July 27, 2005

OIL AND GAS DOCKET NO. 08-0242525

THE APPLICATION OF WAHA STORAGE AND TRANSPORTATION LP PURSUANT TO STATEWIDE RULE 97 FOR A PERMIT TO CREATE, OPERATE AND MAINTAIN AN UNDERGROUND GAS STORAGE FACILITY, WAHA/FROST LEASE, REEVES COUNTY, TEXAS

HEARD BY: Thomas H. Richter, P.E., Technical Examiner
Mark Helmueller, Hearings Examiner

APPLICANT:	**REPRESENTING:**
Michael McElroy, Attorney	WAHA Storage & Transportation LP
Kurt Looff	
Daryl Gee	
R. Kleinenberg	
Bruno Colcombet	
Larry Krohmer	

PROTESTANT:	
Scott Johnson, Attorney	Town of Pecos City

PROCEDURAL HISTORY

Date of Application:	April 8, 2005
Date of Notice:	April 8, 2005
Date of Hearing:	April 22, 2005
Date of Transcript:	May 4, 2005
Date PFD Issued:	

EXAMINERS' REPORT AND PROPOSAL FOR DECISION
STATEMENT OF THE CASE

WAHA Storage & Transportation LP ("WAHA") is seeking authority from the Commission to create, operate and maintain a facility to store natural gas and then retrieve it from solution-mined caverns. The caverns will be created within a bedded salt formation, and requirements for such a facility are set out in Statewide Rule 97. The Town of Pecos City does not oppose the application but questions the use of potable water underlying the facility as the solution for dissolving the bedded salt where a nonpotable water source has been identified by the applicant.

The Town of Pecos City contends that the volume of water to be used to leach the storage caverns is so great, an estimated 200 million barrels of water (MMWB) over 5 years it may adversely effect the municipal supply water wells (completed in the Cenozoic Pecos Alluvium) some six miles from the proposed cavern site. WAHA has stated that it would use the Cenozoic Pecos Alluvium water only if it could not obtain authorization from the Middle Pecos Groundwater Conservation District ("District") to use the nonpotable Capitan Reef water. Pursuant to a July 6, 2005, letter from WAHA to the Town of Pecos City, the Middle Pecos Groundwater Conservation District approved the water well drilling permits for the nonpotable water supply source. Copies of the permits were furnished copies to the protestant.

DISCUSSION OF THE EVIDENCE

APPLICANT'S EVIDENCE

The caverns will be constructed in the Salado Formation, which is a bedded salt formation. The WAHA facility is basically located in Sections 15 and 16, PLS Survey, Reeves County which is adjacent to the Pecos County line. WAHA owns 100% surface estate of Section 16 and 100% mineral fee and leasehold interest in the northwest quarter of Section 16. The cavern area will encompass the northwest quadrant of Section 16. Five square miles of 3-D seismic was used to refine the interpretation of the salt. There are two wells in the proposed site area: the Katy Frost Well No. 1D and Katy Frost Well No. 2 which is the core/test well. The salt rich section of the Salado in the Katy Well No. 2D was 1,470' (coring approximately 1,000') in thickness. Located in the middle of the salt section is 300' of extremely clean salt which will be the cavern section, thus there will be substantial amounts of salt above (630') and below (400') the mined caverns. The horizontal correlations show a thick, continuous section of salt in all directions.[1] Above the Salado Salt is a cap of anhydrite dolomite of the Rustler Formation. Below the Salado salt is the anhydrite of the Castile Formation.

The testing of the cores included: point loads, triaxial compressive strength, uniaxial compressive strength, Brazilian tensile and triaxial creek testing which are used in comprehensive rock mechanics analysis. This section of the salt is ideal for controlled solution mining.

The 11 caverns and wells will be completed as follows: Surface casing, 13-3/8", will be set at 1,500' into the Salado Formation and cemented to the surface. The next string of casing, 10-3/4", will be set at 2,100' and cemented to the surface. The well will then be drilled to 2,460' into the cavern interval and will be under reamed to 14 inches to start the leaching operation. The leaching strings will be the 8-5/8" outer tubing and 5-1/2" inner tubing. A protective nitrogen blanket [2] will be injected to protect the top of the cavern and casing shoe area from the solution. A nitrogen blanket also allows a very long pressure test on the cavern wall and the well casing during all the

[1] There is a salt dissolution front to the east approximately 2000' from the proposed nearest cavern. Salt dome type caverns typically have only 200-300' of horizontal salt.

