

**STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION**

**IN THE MATTER OF THE HEARING CALLED  
BY THE OIL CONSERVATION DIVISION  
FOR THE PURPOSE OF CONSIDERING:**

**APPLICATION OF SOUTHERN UNION GAS SERVICES, LTD. FOR  
APPROVAL OF AN ACID GAS INJECTION WELL, LEA COUNTY, NEW  
MEXICO.**

**CASE NO. 14080  
ORDER NO. R-12921**

**ORDER OF THE DIVISION**

**BY THE DIVISION:**

This case came on for hearing at 8:15 a. m. on February 7, 2008 at Santa Fe, New Mexico, before Examiner Richard I. Ezeanyim.

NOW, on this 21<sup>st</sup> day of March 2008, the Division Director, having considered the testimony, the record and the recommendations of the Examiner,

**FINDS THAT:**

(1) Due public notice has been given, and the Division has jurisdiction of this case and of the subject matter.

(2) The applicant, Southern Union Gas Services, Ltd. ("SUGS" or "applicant"), seeks authority to inject waste water and acid gas (hydrogen sulfide and carbon dioxide) into the San Andres formation, at a depth interval approximately 4375 feet to 5200 feet below the surface, through its Jal #3 Natural Gas Processing Plant AGI Well No. 1 which it proposes to drill at a location 1570 feet from the North line and 1050 feet from the West line (Unit E) of Section 33, Township 24 South, Range 37 East, NMPM, Lea County, New Mexico. The purpose of the injection is to dispose of natural gas processing wastes from SUGS's Jal #3 Natural Gas Processing Plant. This well will replace the Woolworth Estate SWD Well No. 1 (API No. 30-025-27081) which is located 1570 feet from the North line and 800 feet from the West line of said Section 33.

(3) The Woolworth Estate SWD Well No. 1 is currently being used to dispose of the waste water from the Jal #3 Natural Gas Processing Plant.

(4) The basic description of the acid gas injection (AGI) process is as follows:

The treated acid gas (TAG) containing 20 percent Hydrogen Sulfide (H<sub>2</sub>S), 78 percent carbon dioxide (CO<sub>2</sub>), and 2 percent other hydrocarbons from the Jal #3 gas processing plant will be compressed from 5 pounds per square inch (psi) to 1,600 pounds per square inch at the AGI Compression facility. The compressed gas will then be mixed with the waste water from the original waste water disposal well at the new mixing chamber. The mixture will be choked down from 1,600 psi to 980 psi. The AGI wellhead will be equipped with a back-pressure valve which is designed to maintain this pressure on the waste stream in order to keep the waste in a liquid phase. This liquid phase is injected into the well through 3-1/2 inch fiberglass or epoxy-lined tubing set in a nickel clad packer at 4,350 feet, and then, through perforations from 4,375 feet to 5,200 feet, into the San Andres formation. A subsurface automatic safety valve will be placed on the injection tubing 200 feet below the surface to prevent the injected acid gas from migrating upwards in case of an upset or emergency. The facility will be designed to inject 2,318 to 7,929 barrels of liquid waste (treated acid gas, TAG/waste water) per day.

The applicant's witnesses presented the following testimony:

(5) The current Sulfur Recovery Unit (SRU) at the Jal # 3 gas processing plant has reached its processing limit and SUGS had to curtail gas production and processing at the plant.

(6) This acid gas injection well is needed to expand the plant's treating capabilities in order to continue to accept gas from other New Mexico producers such as Range Operating, and Apache Corporation. These companies had curtailed their gas production while waiting for increased treating capabilities at the Jal # 3 gas processing plant to occur.

(7) This project has a number of benefits. Instead of venting the CO<sub>2</sub> to the atmosphere, the CO<sub>2</sub> and hydrogen sulfide (H<sub>2</sub>S) will be sequestered underground thereby reducing the greenhouse gas effects. The New Mexico gas producers will increase their gas production and cash flows with increased tax revenues to the State of New Mexico.

(8) The applicant reviewed all wells within one mile radius of the injection well instead of one half mile, and provided notices to all working interest owners and surface land owners within this one mile radius area of review. No operator or surface land owner appeared at the hearing in opposition to the application.

(9) There are ten (10) permanently plugged and abandoned wells and eight (8) temporarily abandoned wells within one mile area of review of the proposed SUGS AGI well. None of these wells penetrated the proposed injection interval, and all of these wells were properly plugged and abandoned.

