

This application is protested by Tony W. Clemons ("Clemons"), the operator of an adjacent tract to the proposed injection well. The application is also protested by Pergan Marshall ("Pergan"), an organic peroxide manufacturer that operates a Class I hazardous and industrial waste disposal well approximately 2 miles southeast from the proposed Talco Caldwell Oil Unit Well No. 2A.

DISCUSSION OF THE EVIDENCE

Applicant's Evidence

Talco seeks to dispose of produced saltwater generated from BP America's Woodlawn (Cotton Valley) Field, "Woodlawn Field" into the Caldwell Oil Unit Well No. 2A. Talco operates the gas gathering system in the Woodlawn Field and also operates, under contract with BP, their saltwater disposal needs in the field. Talco will gather produced water by pipeline and transport it by pipeline to the proposed disposal well. By disposing of its produced saltwater via a pipeline to its proposed disposal well, Talco will eliminate disposal truck traffic to the wells and will minimize disposal costs. BP estimates it will recover additional gas from its wells because the reduction of saltwater disposal costs will extend the economic life of these wells. Talco's representative also stated additional benefits are realized by piping water to the disposal well over trucking such as increasing public safety, minimizing spills and environmental impacts associated with loading and offloading from trucks. Talco stated BP needs the proposed disposal well to justify drilling additional wells in the field as current disposal demands will increase with the additional wells being planned to be drilled. Additionally, Talco needs the disposal well as its current disposal well, Talco's Wilborn SWD No. 1SW, is shut-in as it is believed the well's fluids injected into the Blossom formation have migrated out of the disposal zone and into an adjacent well, operated by Tony Clemons. The disposal fluids are believed to have entered the well's bradenhead through the well's uncemented casing.

The Caldwell Oil Unit Well No. 2A has a total depth of 6,701 feet. The well has 645 feet of 8 5/8" surface casing cemented to surface, and 6,675 feet of 5 1/2" casing with the top of cement at 4,394 feet. A DV Tool was set at a depth of 3,975 feet with 275 sacks of cement used to cement the well to a depth of 2,080 feet. The well was perforated at 6,465 feet to 6,567 feet and was squeezed with an additional 125 sacks of cement. The Texas Commission on Environmental Quality recommends that usable-quality ground water be protected from the land surface to the base of the Wilcox, which is estimated to occur at a depth of 550 feet. (See attached wellbore diagram) Additionally, the letter advised the applicant of the concerns of the US EPA, that at the referenced location a projected 10,000 year waste plume from a Class I waste disposal well may be penetrated. The letter gave the contact phone number of a US EPA Region 6 representative for further information. The letter references Pergan's well, the WDW-243.

The proposed injection will be through tubing with a packer set at 5,885 feet. The proposed injection interval is in the Young porosity member of the Rodessa Limestone

between 5,986 feet and 6,016 feet. The maximum rate of injection requested is 2,500 barrels of saltwater per day. The daily average injection is estimated at 1,500 barrels of saltwater per day. The maximum requested injection pressure is 1,000 psi.

Talco operates three additional disposal wells for BP to provide disposal for the Woodlawn Field. The Wilborn SWD No. 1SW is a permitted disposal well in the Blossom formation at a depth of 2,390 feet. The well is located approximately one mile northeast from the Caldwell Oil Unit Well No. 2A. The well is currently shut in as there are possible confinement and over-pressurization issues within the shallower Blossom zone in the area. Talco is investigating the issue along with the Railroad Commission's Kilgore District personnel to determine the cause. A second well, the Chapman J.G. -B- GU No. 3, is located approximately one mile southeast from the Caldwell Oil Unit Well No. 2A. The Chapman No. 3 currently handles the water from BP's Woodlawn water processing facility which receives water from about 70% of BP's wells in the Woodlawn Field. The Chapman No.3 is permitted for disposal in the Blossom formation at a depth of 2,390 feet. Finally, the Jones Gas Unit No. 5 is located approximately 4 miles northeast from the Caldwell Oil Unit Well No. 2A. The Jones No. 5 currently handles the water from the remaining 30% of BP's wells in the Woodlawn Field. The Jones No. 5 is permitted for disposal in the Rodessa formation at a depth of 5,750 feet. The permitted maximum disposal rate for these three wells is 12,000 BWPD.

There are two wellbores within a ¼ mile radius of the Caldwell Oil Unit Well No. 2A which penetrate the proposed injection interval. One of the wellbores, the Amoco Wilder Gas Unit No.2 (API # 203-00325) is plugged and abandoned with a total depth of 6,656 feet. Form W-3 indicates the casing was cut and recovered from a depth of 3,314 feet. Although there is no record of cement behind the casing, the fact that it was cut at 3,314 feet usually indicates the top cement is just below that depth. The other well, the Caldwell Gas Unit No. 6L (API# 203-32457) is an active gas well operated by BP and is completed in the Woodlawn (Cotton Valley) Field. The total depth of the well is 10,108 feet. Records retrieved from the Commission's database indicates the well is cemented from 10,108 feet to the top of cement at 4,597 feet. Records indicate that these wellbores are plugged or cased in a manner which will not provide a conduit for migration of injected water from the injection interval into other oil, gas or mineral bearing formations or useable quality water zones.

