

Underground Storage Cavern Rules Stakeholder Meeting



**New Jersey Department of
Environmental Protection**

July 12, 2019

General Disclaimer

This presentation and all associated materials are provided for general informational purposes only. They do not reflect any final agency decision or action.

Introductions – NJDEP Rule Team

- ◆ Division of Waste Enforcement, Pesticides and Release Prevention
 - Sonya Silcox, Standards and Procedures Technician
- ◆ NJ Geological & Water Survey Element
 - Jeffrey L. Hoffman, State Geologist
 - Richard Dalton, Manager
- ◆ Bureau of Release Prevention
 - Paul Komosinsky, Acting Bureau Chief
 - John Notta, Chemical Safety Engineer
- ◆ Bureau of Air Permits
 - Danny Wong, Bureau Chief
- ◆ Bureau of Air Compliance and Enforcement – Southern
 - Mary Toogood, Bureau Chief
- ◆ Bureau of Urban Growth and Redevelopment
 - Suzanne Dietrich, Environmental Specialist
- ◆ Office of Legal Affairs
 - Ryan Knapick, Esq., Regulatory Officer

Purpose

- ◆ Gather input to inform rule provisions regarding permitting, engineering, construction & operation of an underground storage cavern
- ◆ Explain pre-existing statutory obligation
- ◆ Maintain transparency for DEP activities/rulemaking

Goals

- ◆ Obtain educated & experienced insight on cavern systems
- ◆ Listen to concerns and questions of attendees regarding caverns & impacts
- ◆ Use information presented to create an effective & reasonable regulatory program

Agenda

I. Greeting and Introduction

II. Background information

III. Department's New Rule Development

Lunch Break

III. Department's New Rule Development (cont'd.)

IV. Open Forum – questions/concerns

V. Closing Remarks



Ground Rules

Questions?

New Jersey Statutes Annotated 58:10-35.1. through 4 (1951)

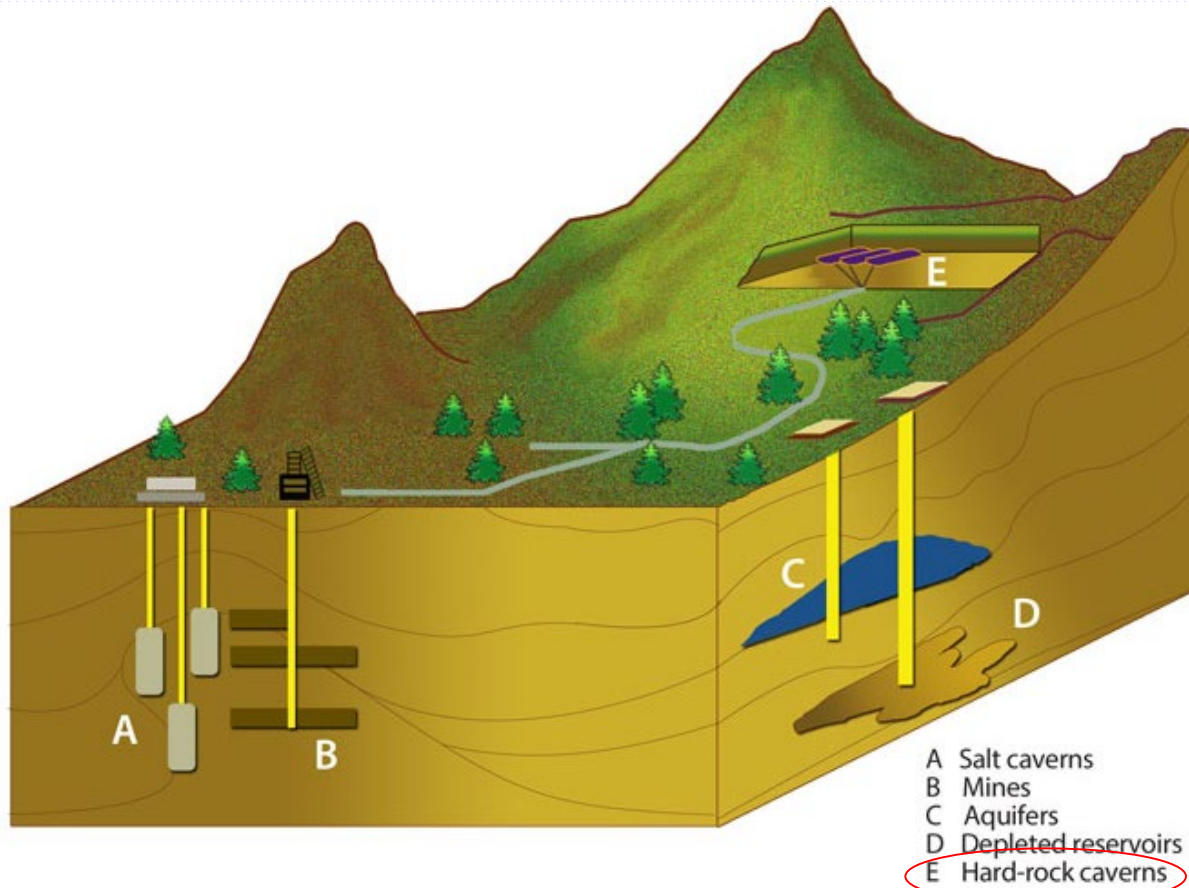
Generally states:

