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RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 01-0309061

COMPLAINT OF CAPITAL STAR OIL & GAS, INC. AGAINST XTO ENERGY, INC. REGARDING INTERFERENCE WITH VARIOUS WELLS LOCATED IN THE FASHING EDWARDS LIME -A- AND FASHING, EDWARDS LIME -B- FIELDS, ATASCOSA COUNTY, TEXAS, FOLLOWING STIMULATIONS PERFORMED BY XTO ENERGY, INC. ON ITS WELLS IN THE EAGLEVILLE (EAGLE FORD-1) FIELD, ATASCOSA COUNTY, TEXAS, IN VIOLATION OF STATEWIDE RULES 7, 10, 13 AND 36

PROPOSAL FOR DECISION

HEARD BY: Robert Musick, P.G. - Technical Hearings Examiner
Kristi M. Reeve - Administrative Law Judge

PROCEDURAL HISTORY:

Complaint Filed:	February 1, 2018
Notice of Hearing Issued:	July 10, 2018
Pre-Hearing Conference:	August 7, 2018
Hearing on the Merits:	December 3 and 4, 2018; April 8 and 10, 2019; and May 16, 2019
Final Hearing Transcript Received:	June 5, 2019
Capital Star Written Closing:	June 17, 2019
XTO Response to Capital Star Closing:	June 27, 2019
Capital Star Reply to XTO Closing:	July 3, 2019
Close of Record:	July 3, 2019
Proposal for Decision Issued:	June 29, 2020

APPEARANCES:

For Complainant, Capital Star Oil & Gas, Inc.:

William Osborne (Attorney) - *Osborne, Griffith & Hargrove, LLP*
Thomas Naincent (Legal Assistant) - *Osborne, Griffith & Hargrove, LLP*

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 2 of 64

Witnesses for Complainant:

Nico Garza (Engineer) - *Cornerstone Engineering*
Lazaro Rodriguez (Production Foreman, South Texas Operations) - *Capital Star*
Jim West (President) - *Capital Star*
Tom Wygant (Vice President) - *Capital Star*

For Respondent, XTO Energy, Inc.:

David Gross (Attorney) - *Gross & Nelson*

Witnesses for Respondent:

Rick Johnston, P.E. (Consulting Engineer) - *Johnson & Cloud Inc.*
John Ely (Hydraulic Fracturing Consultant) - *Ely & Associates*
Tracy Freeling (Senior Reservoir Engineer) - XTO
Heather Anderson (Regional Geologist) - XTO
Frankie Krumrey (Production Superintendent) - XTO
Jeremy Acord (Operations Engineer) - XTO
Dr. Nancy Choi (Operations Engineer) - XTO
Jonathan Matt Uzzell (Drilling Engineer) - XTO
Will Winston (Land Manager) - XTO

Observer:

James Thum (Oil and Gas Manager) - *Idaho Department of Lands, Idaho Oil and Gas Conservation Commission*

Table of Contents

STATEMENT OF CASE	5
JURISDICTION AND NOTICE	6
APPLICABLE LAW AND LEGAL AUTHORITY	6
PRE-HEARING CONFERENCE	9
DISCUSSION OF THE EVIDENCE.....	10
Fashing Edwards Fields	10
Eagleville (Eagle Ford-1) Field	11
Capital Star Oil & Gas’s Case as Presented at Hearing	12
Alleged Impacted Wells – The “Compliant Wells”	13
Testimony of Mr. Rodriguez, Capital Star’s Production Foreman	13
Testimony of Mr. West, Capital Star’s President.....	14
Testimony of Mr. Nico Garza, Capital Star’s Consulting Petroleum Engineer.....	15
XTO Energy, Incorporated’s Case as Presented at Hearing	25
Testimony of Mr. Krumrey, XTO’s Production Foreman	26
Testimony of Mr. Winston, XTO’s Land Manager	27
Testimony of Ms. Anderson, XTO’s Regional Geologist	28
Testimony of Mr. Uzzell, XTO’s Drilling Engineer	30
Testimony of Dr. Choi, PhD, XTO’s Operational Engineer.....	31
Testimony of Mr. Acord, XTO’s Structural Engineer	33
Testimony of Ms. Freeling, XTO’s Senior Reservoir Engineer	35
Testimony of Mr. Ely, XTO Consulting Engineer.....	35
Testimony of Mr. Johnston, XTO Consulting Engineer	37
Capital Star’s Asserted Violations of Statewide Rules	42
Statewide Rule 7.....	42
Statewide Rule 10.....	43
Statewide Rule 13.....	44
Statewide Rule 36.....	46
Violation of Tex. Nat. Res. Code §85.....	47
Capital Star’s Motion to Shift the Burden of Proof	47
XTO’s Response to Alleged Violations of Statewide Rules	48
Statewide Rule 7 and 13.....	48
Statewide Rule 10.....	48
Statewide Rule 36.....	49
Tex. Nat. Res. Code § 85	49
EXAMINERS’ ANALYSIS	50
Violations.....	50
Burden of Proof.....	50

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 4 of 64

Statewide Rule 7.....	50
Statewide Rule 10.....	52
Statewide Rule 13.....	54
Statewide Rule 36.....	56
Tex. Nat. Res. Code §85	57
Application of Rules	58
RECOMMENDATION, PROPOSED FINDINGS OF FACT AND PROPOSED CONCLUSIONS OF LAW	59
FINDINGS OF FACT	59
CONCLUSIONS OF LAW	63
EXAMINERS' RECOMMENDATION.....	64