Talco identified Mr. Clemons' Durkee Gas Unit 1, Well No.3 (API# 203-32500) as being located within ½ mile to the north of the Caldwell Oil Unit Well No. 2A. The well is shut in with an unsuccessful completion in the Hill zone within the Rodessa formation. A Form G-1 of the Durkee Gas Unit 1, Well No.3 shows the top of cement at a depth of 6,200 feet, with a cement squeeze of 70 sacks at a depth of 5,712 feet isolating the perforations made in an attempt to produce the Hill zone within the Rodessa formation. Talco identified 11 other wells located between the ¼ mile and ½ mile radius and stated they reviewed all of the wells' records and found all wells were drilled, completed or configured in a way that would prevent the migration of injected fluids out of the Rodessa Young Member and to protect the usable quality water. The majority of these wells are operated by BP America.

Talco presented a well log cross section that demonstrated that the Rodessa is

present and continuous throughout the Woodlawn Field area and in Harrison County. The Rodessa is found at a depth of 5,690 feet and the base is found at a depth of 6,060 feet in the Caldwell Oil Unit Well No. 2A. Near the top of the Rodessa is the Hill zone which is the only portion of the Rodessa that is productive in this area. Near the bottom of the Rodessa is the Young Member which is approximately 110 feet thick with a 30 foot thick section that contains sufficient porosity and permeability to accept disposal fluids. The Young Member is not productive of any hydrocarbons in the area. The Young Member is the zone that Talco proposes to use as a disposal interval and that Pergan uses as a disposal interval. All other commercial and non-commercial disposal wells within a 10 mile radius that disposes into the Rodessa, dispose into the Rodessa's Young Member.

Talco presented a letter from BP Production Company stating they are supporting Talco's application and their need for additional disposal is to assure the availability of reliable disposal capacity so they can expand drilling in the Woodlawn Field. Current plans are to drill seven wells a year for the next four or five years.

Talco presented pressure front calculations using a formula commonly used by the Railroad Commission's Technical Permitting Section, and the US EPA to estimate pressure rise above initial bottomhole at inputted distances and at selected time frames. The pressure front calculator assumes uniform thickness and porosity and an infinite reservoir. The pressure front calculations estimated the pressure increase caused by Talco's Caldwell Oil Unit Well No. 2A injection at various rates over two distances and for several time periods. The first scenario was for the pressure front increase at .45 miles, the distance to Tony Clemon's Durkee Gas Unit 1, Well No. 3. Talco assumed two different injection zone thicknesses of 110 feet and 60 feet. Talco also calculated the pressure increases at the average daily rate of 1,500 BWPD and at the maximum daily rate of 2,500 BWPD. For an injection zone thickness of 60 feet the pressure increased varied between 390.8 psi for a rate of 2,500 BWPD and 234.5 psi for an average rate of 1,500 BWPD. From an injection zone thickness of 110 feet the pressure increased varied between 213.1 psi for a rate of 2,500 BWPD and 127.9 psi for an average rate of 1,500 BWPD. All of the .45 mile estimates were based on pressure increases after 20 years of disposal.

Talco also calculated the estimated pressure front increase caused by Talco's Caldwell Oil Unit Well No. 2A injection at various rates over several time periods at 2 miles, the distance to Pergan's Class I WDW No. 243. Talco assumed an injection zone thickness of 60 feet and used a maximum rate of 2,500 BWPD for the Pergan estimates. The estimated pressure increased varied over time from 174.4 psi after 10 years of injection, 215.2 psi after 20 years of injection, and 239.1 psi after 30 years of injection. Talco calculated the pressure required to lift oilfield brine (8.95 lb/gallon) to the surface is 2,783.5 psi. The pressure required to lift oilfield brine (8.95 lb/gallon) to the BUQW is 2,527.7 psi. The pressure required to overcome a column of 9.5 lb/gallon mud is 2,957.1 psi.

Notice of the subject application was published in *Marshall News Messenger*, a newspaper of general circulation in Harrison County, on December 20, 2011. A copy of the application was sent on June 2, 2011 to the Harrison County Clerk's Office. Also on June 2, 2011, a copy of the application was sent to the surface owner and offset operators within a

½ mile radius.

Talco Midstream Assets, Ltd has an active P-5 on file with the Commission, with \$25,000 financial assurance.

