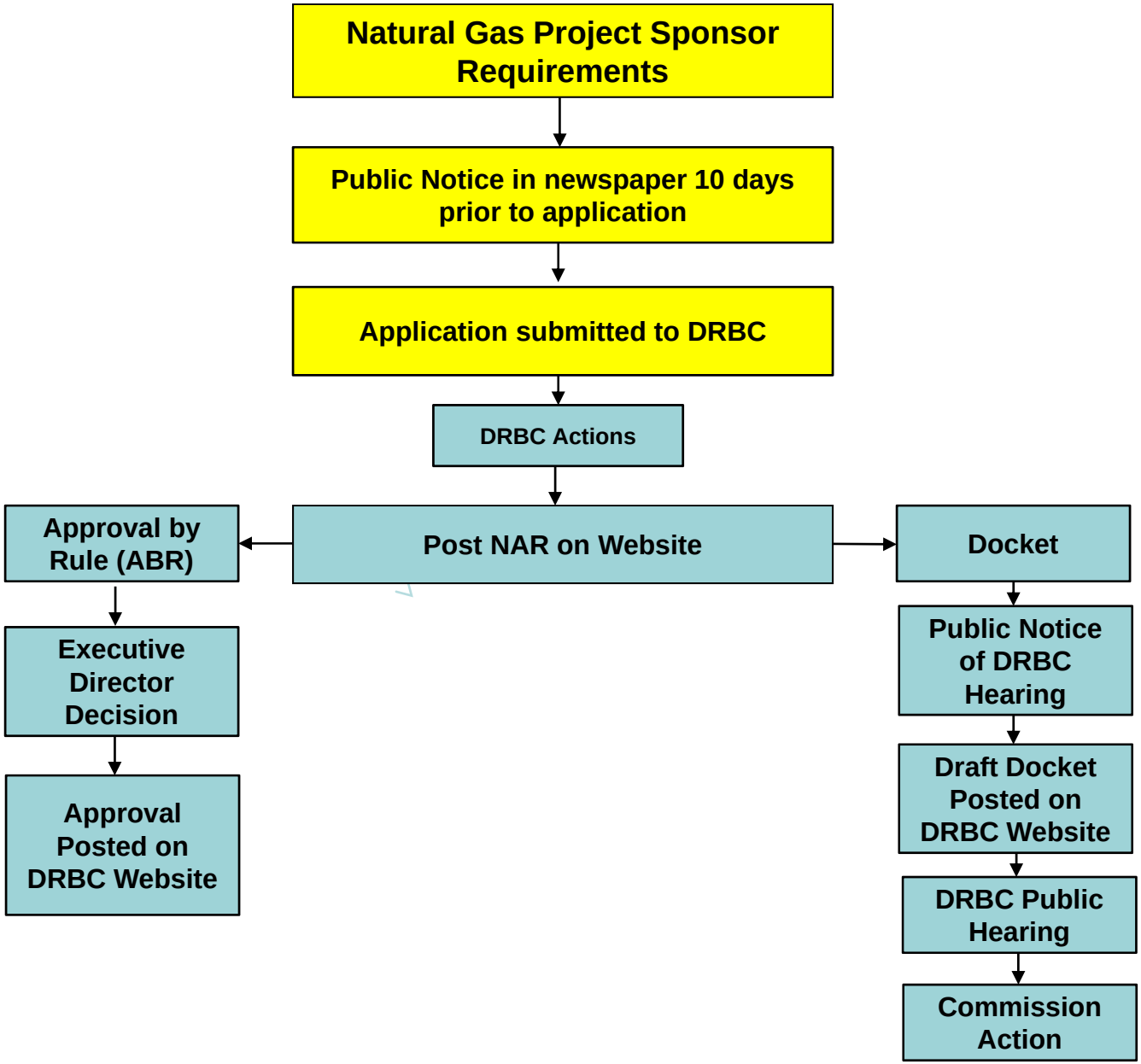
3. Floodplain Regulations-Resolution 76-16
   - Construction activities within floodway and flood fringe