[2] A nitrogen blanket is more environmentally friendly than a diesel oil blanket.

leaching process at a high pressure with gas. The pressure will not be at the maximum operating pressure of the storage cavern, but will be very close and the nitrogen blanket will be continually monitored during the entire leaching process. There will be at least 50' of clean salt below the casing shoe. WAHA estimates that over the next five years, 200 MMWB of fresh water will be used for solution mining of the storage caverns. In its original application, WAHA identifies the Capitan Reef as the source of nonpotable water to be used for solution mining, however, at the hearing, WAHA contended that it retained the option to drill supply wells to the Cenozoic Pecos Alluvium Formation underlying the proposed site. WAHA further argued that the Commission lacks jurisdiction to impose any permit condition which limits its water source for solution mining of the storage caverns for the proposed facility. WAHA believes the Texas Supreme Court decision in *Sipriano v. Great Spring Waters of America, Inc.*, 1 S.W.3d 75 (Tex. 1999) supports this position.

The Commission has previously issued the disposal well permits to dispose of the brine generated as a result of leaching. Brine disposal will be in the Bell Canyon Formation between 4,900' and 6,700'.

Monitor wells will be completed in the cavern field area to monitor the ground water with quarterly testing during the leaching operation. Before the leaching process begins, ground water will be tested to establish a baseline. During gas operations, the monitor wells will be tested semi-annually for two years and annually thereafter for the life of the storage facility.

Once the brining process is finished, the two leaching strings will be removed and the cavern will be filled with storage gas. The tubing will be 7" set on a gas isolation packer approximately one joint above the casing shoe. The top of the cavern will be at approximately 2,150' and the base at 2,450'. The operating pressure of the cavern will be 525 psi to 1785 psi.

Each cavern will have a volume of 1.7 million barrels. Total working volume of the cavern field facility will be 10 BCF of gas. During leaching there will be continuous monitoring of pressures, flow rates, cumulative water injection, brine salinity and temperature. Cavern shape will be monitored with domal sonar surveys. After gas operations commence, sonar surveys will be run every five years and a roof test every 10 years. The shape of the cavern roof will be an arch which provides cavern stability.

The cavern facility will interconnect with six or seven transmission lines in the area and the two-main 20 inch lines will connect with what is known as the Waha Hub approximately 2 miles southwest of the storage facility. The storage facility will be manned 24 hours a day. Pressure and flow sensors are all integrated electronically into the warning and alarm systems through out the storage field area. A Facility Emergency Response Plan will be developed. All the requirements of Statewide Rule 97 will be met.

Additional gas storage facilities are needed in this area. The Permian Basin and southwest New Mexico are prime production areas. Gas storage serves the purpose of making up for those

shortfalls during winter peaking periods. Additionally, the facility will provide more local gas storage services for area producers. This is a prime locale because of the proximity to several major pipeline facilities.

WAHA owns approximately 1,000 acres in Pecos County approximately 13 miles to the east of the proposed facility. As previously noted, WAHA represented in its application that the raw water for leaching will be obtained from the Capitan Reef Formation (± 4000') in Pecos County which underlies the property. This aquifer was the supply source for the leaching of the Unocal/Keystone Gas Storage Facility located in Winkler County. The Capitan Reef is a highly prolific aquifer generally containing "fresh" but not potable water. The Capitan Reef water is in excess of 3,000 mg/l total dissolved solids (TDS) and an average chloride concentration of 880 mg/l. WAHA desires to drill, construct supporting infrastructure and pipe the water from this site to the storage cavern field facility. WAHA noted in its application that the Cenozoic Pecos Alluvium underlying the proposed facility (±800') was an alternative fresh water supply source.

At the time of the hearing, WAHA had not obtained permits for drilling the Capitan Reef water supply wells from the Middle Pecos Groundwater Conservation District. It elected to proceed with the application, arguing that the source of fresh water for solution mining was not a matter subject to the Commission's jurisdiction.