Protestants' Evidence

Tony W. Clemons

Tony W. Clemons, Owner of Tony W. Clemons, is the operator of a lease adjacent to the lease on which the Caldwell Oil Unit Well No. 2A is located. Mr. Clemons is concerned that injected water from Talco's proposed injection well will leave the Young porosity interval through an uncemented casing across the injection interval and enter the productive Hill zone within the Rodessa formation. Mr. Clemons operates wells which are completed in the Hill zone. He is concerned that the proposed injection well might adversely affect any future gas production from the Hill zone. Mr. Clemons is also concerned that any injected fluids leaving the interval and entering any of his wells will damage his wells. Mr. Clemons has applied for two drilling permits (DP#'s 727976 and 729451) issued in November and December 2011 to produce the reserves remaining in the Hill zone. The Wilder Gas Unit Well No.1 (API # 203-00326) has produced 5.8 BCF of gas before it was shut in due to low gas prices in 1972. The Frank Davis Gas Unit Well No. 2 (API # 203-00318) was shut-in 1976 and at the time had a bottom hole pressure of 784 psi with estimated remaining reserves of 850 MMCF of gas.

Mr. Clemons cited several examples of wells he has identified that have no cement across the Rodessa.

1. The Durkee Gas Unit No.1 Well No. 4 (API # 203-32479) has the top of cement at 6,000 feet or approximately at the level of the injection zone. A Form G-1 dated June 17, 1998 shows the 4½" longstring set at a depth of 10,038 feet is cemented with 910 sacks of cement with the top of cement at 6,000 feet. The well is located 0.9 miles northeast from the proposed Caldwell Oil Unit No. 2A.
2. The Lee Gas Unit -A- Well No. 4L (API # 203-31982) has the top of cement at 8,100 feet. Form G-1 dated August 29, 1991 shows the 4½" longstring set at a depth of 10,070 feet is cemented with 665 sacks of cement. The operator at the time, Amoco Production Company stated the top of cement is 8,100 feet. The well is located 0.4 miles northeast from the proposed Caldwell Oil Unit No. 2A.
3. Mr. Clemons identified his well, the Durkee Gas Unit No.1 Well No. 3 (API # 203-32500) as having the top of cement at 6,200 or approximately 200 feet below the proposed injection zone. A Form G-1 dated March 30, 2010 shows the 4½" longstring set at a depth of 10,038 feet is cemented with 930 sacks of cement. The top of cement is listed as 6,200 feet. Additional perforations at a depth of 5,712 feet were squeezed with 70 sacks of cement. Mr. Clemons

stated the workover into the Rodessa Hill zone was unsuccessful.

Mr. Clemons is concerned that a loss of fluid confinement of the injected water in the proposed Young interval of the Rodessa will enter one of his wellbores and cause loss of reserves or pressure up the bradenhead of one of his wells, similar to what has occurred on his Frank Davis Gas Unit Well No. 2. A Talco operated well, the Wilborn SWD No.1 permitted to inject into the Blossom formation at a depth of 2,390 feet, has lost fluid confinement from that interval and has entered Mr. Clemons Frank Davis Estate Well No. 2 (API # 203-00318). The two wells are approximately 900 feet apart. Well logs show the Frank Davis Estate Well No.2 was required to be drilled with 10.7 lb/gal mud in 1951.

Pergan Marshall

Pergan Marshall is an organic peroxide manufacture that produces peroxides that are used as chemical reactors or initiators. The peroxides are used to start chemical reactions in the manufacture of PVC, polypropylene, polystyrene and polyethylene. Most of their customers are petroleum refineries and large chemical plants. In the process of manufacturing the peroxides, industrial wastewater is generated that requires disposal. Pergan uses their waste disposal wells to dispose of the wastewater. Without the disposal well to dispose of the wastewater, Pergan would need to shutdown their plant. Pergan operates their WDW No. 243 to inject industrial wastewater into the Young Member of the Rodessa at a depth of 5,988 feet, the same horizon Talco seeks to inject into. Pergan believes the Young Member of the Rodessa is already overpressured as a result of the injection activity of four other saltwater disposal wells in the area. The injection wells have injected large volumes of water into the relatively thin Young Member estimated by Pergan to be 30 feet thick. The large volume of saltwater into the thin reservoir has caused the reservoir pressure to rise even before the proposed Caldwell Oil Unit No. 2A has injected any fluid. Pergan believes any additional disposal into the already overpressured Young Member will only increase the pressure further and could create the potential for endangerment of the base of the usable quality water (BUQW). Pergan stated they have identified a number of wells in the immediate area that do not have a cement seal across the Young Member of the Rodessa. Without the cement across the Young Member, and with sufficient reservoir pressure, fluids will overcome the hydrostatic head in the wellbores and cause fluid movement out of the Young and into any of the exposed uncemented wellbore casings. Pergan does not believe an additional disposal well should be approved and installed in an already overpressured reservoir.