- ◆ A person conducting any operation for the purpose of obtaining access to an underground area for storage of natural or artificial gas or petroleum products and their derivatives shall obtain a permit from NJDEP for such operation, construction and storage.
- ◆ NJDEP shall prescribe rules and regulations to effectuate the provisions of this act.

New Jersey Statutes Annotated 58:10-35.1. through 4 (cont.)

- ◆ Any such permit may contain such restrictions as the Commissioner determines necessary in the public interest to protect the waters of the State, including subsurface and percolating waters.
- ◆ Permit applications shall be accompanied by a competent engineer or geologist's map for consideration by the State Geologist.

What is an Underground Storage Cavern?



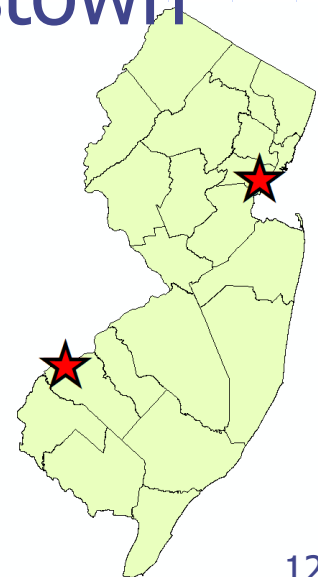
Source: PB-KBB, inc., enhanced by EIA.

Worldwide Applications

- ◆ Hundreds worldwide
- ◆ Material in underground storage caverns held in by pressure from overlying rock and water
- ◆ Compared to above ground storage:
 - safer
 - fewer environmental impacts
- ◆ NJ Focus is hard rock caverns however, law allows storage in other geologic formations