In response to concerns raised by the Town of Pecos City, WAHA asserted that using the Cenozoic Pecos Alluvium as the fresh water source for the estimated 200 MMWB would not have a material impact on the Town of Pecos City municipal well field located some 6 miles away. This claim is based on a Groundwater Availability Modeling (GAM) study performed by the Texas Water Development Board in October 2004 as requested by the Middle Pecos Groundwater Conservation District and it was specific to the WAHA project. The results of the report state *"After five years, projected drawdown exceeding 50 feet due to the project only occur immediately adjacent to the project site. In other words, the drawdown effects of the project decrease quickly away from the project site, and consequently, the effects of the project predicted by the GAM will be minimal beyond a few miles from the project site."*

Subsequent to the hearing, WAHA submitted late filed exhibits showing that it had obtained permits from the Middle Pecos Groundwater Conservation District for four Capitan Reef water supply wells for the proposed facility.

Notice of this application was published in the *Pecos Enterprise*, a newspaper of general circulation in the Reeves County in which the storage facility is located, on November 23, 30 and December 7, 2004.

PROTESTANT'S EVIDENCE

The Town of Pecos City opposes any use of the Cenozoic Pecos Alluvium Formation as the

source of raw water for the solution mining process. The City's municipal water well field is located approximately 6 miles from the storage facility. The lowering of the water table in the aquifer may result in harmful consequences. Reading WAHA's application makes it very clear that WAHA plans on using the Capitan Reef Water as there are numerous references through the application referencing such. However, the testimony in this hearing appears to contradict all such assurances alluded to in the formal application. It is the City's belief that if the application is granted, a special condition should be included that only the Capitan Reef water will be used.

EXAMINERS' OPINION

WAHA acknowledges that its original permit application identifies the Capitan Reef as the source water for the solution mining of the storage caverns. It has obtained the appropriate permits from the Pecos Groundwater Conservation District for four Capitan Reef water supply wells for the proposed facility. The examiners believe that while the permits for the Capitan Reef water supply wells resolve the protestant's concerns, that a permit condition should specify the Capitan Reef as the water source for the solution mining of the storage caverns. To that end clarification is necessary to resolve the issue raised by WAHA that the Commission lacks jurisdiction to impose any permit condition which limits its water source for solution mining of the storage caverns for the proposed facility. It believes the Texas Supreme Court decision in *Sipriano v. Great Spring Waters of America, Inc.*, 1 S.W.3d 75 (Tex. 1999) supports this position.

It is undisputed that WAHA's application satisfies the requirements under Statewide Rule 97 to grant it the requested permit for the proposed facility. The only issue to be determined is whether the permit should include a condition limiting the source water for the facility to the Capitan Reef formation. The submitted GAM report performed by a third party, the Texas Water Development Board, was at the request of the District and not WAHA. The report and its conclusions were not challenged.

COMMISSION JURISDICTION

WAHA's contention that the Commission lacks jurisdiction over this issue is incorrect. Texas Natural Resources Code §§211.001 through 211.034 provide the Commission with broad regulatory authority over hydrocarbon storage facilities in bedded salt formations. Texas Natural Resources Code §211.012 specifically states that the Commission shall establish rules that it finds "necessary and reasonable for the safe construction, operation, and maintenance of salt dome storage facilities." Additionally, the Legislature provides the Commission with wide-ranging discretion in subsection (b), which provides: "The commission may grant exceptions to its rules or impose additional requirements in any permit or amended permit issued to a facility if the facility, as permitted, will not cause an unreasonable danger to the public." (Emphasis added)

There is no question under the statute that the Commission has the regulatory jurisdiction over all aspects of salt dome storage facilities, including their construction. Solution mining to create the storage caverns in the salt formation is an undisputed element of the construction of the facility that falls within the Commission's regulatory authority. Further, the broad discretion

granted to the Commission to impose additional requirements in any permit or amended permit issued for a facility would apply to permit conditions regarding the source of fresh water used in any solution mining activity, should the Commission choose to exercise such authority.