Pergan submitted a graph detailing static bottomhole pressures measured at their well. The graph showed the original bottomhole pressure was 2,250 psia in 1981, before any injection activity had occurred at this site. The most recent measured bottomhole pressure was measured at 2,760 psia in 2011. The graph shows Pergan's steady injection rate of 40 gallons per minute (gpm) or 1,400 BWPD since 1988. The measured bottomhole pressure varied between 2,250 psia to 2,395 psia from 1988 thru 2006. In late 2006, several saltwater disposal wells began injecting into the Rodessa Young Member. The rise in disposal activity coincides with a rise in natural gas prices and Haynesville Shale drilling. Saltwater injection rates began at 70 gpm, or approximately 2,400 BWPD. At the end of 2007, injection rates increased to over 500 gpm or 17,100 BWPD. From late 2006 (beginning of saltwater

injection) till the end of 2007 measured bottomhole pressure increased from 2,340 psia to 2,400 psia. In 2008, while injection rates averaged 550 gpm or 18,800 BWPD, measured bottomhole pressure increased to 2,525 psia. In 2009, injection rates declined from 450 gpm or 15,300 BWPD to 150 gpm or 5,100 BWPD. Measured bottomhole pressure continued to increase from 2,525 psia to 2,620 psia. In 2010, the last year public information was available to Pergan, injection rates increased from 150 gpm to 580 gpm or 19,805 BWPD. Measured bottomhole pressure continued to increase to 2,700 psia as of the beginning of 2011. The last measured bottomhole pressure take was 2,770 psia as of the end of 2011. Pergan is required to measure static bottomhole pressure in their well and report it annually to the TCEQ and the US EPA. Pergan is required to report any reservoir pressure build ups to TCEQ and the EPA. Bottomhole pressures are measured using surface recording quartz pressure gauges after the well is shutdown for a sufficient time period to allow a valid observation of the pressure fall-off curve. The pressure fall off test that Pergan conducts annually is used to derive reservoir characteristics, specifically, to estimate permeability for pressure buildup calculations. Pergan compares current pressure test results with previous year's results. Pergan currently injects waste at a rate of 1,400 BWPD into the Rodessa Young Member.

Pergan submitted a graph containing historic bottomhole pressures vs modeled shut-in pressures generated by a computer simulation model Pergan uses to estimate bottomhole pressures in the Rodessa Young Member as a result of injection well inputs in the area. The modeled bottomhole pressures mimicked the historical data however were consistently higher by 150 to 175 psi above actual historic bottomhole pressures. The modeled pressures closely matched the actual historic pressures in the years 2008 thru 2011, the years four saltwater disposal wells began injecting into the Rodessa Young member. Pergan admitted its model is designed to be conservative and slightly over estimate pressures as US EPA requires estimates to be conservative.

Pergan presented maps showing expected pressure increases generated by the simulation model Pergan uses. The maps shows the location of five Class II (RRC regulated) saltwater disposal wells located within 10 miles of Pergan's Class I WDW No. 243 (TCEQ & EPA regulated). The map identified the location of the C.C. Forbes Company's Well No. 1 (API# 203-33727) and Well No. 2, (API# 203-33726) to the southeast, the Key Energy Services, Davis SWD Well No. 2RR (API# 203-33551) to the south, the Talco Jones Gas Unit, Well No. 5, (API# 203-30978) to the north and the proposed Talco Caldwell well to the northeast. The model assumed the Rodessa Young Member was homogenous, isotropic with constant thickness, porosity, and permeability. Pergan assumed an infinite reservoir in two directions with two no-flow boundaries identified on the map. The boundaries are a fault to the north and a facies change or pinch out of the Rodessa Young Member to the south. A cross section provided identified the change in porosity of the Rodessa Young Member between the Texas Oil & Gas Corp., Lewis Gas Unit No.1 (API# 203-30099) and the Basic Energy's HW Scott No.1, (API# 203-31843). The maps plotted the estimated flowing pressure increase above the original pressure and estimated the increase in pressure expected within one year with the Talco well injecting at the maximum requested injection rate of 2,500 BWPD and the pressure increases expected without the Talco well. In the first scenario, without the Talco Caldwell well, the model predicts a pressure rise of 575 psi at the Talco well location and 720 psi at the Pergan well's location. In the second scenario, with the Talco

well injecting at a rate of 2,500 BWPD, within a year, the model predicts a pressure rise of 900 psi above initial bottomhole pressure. The pressure rise around the Pergan well is predicted to be about 850 psi above initial bottom hole pressure. The model further predicts the C.C. Forbes wells will have pressure increases of 3,500 psi above initial bottomhole pressure. Pergan used injection well flow rates based on the last available data from the Railroad Commission's website which at the time was 2010 data. Pergan assumed 2011's injection rates based on 2010's rates. The two C.C. Forbes wells are permitted to dispose of up to 12,500 BWPD each. The wells are perforated at depths between 5,752 feet to 5,806 feet into the Rodessa. The wells are only 810 feet apart from each other. The Key Energy Services' Davis SWD No. 2RR Is permitted to inject up to 10,000 BWPD. The well is perforated at depths between 5,612 feet to 5,864 feet into the Rodessa. The Talco Jones Gas Unit No.5 is permitted to inject up to 6,000 BWPD into the Rodessa.