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 5 of 64

STATEMENT OF CASE¹

Capital Star Oil & Gas (“Capital Star” or “Complainant”) operates vertical gas wells in the Edwards Lime -A- and Edwards Lime -B- Fields (collectively referred to as the “Fashing Edwards Fields”) in Atascosa County, Texas. XTO Energy, Inc. (“XTO” or “Respondent”) owns the mineral interest in both common and adjacent leases, operating vertical wells in the Fashing Edwards Fields and horizontal wells in the Eagleville (Eagle Ford-1) Field (“Eagle Ford Field”). The Eagle Ford Field overlies the Fashing Edwards Fields at a vertical separation of approximately 250 feet.² XTO has a continuing horizontal drilling program in the shallower Eagle Ford Field.

Capital Star filed a complaint with the Railroad Commission of Texas (“Commission”) against XTO, alleging XTO’s fracking operations caused damage to Capital Star wells in violation of various Commission rules and seeking a finding of rule violations as a precursor to Capital Star’s filing of a civil suit against XTO. Additionally, Capital Star is seeking a designation of the Fashing Edwards Fields as a “potential flow zone,” with a halo of a ¼ mile radius surrounding it, and restricting XTO against further fracture stimulations of Eagle Ford wells across the top of the Fashing Edwards Fields until which time all wells in that field are plugged and abandoned.

Capital Star alleged nearby completion and fracture stimulation treatment (also referred to as “FST”, “fracked” or “frac”) operations by XTO for horizontal well completions in the Eagle Ford Field resulted in the comingling of fluids between two or more Commission designated fields in violation of Statewide Rules 7, 10, 13 and 36.³ Capital Star initially identified five of its wells alleged to have been impacted, but ultimately asserted that a total of seven wells in the Fashing Edwards Fields were impacted by XTO FST operations in the Eagle Ford Field. In addition, Capital Star indicated the Fashing Edwards Fields are hydrogen sulfide (“H₂S”) reservoirs and asserted that communication with the shallower Eagle Ford Field has resulted in safety issues arising from drilling, completion and operation.⁴

Based on the evidence, the Technical Examiner and Administrative Law Judge (collectively, “Examiners”) recommend finding that Capital Star has failed to prove the violations as alleged. The Examiners also recommend finding that the evidence does not support the requested relief of Capital Star for a declaration of a “potential flow zone” with a resulting restriction placed on further fracture stimulations in the Eagle Ford. The

¹ The transcript for the pre-hearing conference held on August 7, 2019, is referred to as “PHC Tr. [Pg., Lns.]” and the transcript for the merits hearing held on December 3 and 4, 2018; April 8 and 10, 2019 and May 16, 2019, is referred to as “Hearing Tr. [Vol., Pg., Lns.]”. Capital Star Oil & Gas, Inc.’s exhibits are referred to as either “PHC Capital Star Ex. [exhibit no.]” or “Hearing Capital Star Ex. [exhibit no.]”; and XTO Energy, Inc.’s exhibits are referred to as either “PHC XTO Ex. [exhibit no.]” or “Hearing XTO Ex. [exhibit no.]”. Closing statements for parties will be referred to as “Filing Title of Party Name, Pg.[page no.]”.

² Hearing Tr. Vol. 1, Pg. 11, Lns. 7-13 and Capital Star Closing Statement filed June 17, 2019.

³ 16 Tex. Admin. Code §§ 3.7, 3.10, 3.13, and 3.36.

⁴ Hearing Tr. Vol. 3, Pg. 53, Lns. 12-18.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 6 of 64

Examiners recommend the requested relief be denied and the complaint of Capital Star be dismissed.

JURISDICTION AND NOTICE

Sections 81.051 and 81.052 of the Texas Natural Resources Code provide the Commission with jurisdiction over all persons owning or engaged in drilling or operating oil or gas wells in Texas, and the authority to adopt all necessary rules for governing and regulating persons and their operations under the jurisdiction of the Commission.

On July 10, 2018, the Hearings Division of the Commission sent a Notice of Hearing (“Notice”) to Capital Star and XTO setting a hearing date of August 7 through 10, 2018.⁵ Consequently, all parties received more than 10 days’ notice. The Notice contains: (1) a statement of the time, place, and nature of the hearing; (2) a statement of the legal authority and jurisdiction under which the hearing is to be held; (3) a reference to the particular sections of the statutes and rules involved; and (4) a short and plain statement of the matters asserted.⁶ On July 23, 2018, the ALJ converted the hearing to a prehearing conference upon the request of XTO. The prehearing conference was held on August 7, 2018, as noticed. At the prehearing conference, the compliant was clarified and the first dates for the hearing on the merits were announced.

APPLICABLE LAW AND LEGAL AUTHORITY

Capital Star alleges XTO has violated Statewide Rules 7, 10, 13 and 36 in the fracking operations of some of its wells located in the Eagle Ford Field. Capital Star did not argue the alleged violations of Commission rules at the hearing. Instead, Capital Star chose to argue the violations within its written closing statement. In its closing statement, Capital Star included two additional violations not included in the Notice, nor discussed at the prehearing conference. Those are violations of Chapter 85 of the Texas Natural Resources Code, one against XTO, the other against the Commission.

