New Jersey Department of Environmental Protection

Bureau of Release Prevention

Underground Storage Cavern System Permit Application to Construct a New Cavern System

I. Applicability

The owner and operator of an underground storage cavern system shall ensure that any underground storage cavern system is constructed, operated, modified, and decommissioned in accordance with the requirements of New Jersey Administrative Code N.J.A.C 7:1F.

No underground storage cavern system subject to the requirements shall be constructed without approval or operated without a permit from the Department issued pursuant to N.J.A.C. 7:1F-4, modified without an approval pursuant to N.J.A.C. 7:1F-5, or decommissioned without an approval pursuant to N.J.A.C. 7:1F-6.

A permit issued by the Department under N.J.A.C. 7:1F-4 shall only apply to a single regulated substance, as specified by the owner and operator in its permit application. Liquified Petroleum Gas (LPG) which can contain mixtures of hydrocarbon-based gases are considered a single regulated substance for purposes of Underground Storage Cavern System permits.

II. Exclusions

The storage of liquefied natural gas in an underground storage cavern system is not permitted under this chapter.

III. Authority

The Permit for an Underground Storage Cavern System is issued under the authority of N.J.S.A. 58:10-35.1 through 35.4 and N.J.A.C. 7:1F. The Permit shall allow for inspection and evaluation to ensure conformance with all provisions of N.J.A.C. 7:1F.

IV. Definitions

Refer to N.J.A.C. 7:1F for a complete list.

“Construction” means the drilling, boring, driving, digging, or otherwise conducting of any operation for the purpose of obtaining access to a pocket or other underground area to establish a new underground storage cavern as part of an underground storage cavern system in addition to installing the infrastructure needed to operate the system.

“Decommission” means the complete withdrawal of any regulated substance, to the greatest feasible extent, from an underground storage cavern system, the sealing and/or removal of the system’s ancillary equipment, and the cessation of operation at the underground storage cavern system.

“Department” means the Department of Environmental Protection.

“Facility” means one or more underground storage cavern system(s) owned or operated by one person on a contiguous piece of property.

"Feasibility study" means a study conducted to assess the suitability of a site for the construction and operation of an underground storage cavern system based upon the site's geology, hydrogeology, above- and below-ground formations or structures, and the regulated substance to be stored at the system.

"First emergency shutdown valve" or "First ESV" means the first actuated valve located on any penetration shaft, used to inject or withdraw the regulated substance into a cavern, downstream from the wellhead that prevents an uncontrolled release.

"Liquefied Petroleum Gas" or "LPG" means any material in liquid form that is composed predominantly of any of the following hydrocarbons or a mixture thereof: propane, propylene, butanes (normal butane or isobutane), and butylenes.

"Major modification" means a change to the regulated substance, or a change to the underground storage cavern system that affects the maximum and/or minimum operating temperatures and/or pressures.

"Maximum Allowable Operating Pressure" or "MAOP" means the maximum pressure of the regulated substance at which an underground storage cavern system is capable of maintaining its mechanical integrity. The maximum allowable operating pressure of any system is the test pressure minus the safety margin.

"Maximum Design Pressure" or "MDP" means the highest pressure at which a pressure test of the cavern may be conducted to verify the integrity of the cavern system. The MDP is the minimum calculated hydrostatic pressure at the highest point of the cavern, in pounds per square inch gauge (psig), minus 29 psig.

"Maximum design temperature" means the maximum temperature of the regulated substance at which an underground storage cavern system is capable of maintaining its mechanical integrity.

"Maximum injection rate" means the maximum rate at which regulated substance is injected into an underground storage cavern system that maintains or otherwise does not compromise the system's mechanical integrity.

"Maximum operating pressure" means the maximum pressure of the regulated substance that is expected during operation. The maximum operating pressure must be less than the MAOP**.**

"Maximum operating temperature" means the maximum temperature of the regulated substance that is expected during operation.

"Maximum withdrawal rate" means the maximum rate at which a regulated substance is withdrawn from an underground storage cavern system that maintains or otherwise does not compromise the system's mechanical integrity.

"Minimum design pressure" means the minimum pressure of the regulated substance at which an underground storage cavern system is capable of maintaining its mechanical integrity.

"Minimum design temperature" means the minimum temperature of the regulated substance at which an underground storage cavern system is capable of maintaining its mechanical integrity.

"Minimum operating pressure" means the minimum pressure of the regulated substance that is expected during operation.

"Minimum operating temperature" means the minimum temperature of the regulated substance that is expected during operation.