Pergan identified three categories of wells it claimed could cause fluids injected into the Rodessa Young Member to leave the over-pressured Rodessa Young Member. These wells are constructed according to the Railroad Commission's existing rules, requirements and guidelines but are believed to contain no cement across the Rodessa Young Member. Because the Rodessa was not considered possibly productive in the area it was not required to be cemented. The three categories of wells include; uncased dry holes that are filled with mud and have no plugs above the Rodessa, active wells with no cement across the Rodessa, and plugged and abandoned wells with no cement across the Rodessa and no plugs above the Rodessa. Pergan provided an example of each category of well that could pose a potential threat to fluid confinement.

Pergan cited the following examples of each category of a well with no cement across the Rodessa.

1. The Wenert Trich, F.C. Green Unit No. 1 (API # 203-30060) is an uncased plugged and abandoned dry hole which was drilled to a depth of 8,434 feet. The well is located 1.6 miles to the southeast from the proposed Caldwell Oil Unit No. 2A. The well has 1,167 feet of cemented surface casing protecting the BUQW at a depth of 600 feet. The uncased hole is filled with 10 lb/gal mud with a surface plug and two additional plugs at 1,108 feet and 6,340 feet. The injection interval is found at a depth of 5,808 feet in this well.
2. The Amoco Production Company's Juble D. Griffis Gas Unit No. 1 (API # 203-30624) is an active gas well which was drilled to a depth of 10,091 feet. The well is located 1.7 miles to the east from the proposed Caldwell Oil Unit No. 2A. The well has 3,010 feet of cemented surface casing protecting the BUQW at a depth of 500 feet. The top of cement behind the longstring is reported by the operator as 6,400 feet. The well has 9.3 lb/gal mud between the longstring and the hole drilled. The injection interval is found at a depth of 5,754 feet in this well.
3. The Wenert Trich, Tuttle No. 1 (API # 203-30030) is a plugged and abandoned well which was drilled to a depth of 8,425 feet. The well is located 1.8 miles to the southwest from the proposed Caldwell Oil Unit No. 2A. The well has 1,157

feet of cemented surface casing protecting the BUQW at a depth of 550 feet. The hole is filled with 9.5 lb/gal mud with a surface plug and three additional plugs at 550 feet, 1,107 feet and 2,380 feet. Casing was cut at a depth of 5,277 feet. The top of cement was reported by the operator at 6,484 feet. The injection interval is found at a depth of 5,762 feet in this well.

Pergan provided a list of 35 additional wells it has identified as not having cement across the Rodessa formation. The majority of wells are located within a 4 mile radius of the proposed Talco Caldwell Oil Unit No. 2A. A late filed exhibit provided by Pergan gave the API number, well name, and map identification number for each well.

EXAMINERS' OPINION

The examiners recommend that the application be denied. Although the proposed Caldwell Oil Unit No. 2A meets the construction requirements to prevent the injection wellbore itself from being a conduit for injected fluids to leave the injection interval, evidence presented at the hearing establishes that the Rodessa Young Member is overpressured in the area as a result of injection beginning in 1988 and with a more recent and rapid expansion of disposal activity since 2006. Additionally, there is evidence that many wells completed in the Cotton Valley formation are not cemented across the Rodessa Young Member. The examiners further recommend denial as the Pergan Marshall disposal well located 2 miles from the proposed Caldwell Oil Unit No. 2A has injected an estimated 12 million barrels of industrial and hazardous wastewater since 1988 into the relatively thin Rodessa Young Member. Currently four commercial and non-commercial disposal wells are authorized to inject up 41,000 BWPD into Rodessa Young Member. Approving additional disposal into this zone will only increase the rate at which overpressurization will occur.

Talco's proposed Caldwell Oil Unit No. 2A has adequate cemented surface casing to protect the usable quality water zone in the immediate vicinity of the wellbore. The production string has cement above the injection zone beginning at a depth of 5,990 feet to a top of 2,080 feet. Talco's request is for a non commercial disposal of a relative low volume of 2,500 BWPD. Additionally, Talco is requesting a low surface injection pressure of 1,000 psig. The examiners take issue with the thickness of the Rodessa Young Member's used by Talco in the pressure front calculations performed in estimating a pressure rise at certain distances. Talco's representative estimated the thickness of the Rodessa Young Member as being 110 feet or 60 feet thick. Log data provided by Talco of the Caldwell Oil Unit No. 2A show at most the thickness of the Young Member containing porosity is closer to 30 feet. Additionally, the resistivity log shows several streaks of reduced porosity which would reduce the net effective thickness to 25 feet. Further, Talco's own application (Form H-1, Item No. 15) identifies the thickness of the injection zone as 30 feet. Talco estimated for an injection zone thickness of 60 feet the pressure increase varied between 390.8 psi for a rate of 2,500 BWPD and 234.5 psi for an average rate of 1,500 BWPD at a distance of .45 miles to Mr. Clemons' Durkee Gas Unit 1, Well No. 3. Adjusting the injection zone thickness to 30 feet will double Talco's estimated pressure rises to 782 psi for a rate of 2,500 BWPD and 469 psi for an average rate of 1,500 BWPD after 10 years of injection.