Capital Star contends XTO is in violation of Statewide Rule 7, as XTO’s fracture stimulations were designed to exceed the thickness of the Eagle Ford shale formation. Statewide Rule 7 states:

Whenever hydrocarbon or geothermal resource fluids are encountered in any well drilled for oil, gas, or geothermal resources in this state, such fluid shall be confined in its original stratum until it can be produced and utilized without waste. Each such stratum shall be adequately protected from infiltrating waters. Wells may be drilled deeper after encountering a stratum bearing such fluids if such drilling shall be prosecuted with diligence and any such fluids be confined in its stratum and protected as aforesaid upon completion of the well. The commission will require each such stratum to be

⁵ See Notice of Hearing issued July 10, 2018.

⁶ See Tex. Gov’t Code §§ 2001.051, .052; 16 Tex. Admin. Code §§ 1.41, 1.42, 1.45.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 7 of 64

cased off and protected, if in its discretion it shall be reasonably necessary and proper to do so.⁷

Capital Star argues that by XTO's actions, XTO has forced Fashing Edwards Fields wells to be out of compliance with Statewide Rule 10, by placing the Eagle Ford stratum in pressure communication with the Edwards stratum.⁸ Statewide Rule 10 states in part, as a general prohibition:

Oil and gas shall not be produced from different strata through the same string of tubulars except as provided in this section. As used in this section, "different strata" means two or more different commission-designated fields, or one or more commission-designated fields and any other hydrocarbon reservoir.⁹

Capital Star alleges that as XTO has proven unable to prevent the migration of fluids from the Eagle Ford stratum field to the Edwards stratum field, it is in violation of Statewide Rule 13.¹⁰ Statewide Rule 13 states in part:

Intent. The operator is responsible for compliance with this section during all operations at the well. It is the intent of all provisions of this section that casing be securely anchored in the hole in order to effectively control the well at all times, all usable-quality water zones be isolated and sealed off to effectively prevent contamination or harm, and all productive zones, potential flow zones, and zones with corrosive formation fluids be isolated and sealed off to prevent vertical migration of fluids, including gases, behind the casing. When the section does not detail specific methods to achieve these objectives, the responsible party shall make every effort to follow the intent of the section, using good engineering practices and the best currently available technology. In accordance with §3.17 of this title (relating to Pressure on Bradenhead), operators must notify the Commission of bradenhead pressure. The Commission will evaluate notices of bradenhead pressure on a case-by-case basis to determine further action and will provide guidance to assist operators in wellbore evaluation.¹¹

Capital Star argues XTO's activities have shown the Edwards stratum¹² is a potential flow zone. Capital Star requests "designation of a 'potential flow zone' as the surface area above all proration units for the Edwards field and within a ¼ mile radius of the outermost of these, from the top of the Austin Chalk to the base of the Edwards

⁷ 16 Tex. Admin. Code § 3.7.

⁸ Closing Statement of Capital Star, Pg. 18.

⁹ 16 Tex. Admin. Code § 3.10(a).

¹⁰ Closing Statement of Capital Star, Pg. 20.

¹¹ 16 Tex. Admin. Code § 3.13(a)(1).

¹² Edwards Stratum is referring to the Edwards Limestone Group which is the stratum of the Fashing Edwards Fields.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 8 of 64

formation, with provision that no Eagle Ford wells above the zone be fracture stimulated until all of the Edwards wells plugged.”¹³ Statewide Rule 13 defines potential flow zone as:

A zone designated by the director or identified by the operator using available data that needs to be isolated to prevent sustained pressurization of the surface casing/intermediate casing or production casing annulus sufficient to cause damage to casing and/or cement in a well such that it presents a threat to subsurface water or oil, gas, or geothermal resources. The Commission will maintain a list of known zones by district and county that are considered potential flow zones and make this information available to all operators. The Commission will revise this list as necessary based on information provided, or otherwise made available, to the Commission.¹⁴

Capital Star alleges XTO has violated Statewide Rule 36 by forcing adjoining wells out of compliance with the Rule due to XTO causing increased pressure in the Edwards formation.¹⁵ Capital Star does not cite to a specific section of Statewide Rule 36, simply quoting the following language of the Rule:

Applicability. Each operator who conducts operations as described in paragraph (1) of this subsection shall be subject to this section and shall provide safeguards to protect the general public from the harmful effects of hydrogen sulfide. This section applies to both intentional and accidental releases of hydrogen sulfide.¹⁶

Capital Star argues XTO’s actions in fracture stimulating wells across the top of the Fashing Edwards Fields is in violation of Chapter 85 of the Texas Natural Resources Code. Capital Star cites to Tex. Nat. Res. Code § 85.046(a)(2)(b) which states:

85.046 WASTE (a) the term “waste,” among other things, specifically includes:
(2) drowning with water a stratum or part of a stratum that is capable of producing oil or gas or both in paying quantities;
(6) physical waste or loss incident to or resulting from drilling, equipping, locating, spacing, or operating a well or wells in a manner that reduces or tends to reduce the total ultimate recovery of oil or gas from any pool.¹⁷

Lastly, Capital Star alleges the Commission has been derelict in its duties due to its failure to “provide rules for shooting wells.” Capital Star cites to Section 202 of the Tex. Nat. Res. Code regarding the Commission’s duty.

¹³ Closing Statement of Capital Star, Pg. 20.

¹⁴ 16 Tex. Admin. Code § 3.13(a)(2)(N).

¹⁵ Closing Statement of Capital Star, Pg. 21.

¹⁶ 16 Tex. Admin. Code § 3.36.