Existing Caverns in New Jersey

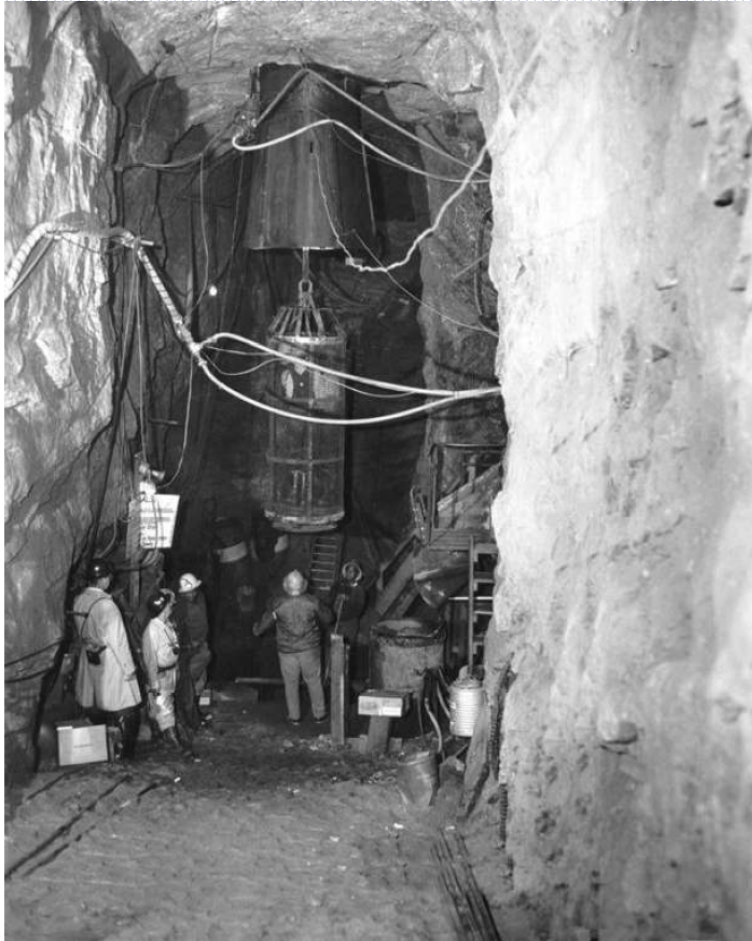
- ◆ Phillips 66 Bayway Refinery, Linden
 - 5 caverns storing propane and butane
- ◆ Delaware River Partners, Gibbstown (former Dupont Repauno site)
 - 1 cavern storing butane



6 Bedrock Storage Caverns in NJ

Name	Esso Propane East	Esso Propane West	Esso Butane 1	Esso Butane 2	Esso Butane 3	Repauno
Permit #	1	1	2	2	2	3
County	Union	Union	Union	Union	Union	Gloucester
Municipality	Linden	Linden	Linden	Linden	Linden	Gibbstown
Constructed	~1957	~1957	~1957	~1957	~1957	1966 - 1968
Contains	propane	propane	butane	butane	butane	butane
Barrels of storage	150,000	167,000	125,000	106,000	157,000	186,000
Depths	292' – 319'	292' – 319'	292' – 321'	292' – 321'	292' – 321'	325' – 357'
Geology	Passaic shale	Passaic shale	Passaic shale	Passaic shale	Passaic shale	gneiss
Notes	Distance between caverns is ~70'		Distance between caverns is ~85'			Originally stored anhydrous ammonia

Gibbstown, NJ ca 1967




Robinson, IL, 2017



Current Regulatory Oversight

- ◆ Bureau of Release Prevention –
 - Toxic Catastrophe Prevention Program
 - Discharge Prevention
- ◆ Division of Water Supply and Geoscience (permitting only)
- ◆ Air Permits
- ◆ Land Use Permits



Questions on Background Cavern Information?

Propose Rules for Caverns

NJDEP Rule Process - General

- ◆ Stakeholder Process
- ◆ Rule Drafting
- ◆ Publication of Rule Proposal
- ◆ Comment Period, includes public hearing
- ◆ Adoption

Purpose of Underground Storage Cavern Rule

- ◆ Regulate the construction, operation, modification, and decommissioning of all underground storage cavern systems through a permit process.
- ◆ Evaluate potential threats to public and impacts to the environment to ensure they are prevented or minimized.

Scope of Underground Storage Cavern Rule

Regulated Substances

◆ Natural or Artificial Gas (Gas)

- Any naturally occurring or synthetic substance that exists in a gaseous state at standard temperature and pressure

◆ Petroleum Products and Derivatives

- Any substance that is a complex mixture, of different hydrocarbons, or any of the products obtained by refining processes.
- Includes substances such as propane, butane, gasoline, kerosene, fuel oil, synthetic oil, and crude oil.