The *Sipriano* case is not on point with respect to this issue. *Sipriano* involved a civil action brought by property owners claiming that a commercial water bottler was draining their water wells. The Texas Supreme Court refused to overturn the common law rule of capture in *Sipriano*, finding that the Texas Constitution makes groundwater regulation a duty of the Legislature. In light of the Legislature's enactment of regulations, the *Sipriano* court declined to dive in to the issue noting: "It would be improper for courts to intercede at this time by changing the common-law framework within which the Legislature has attempted to craft regulations to meet this state's groundwater-conservation needs."

WAHA's citation of *Sipriano* ignores the central holding of the case - under the Texas Constitution groundwater regulation is a legislative duty. The Commission as a regulatory agency derives its jurisdiction from the Legislature. The Legislature granted the Commission broad discretion in regulating hydrocarbon storage facilities in bedded salt formations including the imposition of permit conditions. Accordingly, *Sipriano* is not authority for the argument that the Commission lacks jurisdiction to require a permit condition concerning the source of fresh water used in solution mining of a storage cavern.

PERMIT CONDITIONS

It is clear that the Commission possesses jurisdiction to require a permit condition concerning the source of fresh water used in solution mining of a storage cavern. The next question is whether the Commission through its rules, forms and policies considered the source of fresh water to be used in solution mining of a storage cavern when evaluating a permit application for a storage facility constructed in a bedded slat formation.

The examiners' review indicates that both past and current Commission policy include consideration of fresh water use in permitting storage facilities under Statewide Rule 97 and its predecessor Statewide Rule 74. All applications for permits under both Statewide Rule 97 and Statewide Rule 74 require the filing of Commission Form H-4 (Application to Create, Operate and Maintain an Underground Hydrocarbon Storage Facility," This form explicitly states in its directions to applicants: "Describe the cavity development process, including the composition of displacement fluid, injection rates during cavity creation, cavity-boundary monitoring, method of circulation, and use of blanket liquids." (Instruction No. 5 on Form H-4)

WAHA itself appears to have acknowledged the relevance of this requirement in its application. The application includes a lengthy discussion of the fresh water source including an analysis of the chemical composition of the Capitan Reef water and the fact that while the total dissolved solids in the Capitan Reef water renders its essentially unusable for domestic or agricultural purposes, that it is an acceptable displacement fluid for storage cavern creation.

Historically, the Commission has proven to be in the vanguard when issues of fresh water use for oil and gas operations have arisen in West Texas. The initial concerns raised by the Commission on this issue related to the use of fresh water in secondary recovery waterflooding. The Commission in 1967 determined that the use fresh water as a source for secondary recovery operations was such a significant issue that it created Commission Form H-7, Fresh Water Data Form. This form, which is still in use today, specifically requires that an operator requesting injection authority for a secondary recovery project, provide extensive data on any use of fresh water, including a water quality analysis and a full explanation of the need for using fresh water rather than salt water or other water sources. The examiners specifically note that the adoption and use of this form predates by 16 years the Legislature's enactment of Texas Water Code §27.0511, which made the Commission examination of fresh water use in secondary recovery projects a mandatory requirement.

Because both past and current Commission policy have identified the use of fresh water in oil and gas operations as a salient issue for consideration, it is the examiners' conclusion that this issue should be addressed in the current application in the form of a permit condition limiting the source water for solution mining of the storage caverns to the Capitan Reef. WAHA appears to satisfy this permit condition through the water well permits obtained from the Middle Pecos Groundwater Conservation District for four Capitan Reef water supply wells for the proposed facility. Accordingly, approval of the application is recommended and Environmental Services, Underground Injection and Storage Section should issue the appropriate permit subject to the water supply condition and any other conditions, restrictions and limitations that are required for such permits.

FINDINGS OF FACT

1. Notice of this hearing was given to all persons required to be given notice by the provisions of Statewide Rule 97. Notice of this hearing was given to all affected persons, at least ten (10) days prior to the date of the hearing. Notice of this application was published in the *Pecos Enterprise*, a newspaper of general circulation in the Reeves County in which the storage facility is located, on November 23, 30 and December 7, 2004.