¹⁷ Tex. Nat. Res. Code § 85.046(a)(2)(b).

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 9 of 64

85.202 PURPOSE OF RULES AND ORDERS (a) The rules and orders of the Commission shall include rules and orders:

- (4) to require wells to be drilled and operated in a manner that will prevent injury to adjoining property;
- (5) to prevent oil and gas and water from escaping from the strata in which they are found into other strata;
- (6) to provide rules for shooting wells and for separating oil from gas.¹⁸

Capital Star argues “the failure to implement rules does not abrogate the Commission’s duty to do so, or in the absence of doing so, to prevent offset operators from the consequences of ‘shooting wells’ in such manner as to cause waste or injury to offset operators.”¹⁹

PRE-HEARING CONFERENCE

The hearing on the merits originally scheduled for August 7 through August 10, 2018, was converted to a pre-hearing conference at the request of the Capital Star and XTO. The prehearing conference was necessary to identify the issues involved, alleged rule violations, requested relief, and to adopt a procedural schedule. Capital Star asserted XTO is in violation of Statewide Rule 7, 10, 13 and 36.²⁰ In addition, Capital Star proposed to expand the scope of the complaint by adding additional wells that were alleged to have been impacted by XTO’s frac operations. The hearing on the merits was scheduled to begin December 3, 2018.

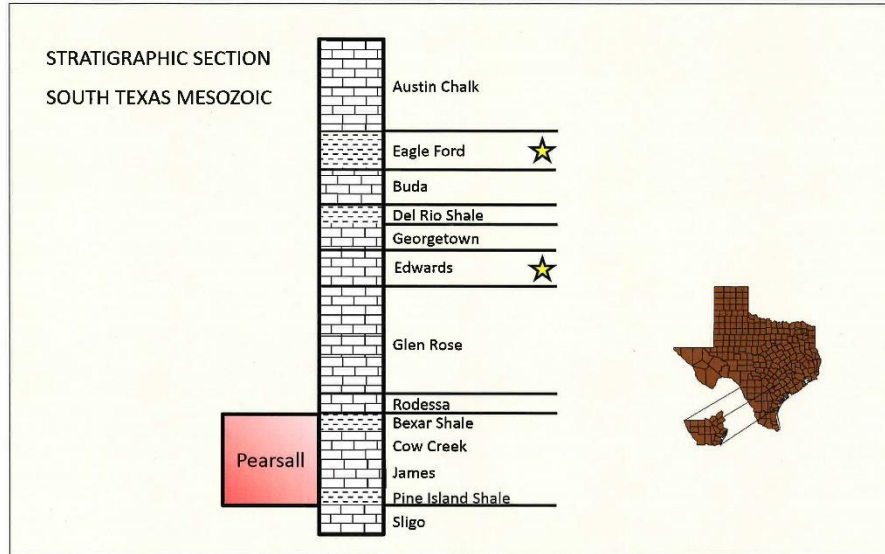
¹⁸ Tex. Nat. Res. Code § 85.202. Last amended 1977.

¹⁹ Closing Statement of Capital Star, Pg. 22.

²⁰ PHC Tr. Pg. 4, Lns. 4-15.

DISCUSSION OF THE EVIDENCE

Fashing Field, Atascosa Co, TX – Geology



Fashing Edwards Fields

The Fashing Edwards Fields²¹ drape across the southeast corner of Atascosa County into the southwest corner of Karnes County. The two Fields were discovered in 1956 and is composed of the Edwards Limestone Group formation at about 10,200 feet, with a 580-foot productive section of mostly natural gas with some condensate.²² 219 active and inactive wells have been drilled and completed in the Fashing Edwards Fields. At the time of the hearing, the Fashing Edwards Fields had 55 active wells and six active operators. The majority of the active wells in the Fashing Edwards Fields are operated by two companies, Capital Star and XTO.²³ The Fashing Edwards Fields' gas production is from two separate reservoirs in the Edwards Limestone Group referred to as the Edwards Lime -A- Field (Field No. 30379500) and the Edwards Lime -B- Field (Field No. 30379750).

²¹ In the hearing, the Fashing Edwards Fields were also referred to as the “the Edwards” or “Fashing Fields”, depending on context of the testimony, etc. Where possible, this document calls the Edwards Limestone Group which is composed of two Commission Fields (Lime -A- and Lime -B-), the Fashing Edwards Fields for consistency.

²² Hearing Tr. Vol. 2, Pg. 9, Lns. 5-11.

²³ Hearing Tr. Vol. 2, Pg. 8, Lns. 5-17; Hearing Capital Star Ex. 12.

Oil and Gas Docket No. 01-0309061
 Proposal for Decision
 Page 11 of 64

The Edwards Lime -A- Field has an average porosity of 15.5 percent, an average permeability of 12.6 millidarcies and an average connate water saturation of 27 percent. In comparison, the Edwards Lime -B- Field has an average porosity of 13.2 percent, an average permeability of 4.4 millidarcies and an average connate water saturation of 24 percent.²⁴ The Edwards Lime -A- Field typically has more production than the Edwards Lime -B- Field.