Liquid Natural Gas Storage

- ◆ Not currently feasible in unlined underground caverns
- ◆ LNG is stored at -260°F
- ◆ At this temperature the rock cracks and LNG leaks
- ◆ Unsuccessful LNG bedrock storage attempts in USA, England and Finland
- ◆ Lined bedrock caverns might be feasible (1 successful experiment)

Scope of Underground Storage Cavern Rule

An Underground Storage Cavern System

- ◆ Consists of the underground cavern area and its associated ancillary equipment
- ◆ Includes components such as storage wells, wellheads, pipes, lines, tubes, and instrumentation up to and including the first emergency shut-off valve

Permit Process

- ◆ One system / one substance / one permit

- ◆ 2 Stages for Submittals and Approvals:
 - Construction
 - Operation

Permit Application Requirements – prior to Construction

◆ Feasibility Study

- Describe the location, extent of the cavern and wells
- Assess the geologic setting and compatibility with the regulated substance to ensure mechanical integrity of the system

◆ Site Selection

- Information on the surrounding area (populations, infrastructure, environmental areas, etc.)
- Separation from other caverns

◆ Design & Construction Specifications

◆ Third party documentation

Design & Construction Specifications

- ◆ Maps
- ◆ Design calculations, specifications, maximum design and operating conditions
- ◆ Codes and standards
- ◆ Corrosion control plan
- ◆ Dust management plan
- ◆ Safety instrumentation
- ◆ Process Hazard Analysis
- ◆ Monitoring

Monitoring

- ◆ Details depend on site geology, construction details, and product
- ◆ Before construction monitor groundwater levels and quality
- ◆ Monitor for horizontal and vertical migration of product stored
- ◆ Real time gas sensors above cavern and in soil
- ◆ In cavern - monitor level, pressure and temperature
- ◆ In groundwater - monitor water levels, for presence of product, and other relevant parameters

Third Party Evaluator

◆ Purpose

- Technical expertise to review cavern design
- Difficulties with State resources/contracting

◆ Competency

◆ Independent

◆ Adapt from EPA Risk Management Plan 40 CFR 68.80

Other Agencies

- ◆ NJ Department of Labor and Workforce Development – Mine Safety Section
 - Use of explosives requires a permit, in accordance with the "Explosives Act" (N.J.S.A. 21:1A-128 et seq.), and regulations (N.J.A.C. 12:190)
 - Oversees "Mine Safety Act" (N.J.S.A. 34:6-98.1 et seq.) along with Pits and Quarries Regulations (N.J.A.C. 12:185), if applicable
- ◆ Delaware River Basin Commission (DRBC)
- ◆ All other permits or approvals required under local, State or Federal law

Permit Review Process – Before Construction

◆ Administrative Review

- Third Party criteria
- Application submission administratively complete
- If deficient, notify, correct and resubmit

◆ Technical Review

- If deficient, notify, correct and resubmit

- ◆ When complete, prepare *draft approval to construct* and initiate public process.

Public Process

- ◆ DEP publish notice of draft approval to construct
- ◆ Public hearing and comment period
- ◆ Department determination:
 - Request additional information;
 - Deny application; or
 - Issue approval to construct

Permit Application Requirements – Prior to Operating

- ◆ As-built specifications
- ◆ Mechanical integrity test results
- ◆ Operation and Maintenance Plan
- ◆ Emergency Response Plan

Permit Review Process – Before Operation

- ◆ Administrative Review
- ◆ Technical Review
- ◆ Department determination:
 - Request additional information;
 - Deny application; or
 - Issue approval to operate

Modifications

- ◆ A change to the design, construction, or method of operation. Does not include repairs or maintenance.
- ◆ Major Modification
 - Affects the maximum and/or minimum operating temperatures and/or pressures.
 - Submission and review process similar to approval to construct and approval to operate
- ◆ Minor Modification
 - Any other change that is not a major modification.
 - Submission and review process similar to approval to operate

Decommissioning

- ◆ Decommissioning plan
- ◆ Safely evacuate material and seal the cavern system

Existing Cavern Facilities

Considerations include requirements to:

- ◆ Within __ years, submit updated Operating Permit application documents
- ◆ Submission and review process similar to approval to operate
- ◆ permit renewal time frame: __ years



Open Forum / Questions?

Contact Information

◆ NJDEP Bureau of Release Prevention

- Phone 609-633-0610
- Email release_prevention@dep.nj.gov

Closing Remarks

◆ NJDEP Stakeholder website:

- <https://www.nj.gov/dep/workgroups/>
- Agenda & Slide Presentation

◆ NJDEP Rules website:

- <https://www.nj.gov/dep/rules/>
- Subscribe to NJDEP email Listserve for rule updates