"Minor modification" means any change to the design or construction of an underground storage cavern system or change in the method of operation of the system that affects storage, injection, or withdrawal activities that is not a major modification.

"Modify" or "modification" means any change to the design or construction of an underground storage cavern system or change in the method of operation of the system that affects storage, injection, or withdrawal activities. A modification does not include repairs or maintenance.

"Operator" means any person who leases, operates, controls, supervises, or has responsibility for, the daily operation of an underground storage cavern system, and each person who has the authority to operate, control, or supervise the daily operation of a system. There may be more than one operator of a system.

"Operation" or "operate" means any ongoing injection, withdrawal, or storage at an underground storage cavern system.

"Owner" means any person who owns a facility, or any person who has a legal or equitable title to a site containing a facility.

"Permit" means the approval issued by the Department under N.J.A.C. 7:1F-4 to construct and operate an underground storage cavern system.

"Person" means any individual or entity, including without limitation, a public or private corporation, company, estate, association, society, business firm, partnership, joint stock company, foreign individual or entity, interstate agency or authority, the United States and any of its political subdivisions, the State of New Jersey, or any of its political subdivisions, or any other meanings that apply to the common understanding of the term. "Person" shall, for the purpose of enforcement, also include a responsible corporate official, including a managing member of a limited liability company or a general partner of a partnership.

"Regulated substance" or "substance" means a gas or a petroleum product and its derivative injected, withdrawn, stored or proposed to be injected, withdrawn, or stored at an underground storage cavern system. For purposes of this chapter, this definition does not include liquefied natural gas.

"Safety margin" means the pressure value that is equal to 10 psig or 10 percent of the test pressure, whichever is greater. The safety margin value is used to determine the maximum allowable operating pressure of an underground storage cavern system.

"Test Pressure" is the pressure value in psig selected to be used in a test to verify the integrity of the cavern system. The test pressure must be less than or equal to the maximum design pressure.

"Underground storage cavern" or "cavern" means a pocket or other underground area or place in any underground stratum excavated and used for the purpose of storing a regulated substance, or a natural geologic trap of any kind used for the purpose of storing a regulated substance.

"Underground storage cavern system" or "system" means an underground storage cavern and associated ancillary equipment including, but not limited to, wells, wellheads, pipes, lines, tubes, and instrumentation that are used for operation of the system up to and including the first emergency shutdown valve, any associated, adjacent maintenance valves, and the pressure relief valve(s) installed to protect the cavern from over pressurization.

V. Fees

Fees for activities related to underground storage cavern permits, compliance monitoring, modification, and decommissioning shall be paid to the Department by the owner or operator of an underground storage cavern in accordance with N.J.A.C 7:1F-1.9 Fees. Refer to the fee section of the Rule for further details.

VI. Program Information

Additional information related to N.J.A.C 7:1F can be requested from the Bureau of Release Prevention at the address listed below in this section, by telephone at (609) 633-0610, by fax at (609) 633-7031, by e-mail at release_prevention@dep.nj.gov, or obtained through the Bureau's website at https://www.nj.gov/dep/enforcement/brp.htm. Further information about the Department can be accessed at www.nj.gov/dep.

Submit the permit application including all accompanying documents required to be submitted pursuant to N.J.A.C 7:1F in the following formats:
- one hardcopy; and
- one electronic/digital version of all documents in pdf format. Contact the Department for the means of submitting the electronic/digital pdf

Applications, forms, and correspondence related to N.J.A.C 7:1F must be submitted to the New Jersey Department of Environmental Protection, Bureau of Release Prevention, Mail Code 22-03D, 401 East State Street, PO Box 420, Trenton, New Jersey, 08625-0420, or by email at release_prevention@dep.nj.gov**.**

Applications, forms, or other materials sent or delivered to the Department at an address other than as listed in this section above shall not be deemed to have been received for the purposes of calculating application review deadlines or other time periods under N.J.A.C 7:1F.

NOTES:

One complete separate permit application form must be submitted for each underground storage cavern system and each regulated substance (or regulated substance mixture).

This permit application includes all accompanying documents required to be submitted pursuant to N.J.A.C 7:1F.

If a facility is simultaneously submitting multiple permit applications for cavern systems at the site and a required accompanying document is a duplicate for all of the cavern systems, the facility may submit only one copy of that accompanying document. (For example, if a facility is applying to construct two cavern systems and has prepared a feasibility study document that contains all required information for both of those cavern systems, the facility only has to submit one copy of the feasibility study document.)