(10) The San Andres formation is laterally extensive with high porosity and

permeability to be able to accept the injected acid gas. There is approximately 350 net feet of injection interval with porosity exceeding 6% at this location.

(11) The zone above the San Andres formation is quite impermeable and has tight carbonates which provides excellent barrier between active hydrocarbon reservoirs above the San Andres formation. The reservoir's suitability has also been demonstrated by twenty years of successful injection of wastewater in the Woolworth Estate SWD Well No. 1.

(12) The AGI well will include a subsurface automatic safety valve on the production tubing to prevent the injected acid gas from flowing back out of the well in case of an upset or emergency.

(13) The surface at the proposed injection site is owned by SUGS and therefore SUGS has all necessary easements and other rights for its surface facilities.

(14) There is a fresh water well on the edge of a one-mile area of review which produces water from the Ogalalla formation. The total depth of fresh water aquifers in the area is less than 220 feet, however, the surface casing will be set at 1050 feet and cement will be circulated to the surface.

(15) The applicant has submitted a revised contingency plan pursuant to Rule 118 and a Discharge Plan Amendment to address the proposed AGI project.

(16) The witnesses also testified that before commencing injection of the acid gas into the new AGI well, the existing Woolworth Estate SWD Well No. 1 will be plugged and abandoned.

#### The Division's Conclusions

(17) The acid gas injection (AGI) well will be adequately constructed to prevent movement of the injected fluid from the injection zone to the surface.

(18) The current Jal # 3 gas processing plant's Discharge Plan permit should be amended to address the combined injection of acid gas and waste water.

(19) The applicant should use a H<sub>2</sub>S and CO<sub>2</sub> resistant cement for this project to address the highly corrosive environment.

(20) Since water is heavier than the mixed acid gas and waste water, the pressure gradient of the injected fluid should be allowed to be slightly greater than the Division's normal pressure gradient of 0.2 pounds per square inch per foot (psi/ft) without fracturing the formation. The applicant's request to grant a maximum surface injection pressure of 986 psi should be approved.

(21) The proposed injection operation as proposed by the applicant can be conducted in a safe and responsible manner, without causing waste, impairing correlative rights or endangering fresh water, public health or the environment.

(22) The application should be approved.

**IT IS THEREFORE ORDERED THAT:**

(1) Southern Union Gas Services, Ltd. is hereby authorized to drill and complete its Jal Plant AGI Well No. 1 at a location 1570 feet from the North line and 1050 feet from the West line (Unit E) of Section 33, Township 24 South, Range 37 East, NMPM, Lea County, New Mexico, in such manner as to permit the injection of waste water and acid gas, consisting principally of hydrogen sulfide and carbon dioxide from its Jal Plant, for disposal into the San Andres formation at a depth of approximately 4375 feet to 5200 feet below the surface, through 3-1/2-inch tubing set in a packer located approximately 4350 feet below the surface. This well will replace the Woolworth Estate SWD Well No. 1 (API No. 30-025-27081) which is located 1570 feet from the North line and 800 feet from the West line of said Section 33.

(2) The operator shall use 3-1/2 inch L-80 fiberglass-lined tubing set in a nickel based packer for this highly corrosive environment.

(3) The current Jal # 3 gas processing plant's Discharge Plan permit shall be amended to address the combined injection of acid gas and waste water.

(4) The applicant shall use Halliburton's special cement for this project to address the highly corrosive environment.

(5) A one-way subsurface automatic safety valve shall be placed on the injection tubing 200 feet below the surface, to prevent movement of the injected acid gas from migrating upwards in case of an upset or emergency.

(6) The operator shall continue to use the existing Woolworth Estate SWD Well No. 1 to dispose of the waste water from the Jal # 3 gas plant, while drilling the AGI well. However, before commencing injection of the mixed acid gas and waste water into the new AGI well, the existing Woolworth Estate SWD Well No. 1 shall be properly plugged and abandoned.

(7) The operator of the well shall take all steps necessary to insure that the injected gas enters on the proposed injection interval and does not escape to other formations or onto the surface.

(8) The well shall be constructed substantially in accordance with the

description in the Injection Well Data Sheet attached to Form C-108 filed by the applicant in this case, including setting surface casing at 1050 feet below the surface, and a total of three casing strings, all with cement circulated to the surface.