Evidence indicates the Fashing Edwards Fields are dominated by a northeast trending fault. The fault has about 700 feet vertical displacement and dips northwestward at a 38 degree angle.²⁵ Typically, Capital Star's wells are located in the up-dip portion of the structure, nearest the fault or towards the northern part of the structure, south of the fault.²⁶

For clarity, the Commission's Field Rules for the Fashing Edwards Fields are summarized below:²⁷

- Fashing (Edwards Lime -A-) Field (referred to as the Edwards Lime -A-) – Includes oil and gas field rules under Field No. 30379500. The oil field rules require an 80-acre drilling unit, with a 40-acre tolerance acreage, with 660 feet lease line spacing and 1,500 feet between well spacing. The gas field rules require a 320-acre drilling unit, with a 32-acre tolerance acreage and an 80-acre optional acreage, with 660 feet lease line spacing and 1,500 feet between well spacing. The Edwards Lime -A- Field is designated at a depth of 11,100 feet and the interval from the land surface to a depth of 4,900 feet must be protected.²⁸
- Fashing (Edwards Lime -B-) Field (referred to as the Edwards Lime -B-) – Includes oil and gas field rules under Field No. 30379750. The oil field rules require a 40-acre drilling unit, with 467 feet lease line spacing and 1,200 feet between well spacing. The gas field rules require 320-acre drilling unit, with 80-acre optional, with 660 feet lease line spacing and 1,500 feet between well spacing.

Eagleville (Eagle Ford-1) Field

The Eagle Ford Field²⁹ has more recent activity and development than the Fashing Edwards Fields.³⁰ The Eagle Ford Field, which is composed of the Eagle Ford shale, is stratigraphically higher in the geologic sequence than the Fashing Edwards Fields and is separated from the top of the Fashing Edwards Fields by a thickness of 250 feet.³¹

²⁴ Hearing Capital Star Ex. 12; Hearing XTO Cross Ex. 7 and 8.

²⁵ Hearing Tr. Vol. 2, Pg. 9, Lns. 12-25; Hearing Capital Star Ex. 12.

²⁶ Hearing Tr. Vol. 3, Pg. 43, Lns. 22-25 and Vol.3, Pg. 44. 1-14.

²⁷ Summary of Field Rules based on a query of the Field Rule for the Edwards Lime -A- Field and the Edwards Lime -B- Field.

²⁸ Hearing Capital Star Ex. 27.

²⁹ In this proposal for decision, "Eagle Ford Field" refers to the Eagleville (Eagle Ford-1) Field.

³⁰ Hearing Tr. Vol. 2, Pg. 8, Lns. 18-21.

³¹ Hearing Capital Star Ex. 15.

Oil and Gas Docket No. 01-0309061
 Proposal for Decision
 Page 12 of 64

Stratigraphically beneath the Eagle Ford shale is the Buda Limestone, Del Rio Clay and Georgetown Limestone, which are intervening formations between the bottom of the Eagle Ford shale and the top of the Edwards Limestone Group which makes up the Fashing Edwards Fields.³²

Evidence indicated that the Commission distinguishes between the Fashing Edwards Fields and the Eagle Ford Field, but often production data for the three reservoirs, the Eagle Ford Field and the Edwards Lime -A- Field and Edwards Lime -B- Field, are combined for the operator's convenience and often called the Fashing Fields.³³

For clarity, the Commission Field Rules for the Eagle Ford Field are summarized below:³⁴

- Eagleville (Eagle Ford-1) Field (referred to as the Eagle Ford Field) – Includes oil and gas field rules under Field No. 27135700. The oil field rules require an 80-acre drilling unit with a 40-acre tolerance and a 40-acre optional and 330 feet lease line spacing with no requirement for between well spacing. The gas field rules require an 80-acre drilling unit, an 88-acre tolerance and a 40-acre optional with 330 feet lease line spacing and no requirement between well spacing. Comments on these rules indicate the GOR is 3,000:1 standard cubic foot per barrel ("scf/bbl") and the correlative interval is 10,294 feet to 10,580 feet in Atascosa, Dimmit, Frio, Gonzales, La Salle, McMullen, Wilson and Zavala Counties, Texas.

Capital Star Oil & Gas's Case as Presented at Hearing

Capital Star currently operates about 100 wells in the Fashing Edwards Fields, with sour gas (aka H₂S impacted) concentrations ranging from 20,000 parts per million to 40,000 parts per million.³⁵ Prior to filing its compliant with the Commission, Capital Star expressed its concerns to XTO regarding the proximity of XTO's wells to Capital Star's deeper Fashing Edwards Fields wells. XTO agreed to put memory gauges on three of Capital Star's Fashing Edwards Fields wells³⁶ to provide real-time pressure information during fracking operations conducted by XTO in August 2018. The memory gauge at the Schumann A-7 Well documented a spike of approximately 5,000 pounds per square inch during XTO fracking operations in mid-August 2018. Capital Star stated normal operating pressure for the Fashing Edwards Fields is about 600 pounds. The spike of pressure from 600 to 5,000 pounds on Capital Star's Schumann A-7 Well corresponded to a FST operation performed by XTO in August 2018, on two XTO wells located about 7,000 feet from the Schumann A-7 Well, resulting in what Capital Star deemed to be a blowout.³⁷

³² Hearing Tr. Vol. 3, Pg. 45, Lns. 12-15; Pg. 46 Lns. 10-14; Hearing Capital Star Ex. 12.

³³ Hearing Tr. Vol. 2, Pg. 11, Lns. 22-25.

³⁴ Summary of Field Rules based on a query of the Field Rule for the Eagleville (Eagle Ford-1) Field.

³⁵ Hearing Tr. Vol. 1, Pg. 10, Lns. 20-25 and Vol.1, Pg. 11, Lns. 1-6.