During the permit application review process, the Department reserves the right to request additional technical information if it deems it to be necessary in order to make a decision regarding the permit application submittal.

A. General Information:

Facility Name and Location:

Facility Name:		
Address:		
City:	**State:**	**Zip:**
Phone Number:		
Facility NJEMS Program Interest Number (if available):		

Facility Mailing Address:

Contact Name:	**Title:**	
Mailing Address:		
City:	**State:**	**Zip:**
Phone Number:	**Email:**	

Cavern System:

Cavern System Designation (name and/or number):
Anticipated date to begin construction:
Anticipated date to complete construction:

Owner (see definition on page 3):

Name:		
Mailing Address:		
City:	**State:**	**Zip:**
Phone Number:	**Email:**	

Operator (see definition on page 3):

Name:		
Mailing Address:		
City:	**State:**	**Zip:**
Phone Number:	**Email:**	

B. Certification

Individual With Direct Knowledge (IDK): (person or persons, including but not limited to any consultant, licensed engineers, or contractors, with direct knowledge of and responsibility for the information contained in this application) (N.J.A.C. 7:1F-1.8(a)1.)

"I certify under penalty of law that I believe the information provided in this document is true, accurate, and complete."

Company Legal Name or Affiliation:	
Name (Print):	**Title:**
Signature:	**Date:**

Responsible Corporate Official (RO) (N.J.A.C. 7:1F-1.8(a)2.)

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and any of its attachments and, based on my inquiry of those persons immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete."

Company Legal Name or Affiliation:	
Name (Print):	**Title:**
Signature:	**Date:**

NOTES:

1.The RO certification above shall not be required if the person required to sign the IDK certification above is the same person required to sign the certification in RO above.

2. Unless specified otherwise, the certifications above shall apply to all accompanying documents submitted with this application. If a different certification is needed for a specific document, copy and attach this completed certification page with that document.

C. Undergound Storage Cavern System Data:

All data fields must be filled out.

1. Cavern System Data

Cavern System Designation (name and/or number)	
Volume Capacity (barrels)	
Maximum Design Pressure (psig)	
Minimum Design Pressure (psig)	
Test Pressure (psig)	
Safety Margin (psig)	
Maximum Allowable Operating Pressure (psi)	
Maximum Design Temperature (Degrees F.)	
Minimum Design Temperature (Degrees F.)	
Maximum Injection Rate (gallons/minute)	
Maximum Withdrawal Rate (gallons/minute)	

2. Regulated Substance Data

	Yes	***No***
Is LPG the Regulated Substance for this Cavern Permit Application?	◯	◯

Instructions:

1. Complete Tables 2.A. and 2.B. below for the Regulated Substance. If it is a mixture of chemical substances, enter the name, CAS #, and concentration range (in weight percent), in descending order starting with the component having the largest concentration range.

2. For LPG Regulated Substance Only:
If you intend to store different mixtures of the component substances comprising LPG periodically in the cavern system for this permit, complete separate Tables 2.A. and 2.B. below for each case having a different majority component or different list of components.
Attach additional pages for Tables 2.A. and 2.B. if needed.

A. Regulated Substance Identification and Concentration Table

Substance Name	CAS Number	Concentration range (weight %)

B. Substance Operating Parameters

Maximum Operating Pressure (psig)	
Minimum Operating Pressure (psig)	
Maximum Operating Temperature (Degrees F.)	
Minimum Operating Temperature (Degrees F.)	
Maximum Storage Amount (barrels)	
Density (pounds per gallon)	

A. Regulated Substance Identification and Concentration Table

Substance Name	CAS Number	Concentration range (weight %)

B. Substance Operating Parameters

Maximum Operating Pressure (psig)	
Minimum Operating Pressure (psig)	
Maximum Operating Temperature (Degrees F.)	
Minimum Operating Temperature (Degrees F.)	
Maximum Storage Amount (barrels)	
Density (pounds per gallon)	

A. Regulated Substance Identification and Concentration Table

Substance Name	CAS Number	Concentration range (weight %)

B. Substance Operating Parameters

Maximum Operating Pressure (psig)	
Minimum Operating Pressure (psig)	
Maximum Operating Temperature (Degrees F.)	
Minimum Operating Temperature (Degrees F.)	
Maximum Storage Amount (barrels)	
Density (pounds per gallon)	

A. Regulated Substance Identification and Concentration Table

Substance Name	CAS Number	Concentration range (weight %)