4. Water Withdrawal Requirements

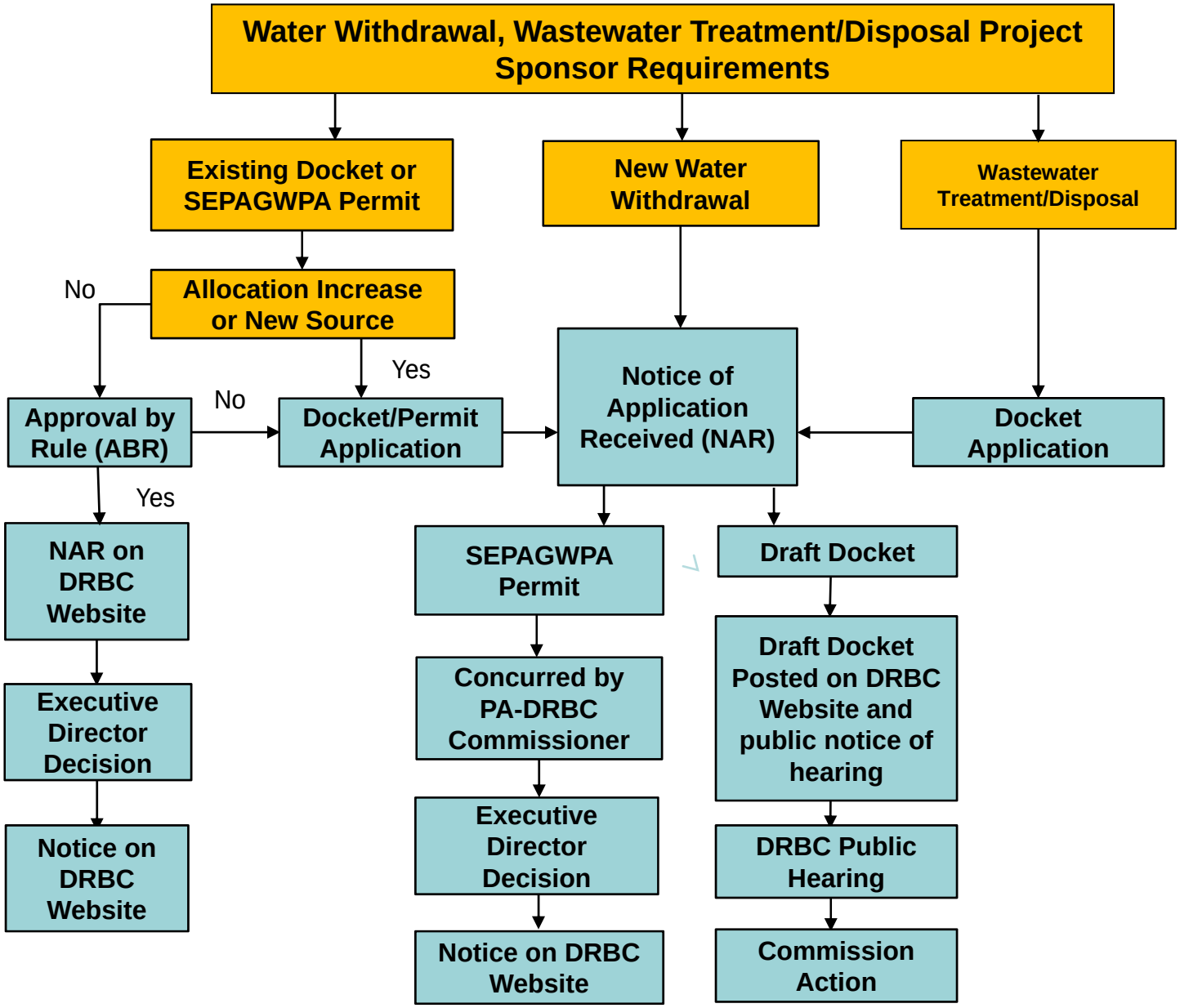
5. Wastewater Disposal Requirements

6. Water Quality Regulations