³⁶ The Capital Star Schumann A-4; Schumann A-5; and Schumann A-7 wells.

³⁷ Hearing Tr. Vol. 1, Pg. 12, Lns. 10-25; Vol 1, Pg. 13, Lns. 1-4; Hearing Capital Star Ex. 23; Hearing XTO Cross Ex. 9.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 13 of 64

Capital Star notified the Commission's District Office and law enforcement because of materials ejected from the wellhead with elevated concentrations of H₂S.³⁸

Alleged Impacted Wells – The “Compliant Wells”

In the complaint, Capital Star alleges that certain wells (referred to as “complaint wells”) have been potentially compromised by XTO during XTO's well completion operations.³⁹ In the hearing, Capital Star summarized each complaint well's construction, perforated intervals, production plots, maximum pressures, oil and gas volumes and known pressure spikes observed during periods in which XTO conducted FST operations.⁴⁰ Below is a list of the complaint wells:

- a. Schumann A-7 Well: 11,000 feet total vertical depth (“TVD”), Completed 1994, Edwards Lime -A-;
- b. Tom “A” GU3-1L Well: 10,990 feet TVD, Completed 1957, Edwards Lime -A- & -B-;
- c. Tom “A” GU4-3L Well: 10,900 feet TVD, Completed 1985, Edwards Lime -A- & -B-;
- d. Urbanczyk GU-1 2L Well: 10,900 feet TVD, Completed 1978; Edwards Lime -A- & -B-;
- e. Urbanczyk GU-1 3L Well: 10,900 feet TVD, Completed 1982, Edwards Lime -A- & -B-;
- f. Urbanczyk GU-2 3U Well: 10,900 feet TVD, Completed 1980, Edwards Lime -A-; and
- g. Urbanczyk GU-2 5 Well: 7,973 feet TVD, Completed 1994, Edwards Lime -A-

Testimony of Mr. Rodriquez, Capital Star's Production Foreman

Mr. Rodriquez, Capital Star's Production Foreman, indicated that Capital Star collected samples from the Urbanczyk and Schumann wells to document changes to well liquids.⁴¹ In order to document Capital Star's position, he photographed samples from three Urbanczyk Wells (identified as 2-3, 1-2, 2-5) and two Schumann Wells (identified as the A-6 and A-7). He also stated the photographs showed a physical change in sediment textures and color.⁴²

Mr. Rodriquez indicated that 10 types of commercial products were observed in samples collected as early as May 2016, from Capital Star's wells after an XTO FST occurred in 2016 near the Schumann A-7 Well. The sample showed a 98% match to

³⁸ Hearing Tr. Vol. 1, Pg. 13, Lns. 5-11.

³⁹ Hearing Capital Star Ex.13; Hearing XTO Cross Ex. 9.

⁴⁰ Hearing Tr. Vol. 2, Pg. 43-78; Hearing Capital Star Ex. 16.

⁴¹ Hearing Tr. Vol. 1, Pg. 48 and 53.

⁴² Hearing Capital Star Ex. 2; Hearing Capital Star Ex. 4.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 14 of 64

refined oil, such as diesel, which is often used for FSTs.⁴³ It was Mr. Rodriguez's opinion that these samples showed impacts from XTO fracs as early as 2016.⁴⁴

Capital Star further alleged that a blowout occurred from the Schumann A-7 Well in August 2018. Mr. Rodriguez stated that at the time of the Schumann A-7 blowout on August 16, 2018, approximately 5,054 pressure square inch gauge "psig" was recorded as the peak pressure, which is significantly different than the 481 psig observed before the blowout.⁴⁵ As a result of the increased pressure, the nipple on the tree was compromised which caused the discharge of drilling mud and possibly allowed some H₂S to escape from the well.⁴⁶ It was Mr. Rodriguez's testimony that the blowout was caused by XTO fracking one of its wells completed in the Eagle Ford Field.⁴⁷ On the day of the blowout, XTO red tagged the Schumann A-7 well and "symbolically" sealed the well for safety issues.⁴⁸ On the day after the blowout, August 17, 2018, the pressure on the wellhead was 2,578 psig.⁴⁹

Testimony of Mr. West, Capital Star's President

Mr. West, President of Capital Star and CEO of Modelo, testified that Capital Star was not satisfied with the quality of data for each well it acquired from Momentum during the March 2015 acquisition.⁵⁰ He stated that a cement bond log was not available for the Schumann A-7 Well, but indicated that other acquired properties had geologic analysis that supplemented missing data for the Schumann A-7 Well.⁵¹ He maintained that the structural position of the Schumann A-7 Well is not well understood because the data was not part of the acquisition when Capital Star purchased the Well.⁵²

Mr. West indicated that Capital Star also holds non-operating ("non-op") working interests in many of XTO's Fashing Edwards Fields wells. He stated that Capital Star questioned certain expenditures made by XTO in joint well projects and bookkeeping issues associated with XTO's operations.⁵³

We attempted to get rid of the non-op property that we had with XTO because it was very evident that XTO was not a very prudent operator, that not only did they have problems in the fields, they had problems with their accounting.⁵⁴

⁴³ Hearing XTO Cross Ex. 1.

⁴⁴ Hearing Tr. Vol. 1, Pg. 72.

⁴⁵ Hearing Capital Star Ex. 4.

⁴⁶ Hearing Tr. Vol. 1, Pg. 13, Lns. 5-11.