B. Substance Operating Parameters

Maximum Operating Pressure (psig)	
Minimum Operating Pressure (psig)	
Maximum Operating Temperature (Degrees F.)	
Minimum Operating Temperature (Degrees F.)	
Maximum Storage Amount (barrels)	
Density (pounds per gallon)	

D. Permit Documentation Inclusion Checklist:

***** Mark (X) each box either YES (if included with the application) or NO.***

Submittal Included	***Yes*****	***No*****
1. A feasibility study completed in accordance with N.J.A.C. 7:1F-2.1. (See Section E. below.)	◯	◯
2. Design specifications in accordance with N.J.A.C. 7:1F-2.2(a), including a description of how the owner and operator of the system shall comply with each of the Construction Requirements of N.J.A.C. 7:1F-2.2(c). (See Section F. below)	◯	◯
3. A process hazard analysis in accordance with N.J.A.C. 7:1F-2.3. (See Section G. below)	◯	◯
4. Assessments of environmental, health, and climate change impacts in accordance with N.J.A.C 7:1F-2.4. (See Section H. below)	◯	◯
5. Documentation demonstrating the competency and independence of the third party conducting an evaluation of the application materials in 1, 2, 3, and 4 above in accordance with N.J.A.C. 7:1F-2.5(b) and (d). (See Section I. below)	◯	◯

Instruction for Sections E. through I. below:

Identify each required document specified in the tables below that is being submitted with this permit application by title, identification number (if applicable), and date of issue or latest revision date. If there are multiple documents being submitted to comply with each required row in the tables, make sure to identify and list each separate document.

E. Feasibility Study Documentation

Rule Cite	Document Requirement	Document Title	Identification Number (if applicable) and/or filename (for electronic submission)	Issue/Revision Date
2.1(a)1	The approximate location, capacity, dimensions, and depth of the proposed underground storage cavern			
2.1(a)2	The locations of any shaft or well drilled or proposed to be drilled			
2.1(a)3	An assessment of the geographical, topographical, and physical data for the site of the underground storage cavern system, including the regional and site-specific geologic and hydrogeologic settings of the system, and the observed fluctuations of the local ground water levels			
2.1(a)4	Identification of the regulated substance to be stored including, if applicable, all mixtures and/or grades of LPG to be stored and the concentration of any component of the regulated substance, including of all LPG mixtures and/or grades to be stored			
2.1(a)5	An assessment of the compatibility of the regulated substance, including all proposed mixtures and grades of LPG included in the application, with all parts of the system and a demonstration that the mechanical integrity of the system will not be impaired			
2.1(a)6i	An assessment of all available sources of information to demonstrate that any well, including any abandoned well, at the proposed site: Has been constructed in accordance with all applicable local, State, and Federal laws			

Rule Cite	Document Requirement	Document Title	Identification Number (if applicable) and/or filename (for electronic submission)	Issue/Revision Date
2.1(a)6ii	An assessment of all available sources of information to demonstrate that any well, including any abandoned well, at the proposed site: All known abandoned wells have been properly decommissioned in accordance with the requirements under the Well Construction and Maintenance rules at N.J.A.C. 7:9D			
2.1(a)7	An assessment of any existing surface infrastructure or activity at the proposed site and its effect, if any, on the system's mechanical integrity			
2.1(a)8	An assessment of all applicable local, State, and Federal laws including, but not limited to, Department regulations that are applicable to the project			
2.1(b)	The feasibility study shall be completed by a person experienced with the design and construction of underground cavern systems and its mechanical integrity			
2.1(c)	The feasibility study shall be certified by a licensed professional engineer			

F. Design Specifications Documentation

Rule Cite	Document Requirement	Document Title	Identification Number (if applicable) and/or filename (for electronic submission)	Issue/Revision Date
2.2(a)1	A paper copy, together with a digital version as specified in 2.2(b), of an accurate map to scale showing the location, dimensions, and depth of any proposed underground storage cavern and of all shafts and wells drilled or proposed to be drilled			
2.2(a)2	Any engineering design drawing(s) of the system			
2.2(a)3	Any construction and engineering calculations associated with the underground storage cavern system, including any supporting documentation			
2.2(a)4	The specifications of the equipment and material to be installed or otherwise used during construction			
2.2(a)5	A description of the methods of construction to be utilized, including but not limited to methods of excavation and shaft construction and grouting			
2.2(a)6	The maximum allowable operating pressure, maximum and minimum design pressures, and maximum and minimum design temperatures of the system			
2.2(a)7	The maximum and minimum operating pressures and temperatures of the system based on the regulated substance, including supporting documentation on how calculated			

Rule Cite	Document Requirement	Document Title	Identification Number (if applicable) and/or filename (for electronic submission)	Issue/Revision Date
2.2(a)8	The codes and standards upon which the design specifications are based			
2.2(a)9	Corrosion control measures			
2.2.(a)10	A dust management plan that sets forth measures to control particulate dust from construction activities and sources that include, but is not limited to muck piles, loading and haulage, material transfer points, crushers, face drilling, blasting, roof bolting, skip loading, dumping, surface work areas, and roadways			

G. Construction Requirements of N.J.A.C. 7:1F-2.2(c) and (d)

Provide a description of how you will comply with the following construction requirements. Attach additional pages and/or documentation as needed.