(9) During drilling operations, the operator shall monitor the well for hydrocarbon shows. Any hydrocarbon shows within the San Andres formation shall be reported to the Division prior to commencement of injection.

(10) Copies of interpreted and basic logs of the completed well, including a dipole sonic log or a formation microscanner log over the San Andres, and a letter setting forth the estimated static bottomhole pressure of the injection formation shall be delivered to the Division's Hobbs District Office prior to commencement of injection.

(11) After installation of the injection tubing prior to commencing injection operations, and at least once every two years thereafter, the operator shall pressure test the casing from the surface to the packer-setting depth to assure casing integrity. Further, the operator shall monitor pressure on the backside using continuous chart recorder or digital equivalent to immediately detect any leakage in the casing.

(12) Prior to injecting acid gas, the casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge or approved leak-detection device to detect any leakage in the casing, tubing or packer.

(13) The acid gas shall be mixed with the plant waste water in a closed system prior to injection into the San Andres formation.

(14) The operator shall record injection rates and pressures on a continuous basis and report the readings annually, or more often if requested, to the Engineering Bureau in the Division's Santa Fe Office and to the Division's Hobbs District Office. Each such report shall include the well name, location, API Number and the number of this order.

(15) The injection well or system shall be equipped with a pressure limiting device that will limit wellhead pressure on the injection well to no more than 986 psi while injecting acid gas and waste water. The operator shall maintain the injection fluid in the non-corrosive phase with minimum pressure regulating devices as necessary.

(16) The Director of the Division may authorize an increase in the injection pressure upon a proper showing that such higher pressure will not result in the migration of the injected gases from the permitted injection formation. Such showing shall consist of a valid step-rate test run in accordance with procedures acceptable to the Division.

Any step-rate test shall be run with an inert fluid such as produced water, and not with acid gas.

(17) The operator shall notify the Hobbs District Office of the Division of the time of the setting of the tubing and packer and of any mechanical integrity test so such operations can be witnessed or inspected.

(18) Without limitation on the duties of the operator as provided in Division Rules 19 and 116, the operator shall immediately notify the Hobbs District Office of the Division of any failure of the tubing, casing or packer in the well, or of any leakage or release of water, oil or gas from around any produced or plugged and abandoned well in the area, and shall take such measures as may be timely and necessary to correct such failure or leakage.

(19) Prior to commencing injection of acid gas, the operator shall secure approval by the Division's Environmental Bureau of a hydrogen sulfide contingency plan that complies with Division Rule 118.

(20) The operator may commence injection of produced water prior to injection of acid gas and may inject either or both fluids pursuant to the limitations of this order, depending on operational considerations. The operator shall submit monthly reports of injection volumes of waste water and acid gas on Form C-115, in accordance with Division Rules 706 and 1115.

(21) The operator shall provide written notice of the date of commencement of injection into the AGI well to the Hobbs district office of the Division.

(22) The injection authority herein granted shall terminate one year after the effective date of this order if the operator has not commenced injection operations pursuant hereto; provided however, the Division Director, upon written request by the operator, may extend this time for good cause.

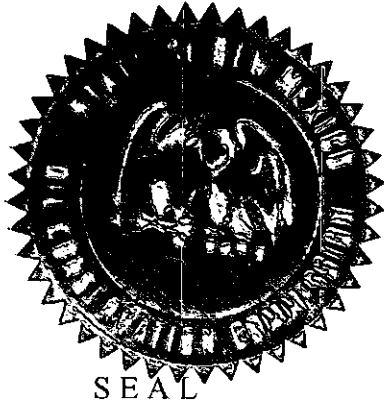
(23) Compliance with this order does not relieve the operator of the obligation to comply with other applicable federal, state or local laws or rules, or to exercise due care for the protection of fresh water, public health and safety and the environment.

(24) The Division Director may amend this order by administrative order, after proper notice, and the absence of protest.

(25) Jurisdiction of this case is retained for the entry of such further orders as the Division may deem necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (i) to protect fresh water or (ii) in a manner consistent with the requirements of this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein,

or without notice or hearing in case of emergency, subject to the provisions of NMSA  
1978 Section 70-2-23.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



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OIL CONSERVATION DIVISION

A handwritten signature in black ink, appearing to read "Mark E. Fesmire".

MARK E. FESMIRE, P.E.  
Director