2. The caverns will be constructed in the Salado Formation, which is a bedded salt formation.

    a. The salt rich section of the Salado in the Katy Well No. 2D was 1,470' (coring approximately 1,000') in thickness.

    b. Located in the middle of the salt section is 300' of extremely clean salt which will be the cavern section, thus there will be substantial amounts of salt above (630') and below (400') the mined caverns.

    c. Above the Salado Salt is a cap of anhydrite dolomite of the Rustler Formation and below the Salado salt is the anhydrite of the Castile Formation.

3. There will be 11 caverns, each with a capacity of 1.7 million barrels, for a total combined gas capacity of 10 BCF.

    a. A protective nitrogen blanket will be injected to protect the top of the cavern and casing shoe area from the solution mining. The nitrogen blanket also allows a very long pressure test on the cavern wall and the well casing during all the leaching process at a high pressure with gas.

    b. There will be at least 50' of clean salt below the casing shoe.

    c. Leaching operations will require approximately 200 MMWB over the next five years.

    d. The water supply source for the leaching will be wells in Pecos County drilled to the Capitan Reef formation.

    e. During leaching there will be continuous monitoring of pressures, flow rates, cumulative water injection, brine salinity and temperature; cavern shape will be monitored with domal sonar surveys.

    f. After gas operations commence, sonar surveys will be run every five years and a roof test every 10 years.

    g. The shape of the cavern roof will be an arch which provides cavern stability.

    h. The top of the cavern will be at approximately 2,150' and the base at 2,450'. The operating pressure of the cavern will be 525 psi to 1785 psi.

4. The cavern facility will interconnect with six or seven transmission lines in the area and the two-main 20 inch lines will connect with what is known as the Waha Hub approximately 2 miles southwest of the storage facility.

    a. The storage facility will be manned 24 hours a day.

    b. Pressure and flow sensors are all integrated electronically into the warning and alarm systems through out the storage field area.

    c. A Facility Emergency Response Plan will be developed. All the requirement of Statewide Rule 97 will be met.

5. Monitor wells will be completed in the cavern field area to monitor the ground water with quarterly testing during the leaching operation. During gas operations, the monitor wells will be tested semi-annually for two years and annually thereafter for the life of the storage facility.

6. The Commission has previously issued the disposal well permits to dispose of the brine generated as a result of leaching. Brine disposal will be in the Bell Canyon Formation between 4,900' and 6,700'.

7. WAHA acquired approximately 1,000 acres (in fee) in Pecos County approximately 13 miles to the east. Raw water for leaching will be obtained from the Capitan Reef Formation (± 4000') in Pecos County which underlies the property.

   a. The Capitan Reef is a highly prolific aquifer generally containing "fresh" but not potable water with 3,000 mg/l total dissolved solids (TDS) and an average chloride concentration of 880 mg/l.

   b. The acquired property in Pecos County for the raw water is located within the jurisdictional boundaries of the Middle Pecos Groundwater Conservation District.

8. The Middle Pecos Groundwater Conservation District approved authorization to WAHA for the drilling of water wells within the District's jurisdictional area on June 28, 2005.

CONCLUSIONS OF LAW

1. Proper notice was timely given to all parties entitled to notice pursuant to applicable statutes and rules.

2. All things have occurred and have been accomplished to give the Commission jurisdiction in this case.

3. The Commission possesses jurisdiction under Texas Natural Resources Code §211.012 to require a permit condition limiting the water supply source for the leaching of the storage caverns for the proposed gas storage facility to the nonpotable waters of the Capitan Reef Formation in Pecos County.

4. The construction and use of the proposed gas storage facility will not endanger oil, gas, or geothermal resources or cause the pollution of surface water or fresh water strata unproductive of oil, gas, or geothermal resources.

5. The applicant has complied with the requirements for approval set forth in Statewide Rule 97.

6. Granting the application is in the public interest and the proposed operations are not hazardous to the public.

EXAMINERS' RECOMMENDATION

Based on the above findings and conclusions, the examiners recommend that the application

of WAHA Storage & Transportation LP to create, operate and maintain a facility to store natural gas and then retrieve it from solution-mined caverns be granted subject to a permit condition limiting the water source for solution mining of the storage caverns to the nonpotable water of the Capitan Reef formation in Pecos County.

Respectfully submitted,

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