Talco's calculations further assume an infinite reservoir. The evidence indicates the

reservoir has two no-flow boundaries one 6 miles to the north (fault zone) and a porosity pinch-out 10 miles to the south. A cross section presented by Pergan demonstrates the existence of the porosity pinch-out of the Rodessa Young Member. The effect of having any no flow boundaries in the reservoir would be to reduce the size of the injection reservoir or confine it, which would increase the rate of overpressuring. The pressure evidence in Pergan's Exhibit No. 2 supports the interpretation that the reservoir is confined. In the year 2009, injected fluid volume decreased from 17,700 BWPD (520 gpm) to 5,120 BWPD (150 gpm), however, pressure continued to rise from 2,520 psia to 2,610 psia. The continuing rise in pressure with a reduced injection volume indicates the reservoir is not infinite but is confined.

The examiners believe the existence of numerous wells with no cement across the Rodessa Young Member presents an unacceptably high risk of fluids leaving the Rodessa Young Member. The Protestant, Tony Clemons identified two wells within ½ mile of the proposed Caldwell Oil Unit No. 2A that do not have cement across the Rodessa Young Member. The Lee Gas Unit -A- Well No. 4L (API # 203-31982) is a well with the top of cement at 8,100 feet. The well is located 0.4 miles northeast from the proposed Caldwell Oil Unit No. 2A. Mr. Clemons identified his well, the Durkee Gas Unit No.1 Well No. 3 (API # 203-32500) as having top of cement at 6,200 feet or approximately 200 feet below the proposed injection zone. Additional perforations at a depth of 5,712 feet were squeezed with 70 sacks of cement. Mr. Clemons identified an additional well .9 miles from the proposed Caldwell Oil Unit No. 2A, the Durkee Gas Unit No.1 Well No. 4 (API # 203-32479) as having the top of cement at 6,000 feet or approximately at the level of the injection zone. Pergan Marshall identified 38 wells on late-filed Exhibit No. 1, with the majority within a 4 mile radius of their well that have records that indicate there is no cement across the Rodessa. A spot check of Commission records by the examiners, shows the list is accurate for wells checked nearest the proposed Talco Caldwell well. The examiners spot checked the four nearest wells identified by Pergan as having no cement across the Rodessa with Commission filed records. The wells include: Pergan # 57, BP America Caldwell Gas Unit No. 3, (API # 203-31113) top of cement (TOC) 6,215 feet; Pergan # 201, Newfield Exploration Durkee Gas Unit No. 1, (API # 203-32788) top of cement (TOC) 6,400 feet; Pergan # 183, Reserve Management Inc., Durkee Gas Unit 1, No. 4 formerly No.3 , (API # 203-32479) top of cement (TOC) 6,000 feet; and Pergan # 201, Newfield Exploration Durkee Gas Unit No. 1, (API # 203-32790) top of cement (TOC) 7,400 feet. Mr. Clemons identified the Lee Gas Unit -A- Well No. 4L (API # 203-31982) as a well with the top of cement at 8,100 feet. All five wells are within one mile of the proposed Talco Caldwell Oil Unit No. 2A.

The examiners believe the Rodessa Young Member is overpressured. Direct pressure measurements performed by Pergan Marshall, Pergan Exhibit No. 2, at their disposal well WDW No. 243, demonstrates the Rodessa Young Member is overpressured. In 1988, the original bottomhole pressure was 2,250 psia. The most current bottomhole pressure measurement is 2,770 psia. Most interestingly the rise in pressure of the Rodessa Young Member appears directly tied to the rise in Class II commercial and non-commercial disposal wells. The examiners estimated Pergan Marshall has injected over 12.3 million barrels (24 years of 1400 BWPD) of industrial and/or hazardous wastewater. The examiners reviewed Commission filed records and determined approximately another 29.1 million barrels of saltwater (Talco Jones No. 5, reported 400,156 BW, CC Forbes No.1, reported 8.53

MMBW, CC Forbes No.2, reported 6.92 MMBW, Key Energy Davis No. 2RR, reported 13.2 MMBW) was injected by the Class II wells. A total of 41.4 million barrels of water has been injected into the relatively thin, 30 foot, and confined Rodessa Young Member. It is no surprise the Rodessa Young Member is overpressured. Individually, each disposal well met the Railroad Commission's requirements for permitting just as Pergan Marshall's well met the requirements of TCEQ and the US EPA permitting. The examiners believe collectively, the area wells have over injected and overpressured the Rodessa Young Member in this area. The Commission is so concerned that over injection is occurring it is taking proactive steps in the form of a letter dated April 23, 2012 requesting certain operators in Harrison, Panola and Shelby Counties to submit within 90 days pressure data from known disposal zones including the Rodessa so that the Commission can determine the extent of over pressuring in the area. The Commission has also not issued any new commercial disposal well permits in the last year due to growing concerns over overpressuring.

