

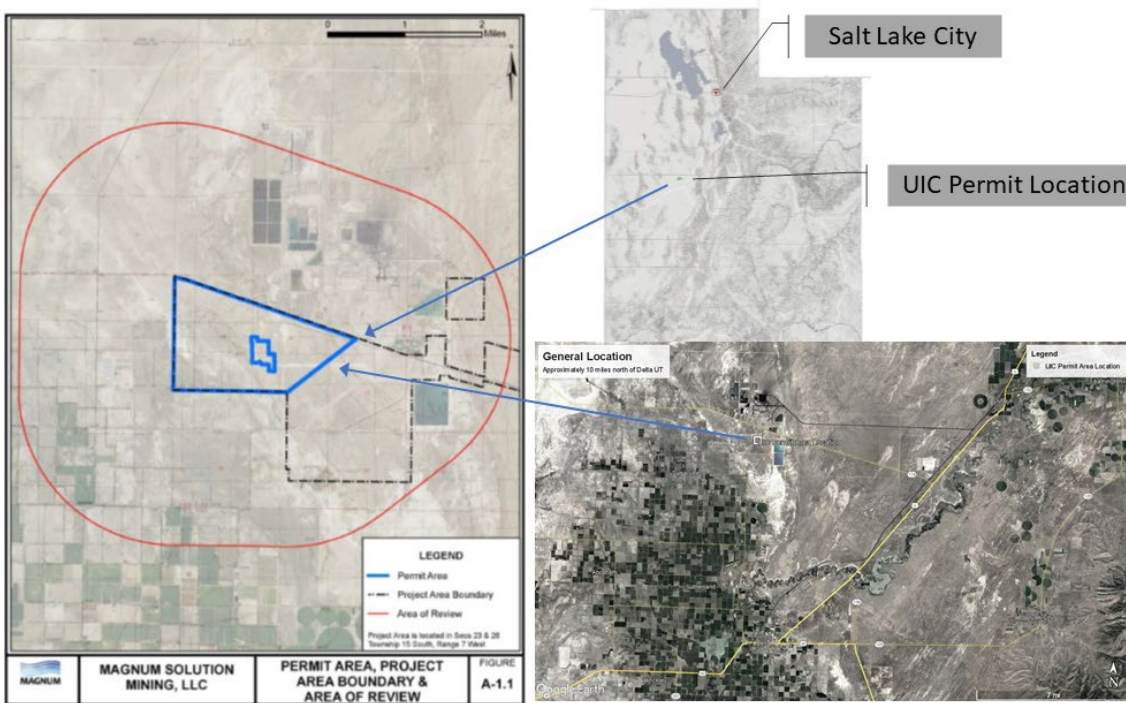


UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

**FACT SHEET AND STATEMENT OF BASIS
 UNDERGROUND INJECTION AND CONTROL (UIC) CLASS V AREA PERMIT**

UTU-27-AP-BDCCF0C

FEBRUARY, 2022



<p><u>Location:</u> Millard County, Utah</p>	<p><u>Operator:</u> Advanced Clean Energy Storage I (ACES I), LLC</p>
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I. Purpose of the Fact Sheet

Pursuant to section §124.8 of the Underground Injection Control (UIC) regulations in Title 40 of the Code of Federal Regulations (CFR) which is incorporated by reference in the Utah UIC Administrative Rules (R317-7), the purpose of this fact sheet is to briefly describe the principal facts and considerations that went into preparing this Class V Permit (Permit) by the Division of Water Quality (DWQ), the UIC permitting authority. To meet these objectives, this fact sheet contains a description of the permitted facility, a description of the injectate, information on the permitting process, a statement of basis for setting permit conditions. This Permit was drafted under UIC permit regulations for Class V injection wells associated with the production of electric power (R317-7-3.5.M and 40 CFR 146.5(e)(12) by Utah UIC Director authority as incorporated by R317-7-1.8.

II. Brief Description of the Facility

ACES I plans to inject, store and withdraw hydrogen from underground storage caverns constructed in a tectonically thickened salt body located approximately 9 miles north of Delta, Utah in Millard County and at depths greater than 3,000 feet below the surface. The construction of these caverns is permitted by ACES I's solution mining UIC Class III Permit UTU-27AP-718D759.