⁴⁷ Hearing XTO Cross Ex. 9.

⁴⁸ Hearing Tr. Vol. 1, Pg. 26-27.

⁴⁹ Hearing Tr. Vol. 1, Pg. 91.

⁵⁰ Hearing Tr. Vol. 1, Pg. 144, Lns. 8-25; Vol.1, Pg. 148, Lns.18-25.

⁵¹ Hearing Tr. Vol. 1, Pg.144-145.

⁵² Hearing Tr. Vol. 1, Pg. 146, Lns. 1-12.

⁵³ Hearing Tr. Vol. 1, Pg. 150-151.

⁵⁴ Hearing Tr. Vol. 1, Pg. 151-152.

Mr. West testified that it had tried to obtain information about XTO's insurance so Capital Star and XTO's insurance companies could confer about the blowout at the Schumann A-7 Well, but XTO informed Capital Star it was self-insured.⁵⁵ Mr. West contends that when XTO tagged the Schumann A-7 Well, it took responsibility for the Well's blowout, therefore it should pay for damages to the Well and offer to clean up the environmental issues associated with the blowout.⁵⁶

Testimony of Mr. Nico Garza, Capital Star's Consulting Petroleum Engineer

Mr. Nico Garza, Capital Star's Petroleum Engineer witness, testified that communication with an existing well of fluids from a nearby FST operation, known as a "frac hit," is a common occurrence in today's horizontal shale plays. He indicated that over the past eight years in the Eagle Ford Field, frac hits have become frequent occurrences. Mr. Garza contends that the industry has typically agreed to notify other nearby operators of an impending FST, so nearby operators can prepare for any potential frac hit by ensuring wellhead equipment has a 5,000-pound rating to avoid well control issues.⁵⁷ He stated that a frac hit could range from a pressure pulse to an imploded wellbore:

The severity of the frac hit isn't necessarily directly correlated to the distance between wells. It has to do with lots of things; one, yes, the rate and the volume and the proppant and the horsepower, but also has to do with either the presence of natural fractures that exist in the reservoir, connectivity with those natural fractures and the complexity of the natural fractures.⁵⁸

Mr. Garza, stated that the first XTO well was completed in 2005, with approximately 38 additional horizontal wells being completed by XTO in the Eagle Ford Field between 2010 through 2018.⁵⁹ He indicated that in general, the XTO wells are in the middle of the geologic structure, which climbs to the northwest. Mr. Garza presented maps to illustrate the horizontal aerial extent of the Fashing Edwards Fields in the Edwards Limestone Group and Eagle Ford Field, which comprises the Eagle Ford shale formation.

Mr. Garza further detailed the general history of horizontal well completions in the Fashing Edwards Fields and the Eagle Ford Field:

- XTO completed horizontal wells in the Eagle Ford Field from 2012 through 2018.⁶⁰ These wells were completed in proximity to existing vertical wells owned and operated

⁵⁵ Hearing Tr. Vol. 1, Pg. 159, Lns. 1-21.

⁵⁶ Hearing Tr. Vol. 1, Pg. 161, Lns. 1-17.

⁵⁷ Hearing Tr. Vol. 1, Pg. 170, Lns. 1-12.

⁵⁸ Hearing Tr. Vol. 1, Pg. 171, Lns. 15-22.

⁵⁹ Hearing Tr. Vol. 2, Pg. 12, Lns. 12-19; Hearing Capital Star Ex. 13.

⁶⁰ Hearing Tr. Vol. 2, Pg. 14-18.

Oil and Gas Docket No. 01-0309061

Proposal for Decision

Page 16 of 64

by Capital Star. Mr. Garza asserted that well spacing decreased each year starting with the initial installation of the horizontal wells in the Eagle Ford Field to recent completions.⁶¹

- In 2014, XTO completed five Eagle Ford Field wells as infill wells, with 700-foot-between-well spacing proximal to Capital Star's Tom "A" GU3-1L Well and Tom "A" GU4-3L Well, completed in the Fashing Edwards Fields.⁶²
- In 2015, and 2016, XTO completed twelve Eagle Ford Field wells near Capital Star's Urbanczyk GU-2 5 Well and Schumann A-7 Well, completed in the Fashing Edwards Fields. Mr. Garza emphasized that XTO fracked the twelve wells April and May 2016, the same period that Capital Star well data in the Fashing Edwards Fields showed problems with well fluids. Capital Star started complaining to XTO about interference around that time.⁶³
- In 2017, XTO completed six wells between two areas previously developed near the Urbanczyk GU-1 2L Well, Urbanczyk GU-1 3L Well, and the Urbanczyk GU-2 3U Well, with between-well spacing about 300 feet apart.⁶⁴
- In 2018, XTO completed eight wells in the Eagle Ford Field surrounding the Schumann A-7 Well, with between-well spacing set at approximately 300 to 400 feet.⁶⁵

Capital Star presented a series of articles from industry journals that discussed FSTs.⁶⁶ Mr. Garza first referenced an article titled, *Oil and Gas Producers Find Frac Hits in Shale Wells a Major Challenge*, to define a frac hit based on common industry standards.⁶⁷ He read, "a frac hit is known as an inter-well communication between one well and another during a fracture stimulation job."⁶⁸

Mr. Garza testified that frac hits are not always bad. A frac hit between two wells establishes efficiency in draining a reservoir. If an operator is trying to recover oil efficiently, the objective is spacing wells far enough apart so the frac will connect both wells and efficiently drain the entire reservoir. The problem occurs when a FST for a well connects with other nearby legacy wells when there was not an intent to establish communication.⁶⁹ In this regard, he referenced another article titled, *Frac Hits Reveal:*

⁶¹ Hearing Tr. Vol. 2, Pg. 15, Lns. 11-20; Hearing Capital Star Ex.13.