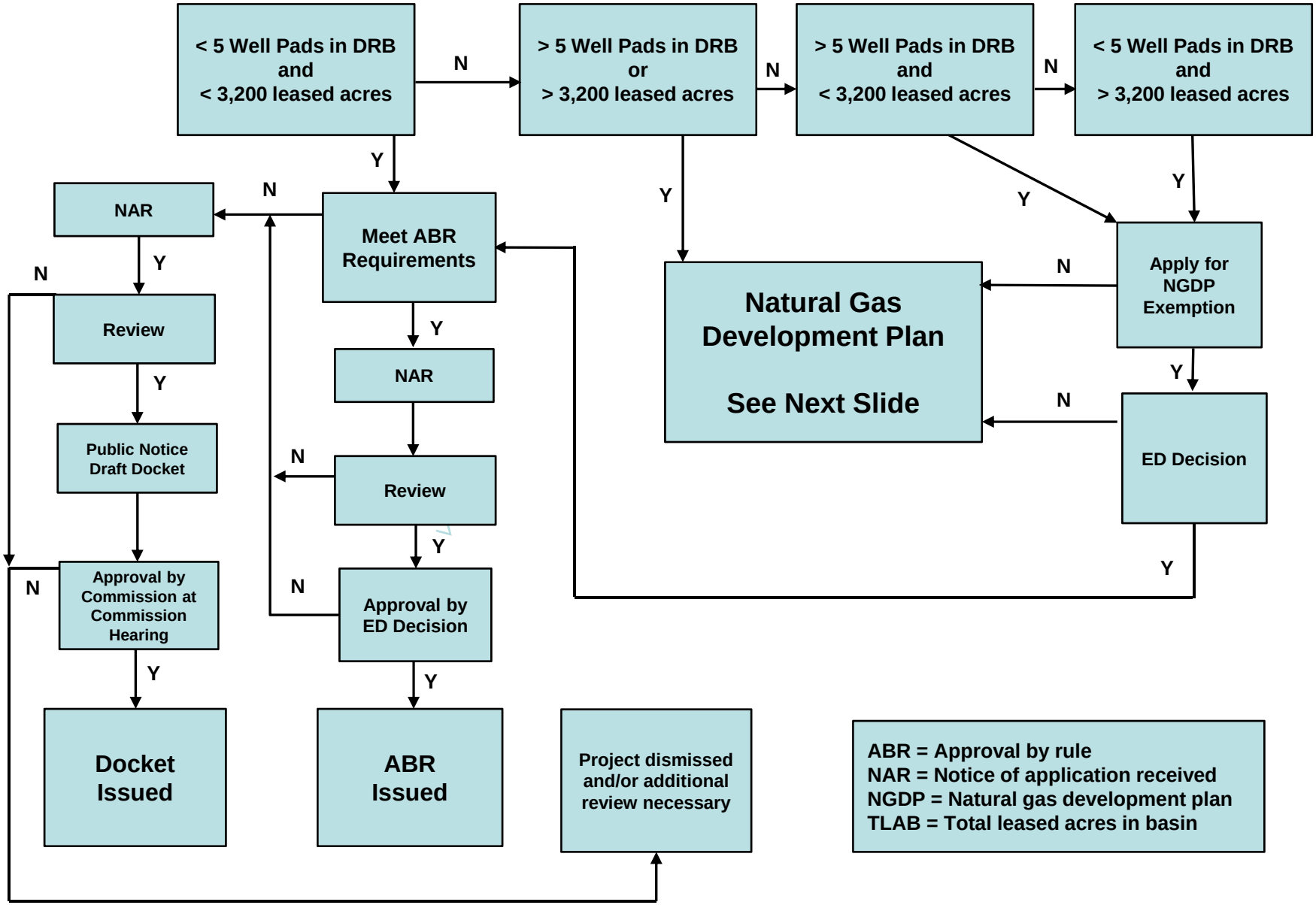
Section 7.3 Public Notice Procedure for Natural Gas Wells and Natural Gas Development Plans