III. Description of Injectate

The storage caverns are created by solution mining with fresh water under the UIC Class III Permit which limits cavern capacity by imposing strict cavern diameter to pillar width (salt mass between caverns) ratios and standoff distances to the edge of the salt formation itself. Brine created by the solution mining process is stored in nearby surface solar evaporation ponds which are regulated by Ground Water Discharge Permit UGW270010. The completed caverns are then used to store and recover gaseous hydrogen by injection and recovery under pressure as regulated by this UIC Class V permit. The hydrogen is generated on site by electrolysis of water and is used to generate electricity by combustion. The total storage volume in the two caverns (H-1 and H-2) that will be constructed for this project is 11 million barrels. The limits of total hydrogen capacity and injection and withdrawal rates by mass and volume are constrained by the total cavern volume, the maximum allowable hydrogen gas pressure (Specified in the Storage Cavern Field Operating, Monitoring and Reporting Plan (SCFOMRP) which is Permit Attachment C)

IV. Information on the Permitting Process

The Class V Permit was prepared by the DWQ for public notice and public comment according to 40 CFR 124.10 which is incorporated by reference by R317-7-1. Public comments will be accepted by the DWQ for 30 days following the first day of public notice in the local newspaper that serves the affected community. A hearing may be held by the DWQ if public comments are substantial and the Draft Permit requires revision based on these comments.

The comment period ended April 4, 2022. No comments were received.

V. Statement of Basis for Establishing Permit Conditions

The basis for issuing the UIC Class V permit for hydrogen storage is to ensure compliance with the Utah UIC administrative rules for Class V injection well activities, R317-7. Praxairs' Underground Gas Storage Facility, Hydrogen Storage Lease, Well No. 1, Moss Bluff Field, Liberty County Texas is the most current and operational salt cavern hydrogen storage facility existing in the nation has developed a methodology for the monitoring of wells and caverns which were used to inform the development of the permit conditions where they apply to the injection and recovery of pressurized hydrogen in solution mined salt caverns. These state-of-the-art methodologies have been required in the Permit to ensure well and cavern integrity and stability and protection of USDWs.

The following gas and hydrogen cavern storage regulation, construction, operation, monitoring and mechanical integrity testing procedures and methodologies were reviewed and modified to develop this Class V Permit:

- Ground Water Protection Council and Interstate Oil and Gas Compact Commission. Underground Gas Storage Regulatory Considerations: A Guide for State and Federal Regulatory Agencies. May, 2017. 122 pages.
- Railroad Commission of Texas – Final Order Approving the Application of Praxair, Inc. for a Permit Pursuant to Statewide Rule 97 to Create, Operate and Maintain an Underground Gas Storage Facility, Hydrogen Storage Lease, Well No. 1, Moss Bluff Field, Liberty County Texas, Oil and Gas Docket No. 03-0238823, August 2004.
- Railroad Commission of Texas – The Application of Praxair, Inc., for a Permit to Create, Operate and Maintain an Underground Gas Storage Facility, Praxair Hydrogen Storage Lease, Well No. 1, Moss Bluff Field, Liberty County Texas, Oil and Gas Docket No. 03-0238823, July 2004.
- January 15th - 20th, 2017 Mechanical Integrity Test - Prepared for: Praxair, Inc. by Oates Energy Solutions January 23, 2017

Distributed temperature and pressure sensing fiber optic cables will be used to monitor the caverns and hydrogen inventory continuously.

The UIC Class III permit (UTU-27-AP-718D759) regulates salt cavern construction of this facility. Permit required operation conditions are specified in the SCFOMRP.

VI. Summary of Conditions of the Permit for Hydrogen Storage

The conditions of the UIC Class III permit for cavern development, monitoring, maintenance, well mechanical integrity testing, and financial assurance for cavern closure and well plugging and abandonment are also required by the Class V Permit. The following specific conditions in Part III of this Class V Permit apply to hydrogen storage facility operation:

1. Section D - The SCFOMRP is included as Attachment C of this permit as an enforceable condition of this UIC Class V Permit. The SCFOMRP includes:
 - Quarterly hydrogen gas inventory monitoring and reporting to DWQ.
 - Monitoring and reporting to DWQ of any geochemical byproducts that may indicate cavern reaction and cavern or well erosion and corrosion, respectively.
2. Section E - The hydrogen storage specific operating pressures specified in Part III, Section E.4.b, subsections i through iii, and in Part III, Section E.4.c.
3. Section F – Notice Procedures for Identifying Applicable Permit(s) (Class III, Class V, or both concurrently)
4. Section J – Geomechanical analysis and reassessment will be conducted if any geochemical processes that are detected during operations that may affect cavern stability during Class V operations as prescribed in the conditions of UIC Class III Permit Part III Section K and 40 CFR 144.52 and as set forth in the SCFOMRP.

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