1. Construction of the system and storage of materials related to construction, including any excavated materials, must be completed in accordance with the Mine Safety Act, N.J.S.A. 34:6-98.1 et seq., the Radiation Protection Act, N.J.S.A. 26:2D, and the Explosives Act, N.J.S.A. 21:1A-128 – 1A-144 as applicable, and all other applicable local, State, and Federal laws.

2. A system must be constructed in adherence with the design specifications submitted to the Department pursuant to N.J.A.C 7:1F-2.2 (a). If during construction, the owner or operator deviates from the Department approved design specifications, the owner and operator shall notify the Department in writing and provide updated design specifications certified by a licensed professional engineer for approval by the Department.

3. In addition to the requirements for well construction under N.J.A.C. 7:9D, any well or shaft must be constructed with casing of appropriate depth, cementing, tubing, pipes and other equipment to ensure and maintain mechanical integrity.

4. The separation between any individual underground storage cavern within a new or expanded system shall be a distance sufficient to ensure that the caverns are able to maintain mechanical integrity and can be safely operated, and that the migration of the regulated substance(s) between caverns is prevented.

5. Corrosion control measures must be implemented during construction.

6. Instrumentation to measure the pressure, level, flowrate, and temperature of any regulated substance that is injected or withdrawn from the cavern must be installed and calibrated.

7. A ground water detection monitoring system must be installed, at appropriate locations and depths, to detect any releases from the system to ground water.

8. A ground water level (high and low) monitoring system must be installed appropriate locations and depths.

9. A dust control plan must be implemented during all construction activities.

10. An atmospheric detection system for accidental releases must be installed.

11. Installation of a soil vapor monitoring system designed to detect any migration of the regulated substance in the soil above the cavern area.

12. The system must include a first ESV on any penetration shaft used to inject or withdraw the regulated substance into the cavern, except the vapor pressure relief line. The first ESV must be, at a minimum:
    a. Fail-safe;
    b. Fire-safe;
    c. Part of an emergency shutdown system that will close the valve upon detection of excess flow or pressure, gas leak detection, or fire;
    d. Capable of being activated locally at the cavern area and remotely; and
    e. Incapable of being opened remotely.

13. The owner shall maintain and control all of the surface and mineral rights of all privately owned land within 300 feet of the surface footprint of the cavern.

14. All information required under N.J.A.C. 7:1F-2.2 shall be completed in accordance with accepted industry standards and certified by a licensed professional engineer.

G. Process Hazard Analysis Documentation

Will this underground storage cavern system store a regulated substance that is an extraordinarily hazardous substance as defined under the Toxic Catastrophe Prevention Act Program rules at N.J.A.C. 7:31-1.5? Check one: Yes ◯ No ◯

Rule Cite	Document Requirement	Document Title	Identification Number (if applicable) and/or filename (for electronic submission)	Issue/Revision Date
2.3	Process Hazard Analysis			
N.J.A.C. 7:31-4.2 (if applicable)	Risk Assessment			

H. Assessments of Environmental, Health, and Climate Change Impacts Documentation

Rule Cite	Document Requirement	Document Title	Identification Number (if applicable) and/or filename (for electronic submission)	Issue/Revision Date
2.4(b)	Environmental inventory descriptions			
2.4(c)	Environmental Assessment			
2.4(d)	Health Impact Assessment			
2.4(e)	Summary discussion of any potential adverse impacts identified in the environmental and health assessments in (c) and (d) above that cannot be avoided should the proposed facility be constructed and operational.			
2.4(f)	Climate change impact assessment			

I. Documentation demonstrating the competency and independence of the third party conducting an evaluation of the application materials

Rule Cite	Document Requirement	Document Title	Identification Number (if applicable) and/or filename (for electronic submission)	Issue/Revision Date
2.5(b)	Documentation that the third party meets the competency and independence requirements			
2.5(d)	Owner and operator third party requirements			