The examiners do not believe that Talco Midstream Assets has demonstrated that injected fluids will be confined to the Rodessa Young interval due to the existing overpressuring of the Rodessa Young Member and the many potential avenues for fluids to exit the formation. There are numerous Cotton Valley producing wells, dry holes and plugged and abandoned wells in the area which do not have cemented casing across the proposed disposal interval. These wells may provide a conduit for migration of injected salt water out of the disposal interval, possibly even to the surface. Further complicating the issue is the fact that approximately 12.3 million barrels of industrial and or hazardous wastewater has already been injected into the same formation. A surface breakout of the Rodessa within the waste plume could result in commingled saltwater with industrial and or hazardous wastewater reaching the surface.

Talco gave notice of this hearing by publication, pursuant to Statewide Rule 9(5)(D), which requires publication in order to give notice to "...other local governments, interested, or affected persons...". At the hearing, Talco objected to the standing of Pergan, stating that Pergan did not meet the definition of "affected person" as defined in Statewide Rule 9(5)(E)(ii). That section states:

- (ii) For purposes of this section, "affected person" means a person who has suffered or will suffer actual injury or economic damage other than as a member of the general public or as a competitor, and includes surface owners of property on which the well is located and Commission-designated operators of wells located within one-half mile of the proposed disposal well. (Emphasis added)

Talco states that Pergan is a competitor and thus has no standing in this hearing. The examiners do not agree. Talco is an entity regulated by the Texas Railroad Commission and seeks a Commission permit to dispose of nonhazardous oil or gas waste by injection. Pergan is an entity regulated by the Texas Commission on Environmental Quality and has a permit from that agency to dispose of hazardous waste by injection. Talco and Pergan may both be interested in the same disposal interval, but are not competitors in the sense of competing for the same business. The examiners conclude that Pergan has standing to appear in this hearing and contest the applied-for permit.

This is not to say that a competing oil or gas waste disposal operator with a Commission Statewide Rule 9 permit would never have standing to contest a Statewide Rule 9 application. Such a competitor would potentially be well situated to provide the Commission with detailed technical information that may aid the Commission in determining whether a permit application should be granted. The examiners believe that the intent of Statewide Rule 9(5)(E)(ii) is to exclude testimony of a purely economic nature indicating that the granting of a permit to a competitor would result in a decrease in business for a protesting Statewide Rule 9 permit holder.

FINDINGS OF FACT

1. Notice of this application and hearing was provided to all persons entitled to notice at least ten (10) days prior to the date of the hearing.
2. Notice of this application was published in *Marshall News Messenger*, a newspaper of general circulation in Harrison County, on December 20, 2011.
3. Protestant Tony W. Clemons appeared and presented evidence. Protestant Pergan Marshall appeared and presented evidence. Protestant Pergan Marshall is not a competitor of Applicant Talco Midstream Assets, LTD. within the meaning of Statewide Rule 9(5)(E)(ii) and had standing to appear at the hearing.
4. Talco Midstream Assets, LTD. requests authority to operate a non commercial disposal well in Harrison County with injection into the Young Member of the Rodessa formation between 5,986 feet and 6,016 feet. The Rodessa is productive in the Hill zone in the area.
5. The Caldwell Oil Unit No. 2A is adequately cased and cemented; however usable quality water will not be adequately protected from pollution because injected fluids will not be confined to the injection interval throughout the area likely to be affected by injection.
 - a. The subject well has 645 feet of 8 $\frac{5}{8}$ " surface casing cemented to surface.
 - b. The subject well has 6,675 feet of 5 $\frac{1}{2}$ " casing, cemented with a top of cement at 4,394 feet. A DV Tool was set at a depth of 3,975 feet with 275 sacks of cement used to cement the well to a depth of 2,080 feet. The well was perforated at 6,465 feet to 6,567 feet and was squeezed with an additional 125 sacks of cement.
 - c. Injection will be through tubing set on a packer no higher than 100 feet above the top of the injection interval.
 - d. The Texas Commission on Environmental Quality recommends that usable-quality ground water be protected from the land surface to the

base of the Wilcox, which is estimated to occur at a depth of 550 feet. Additionally, the letter advised the applicant that at the request of US EPA, that at the referenced location a projected 10,000 year waste plume from a Class I waste disposal well may be penetrated. The letter gave the contact phone number of a US EPA Region 6 representative for further information. The letter references Pergan's well, the WDW-243.