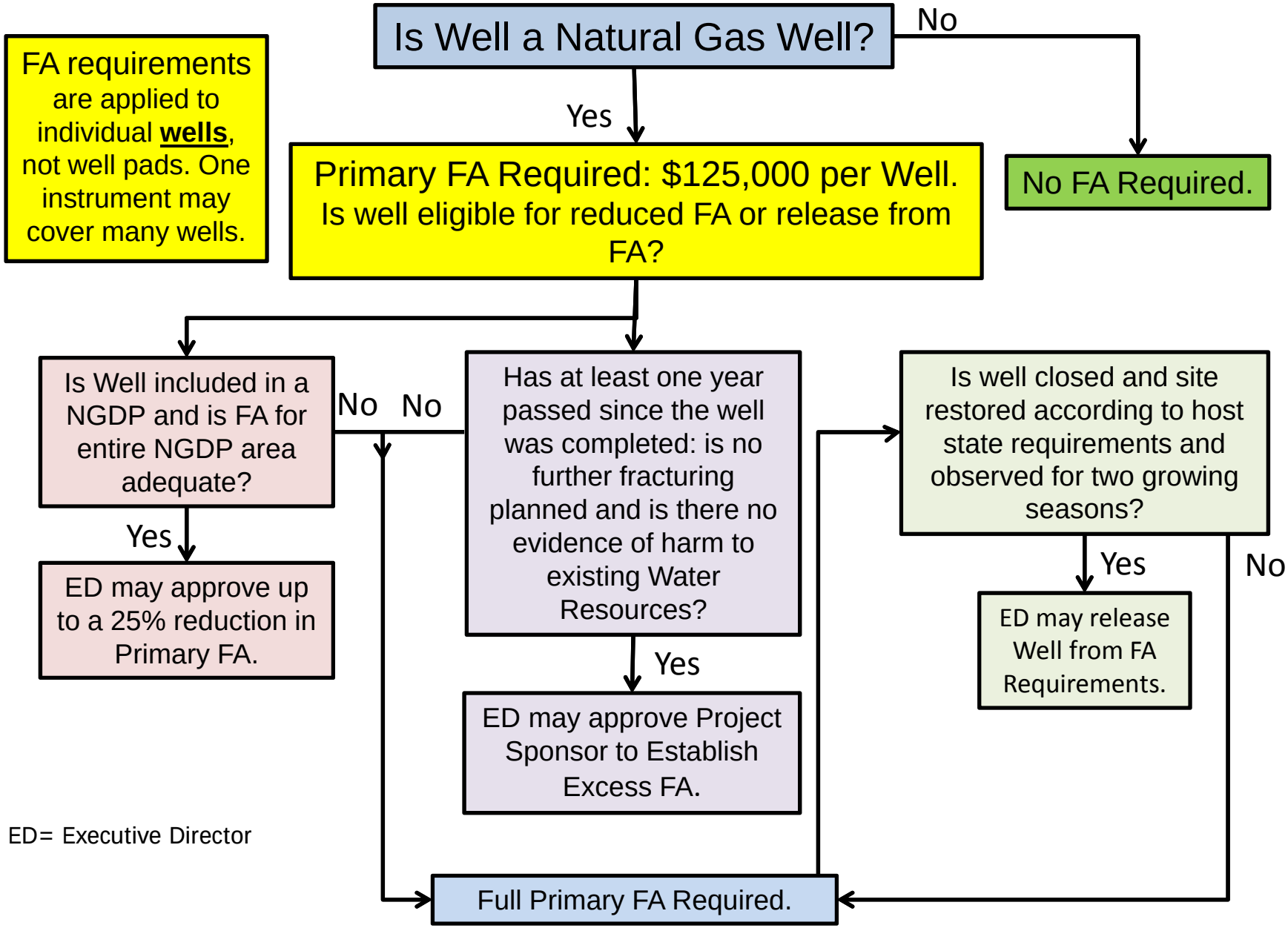
Section 7.3 Public Notice Procedure for Water Withdrawals and Wastewater Treatment Projects



Section 7.5 Well Pad Process



Section 7.3 (k) Financial Assurance ("FA") Overview



Ranking of Constituents by Mean flowback water concentration

Parameter Group	Results (mg/L)
Total Dissolved Solids mg/L 10 SM18 2540 C	81,627.02
Chloride mg/L 1 MCAWW 300.0A	49,472.68
Hardness, as CaCO3 mg/L 5 SM20 2340C	24,787.62
Sodium-DISS ug/L 5000 SW846 6010B	21,710.21
Sodium ug/L 5000 SW846 6010B	20,197.76
Calcium-DISS ug/L 5000 SW846 6010B	6,949.16
Chemical Oxygen Demand (COD) mg/L 10 MCAWW 410.4	6,686.42
Calcium ug/L 5000 SW846 6010B	6,518.05
Strontium-DISS ug/L 50 SW846 6010B	1,510.51
Strontium ug/L 50 SW846 6010B	1,433.30
Barium-DISS ug/L 200 SW846 6010B	1,156.48
Barium ug/L 200 SW846 6010B	1,149.11
Magnesium-DISS ug/L 5000 SW846 6010B	586.62
Biochemical Oxygen Demand mg/L 2 SM18 5210 B	553.74
Magnesium ug/L 5000 SW846 6010B	548.72
Bromide mg/L 1 MCAWW 300.0A	507.77
Potassium-DISS ug/L 5000 SW846 6010B	483.34
Potassium ug/L 5000 SW846 6010B	461.04
Total Suspended Solids mg/L 4 SM20 2540D	338.70
Dissolved Organic Carbon mg/L -- SM20 5310B	316.98
TOC mg/L 1 SM20 5310B	297.40
Acidity mg/L 5 SM20 2310B (4a)	250.66
Total Alkalinity mg/L 5 SM18 2320 B	131.50
Sulfate mg/L 1 MCAWW 300.0A	104.56

Wells in the DRB

Red well symbol denotes drilled well

Blue well symbol denotes well not yet drilled