6. Talco Midstream Assets, LTD. did not establish that the proposed injection will be confined to the injection interval throughout the area it will impact.
 - a. The Rodessa Young Member interval proposed for injection is overpressured in the area and prior injection into the interval has affected wells at distances as much as 10 miles away.
 - b. The Rodessa Young Member interval proposed for injection is a relatively thin 30 foot thick zone within the Rodessa formation. The Rodessa Young Member reservoir is believed to be confined as it has two no flow boundaries one 6 miles to the north (fault zone) and a porosity pinch-out 10 miles to the south.
 - c. The Rodessa Young Member interval in the area has undergone active and continuous injection since 1988.
 - d. The Pergan Marshall's Class I WDW No. 243 (TCEQ & EPA regulated) disposal well is located about 2 miles to the southeast of the proposed disposal well. Approximately 12.3 million barrels of industrial and/or hazardous wastewater ("BW") have been injected into the Rodessa Young Member since 1988. The well currently injects at a rate of 1,400 BWPD.
 - e. The Key Energy Services, Davis SWD Well No. 2RR is a commercial disposal well that is located about 10 miles to the southeast of the proposed disposal well. Approximately 13.2 million barrels of saltwater have been injected into the Rodessa Young Member since December 2006. The well currently (as of November 2011) injects at a rate of 6,200 BWPD.
 - f. The C.C. Forbes Company's C.C. Forbes Well No. 1 commercial disposal well is located about 11.4 miles to the southeast of the proposed disposal well. Approximately 8.5 million barrels of saltwater have been injected into the Rodessa Young Member since December 2006. The well currently (as of November 2011) injects at a rate of 1,360 BWPD.
 - g. The C.C. Forbes Company's C.C. Forbes Well No. 2 commercial disposal well is located about 11.5 miles to the southeast of the

proposed disposal well. Approximately 6.9 million barrels of saltwater have been injected into the Rodessa Young Member since January 2008. The well currently (as of November 2011) injects at a rate of 1,360 BWPD.

- h. The Talco Jones Gas Unit, Well No. 5 disposal well is located about 3.8 miles to the northeast of the proposed disposal well. Approximately 0.4 million barrels of saltwater have been injected into the Rodessa Young Member since February 2010. The well currently (as of November 2011) injects at a rate of 1,540 BWPD.
- i. In 1988, the bottomhole pressure of the Rodessa Young Member was measured at 2,250 psi in the Pergan Marshall WDW No. 243 well. Pergan Marshall recently measured the bottomhole pressure in their well as 2,770 psia. Talco reports the bottomhole pressure is currently 2,500 psi in the Caldwell Oil Unit No. 2A.
- j. Measured bottomhole pressures taken over a period of time since 1988 at the Pergan Marshall's WDW No. 243 show a dramatic rise in pressures coinciding with increased recent saltwater disposal activity. Pressures have increased rapidly since 2006.
- k. There are as many as 39 currently identified Cotton Valley producing wells, dry holes and plugged and abandoned wells in the area which do not have cemented casing across the proposed disposal interval, one within 2,000 feet of the proposed disposal well. These uncemented intervals provide a conduit for injected fluids to escape the permitted disposal interval.
- l. A projected 10,000 year waste plume from the Pergan Marshall Class I waste disposal well encompasses the entire area where all 39 wells, identified as having no cement across the Rodessa, are located.
- m. Any future surface breakout from the Rodessa Young Member within the 10,000 year waste plume area may be commingled with industrial and/or hazardous wastewater.
- n. Fluids injected into the Caldwell Oil Unit No. 2A have the potential to leave the Rodessa Young Member, the permitted interval, through an uncemented wellbore and enter the Rodessa Hill zone, and present a hazard to this gas-bearing productive formation.

CONCLUSIONS OF LAW

1. Proper notice was issued in accordance with the applicable statutory and regulatory requirements.

2. All things have occurred to give the Railroad Commission jurisdiction to consider this matter.
3. Talco Midstream Assets, LTD. has not satisfied the requirements of Chapter 27 of the Texas Water Code and the Railroad Commission's Statewide Rule 46 for the injection of produced water into the Caldwell Oil Unit Well No. 2A.
 - a. Talco Midstream Assets, LTD. failed to show that the use of the proposed Caldwell Oil Unit Well No. 2A would not endanger or injure any oil, gas or other mineral formation as required under Texas Water Code §27.051(b)(2).
 - b. Talco Midstream Assets, LTD. failed to show that the use of the proposed Caldwell Oil Unit Well No. 2A would not cause pollution of surface water or fresh water strata as required under Texas Water Code §27.051(b)(3).
 - c. Talco Midstream Assets, LTD. did not meet its burden of proof in showing that injected fluids will be confined to the proposed injection interval as required under Texas Water Code §27.051(b)(3).

EXAMINERS' RECOMMENDATION

Based on the above findings and conclusions, the examiners recommend that the application of Talco Midstream Assets, LTD. for authority to inject salt water into its Caldwell Oil Unit Well No. 2A be denied, as set out in the attached Final Order.

Respectfully submitted,



Andres J. Trevino, P.E.
Technical Examiner



Marshall Enquist
Legal Examiner



TALCO MIDSTREAM ASSETS, LTD (835421)
 CALDWELL SWD NO. 2A
 H. VARDEMAN A-726 SURVEY
 API #203-33195
 HARRISON COUNTY, TEXAS