⁶² Hearing Tr. Vol. 2, Pgs. 15-16; Hearing Capital Star Ex. 13.

⁶³ Hearing Tr. Vol. 2, Pg. 17, Lns. 5-18.

⁶⁴ Hearing Tr. Vol. 2, Pg. 17-

⁶⁵ Hearing Tr. Vol. 2, Pg. 36, Lns. 12-15; Hearing Tr. Vol. 3, Pg. 246, Lns. 1-16.

⁶⁶ Hearing Capital Star Ex. 5, 6, 7, 8, 9, 10 and 11.

⁶⁷ Hearing Capital Star Ex. 5, Journal of Petroleum Technology, *Oil and Gas Producers Find Frac Hits in Shale Wells a Major Challenge*, April 2017.

⁶⁸ *Id* and Hearing Tr. Vol. 1, Pg. 169, Lns. 4-8.

⁶⁹ Hearing Tr. Vol. 1, Pg. 174, Lns. 4-17.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 17 of 64

Well Spacing May be Too Tight, Completion Volumes Too Large.⁷⁰ Mr. Garza stated the article looks at options to prevent a frac hit, such as lower completion rates, lower completion volumes, orienting wells against conventional expectations (such as along natural planes of weakness in the rock structure), to minimize the effects of fracking from one distance to another (which is counter to trying to maximize recovery of the reserves).⁷¹

Mr. Garza argued that FST can initiate a well to well communication event that can create production losses or gains and on occasion cause mechanical damage when frac energy from a stimulated well extends to the drainage area or directly contacts an adjacent well or offset well. He testified that pressure increases have been detected in wells at distances ranging from hundreds to thousands of feet from the stimulated well.⁷² In support of his argument, Mr. Garza cited to a third article, titled *Frac Hit Induced Production Losses: Evaluating Root Causes, Damage Location, Possible Prevention Methods and Success of Remedial Treatments*.⁷³ He declared that communication has been observed between 2,500 to 4,000 feet and are common in the Haynesville Field and the Eagle Ford Field.⁷⁴

Mr. Garza asserted that natural fractures have a substantial effect on the connectivity between wells. He indicated that natural fractures are targeted to maximize connectivity and increase production since natural fractures have the best pressure connectivity potential. Therefore, higher rates of frac hits commonly are observed in the vicinity of natural fractures than otherwise would be expected. In support of his argument, Mr. Garza cited a fourth journal article, titled *Analysis of Horizontal Well Fracture Interactions, and Completion Steps for Reducing the Resulting Production Interference*.⁷⁵

Mr. Garza stated that infill drilling and tighter well spacing has improved the production on shale leases. He said that these practices have also intensified the number of frac hits observed in horizontal shale plays. To support his statement, he cited to *Pre-Loads: Successful Mitigation of Damaging Frac Hits in the Eagle Ford*.⁷⁶ Mr. Garza testified that this article talks about parent and child wells, with the parent well defined as the existing well and the new well defined as the child well. He indicated that the parent well had depleted pressure values or a pressure sink, typically observed in older wells.

⁷⁰ Hearing Tr. Vol. 1, Pg. 174; Hearing Capital Star Ex. 6, Journal of Petroleum Technology, *Frac Hits Reveal: Well Spacing May be Too Tight, Completion Volumes Too Large*, November 2017.

⁷¹ Hearing Tr. Vol. 1, Pg. 174, Lns. 14-25.

⁷² Hearing Tr. Vol. 1, Pg. 177, Lns. 9-18.

⁷³ Hearing Tr. Vol. 1, Pg. 176-177; Hearing Capital Star Ex. 7, Society of Petroleum Engineers, *Frac Hit Induced Production Losses: Evaluating Root Causes, Damage Location, Possible Prevention Methods and Success of Remedial Treatments*, SPE-187192-MS, 2017.

⁷⁴ Hearing Tr. Vol. 1, Pg. 177, Lns. 13-18.

⁷⁵ Hearing Tr. Vol. 1, Pg. 185-186; Hearing Capital Star Ex. 9, Society of Petroleum Engineers, *Analysis of Horizontal Well Fracture Interactions, and Completion Steps for Reducing the Resulting Production Interference*, SPE-191671-MS, 2018.

⁷⁶ Society of Petroleum Engineers, *Pre-Loads: Successful Mitigation of Damaging Frac Hits in the Eagle Ford*, SPE-1917812-MS.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 18 of 64

Mr. Garza asserted that the reservoir (referring to the Fashing Edwards Fields) has about 600 pounds of pressure, which is indicative of a pressure sink or depleted pressure condition. He explained the child well, located in a different reservoir in this case, is fracture stimulated and has a bottom hole pressure of 12,000 pounds. Mr. Garza stated that the high pressure always migrates to low pressure, therefore if you have a pressure depletion or pressure sink, the fracture tends to die off into the more depleted zone.⁷⁷

Mr. Garza declared that the Edwards Lime -A- Field reservoir is depleted to a pressure of about 560 pounds and located about 250 feet deeper than the Eagle Ford Field reservoir, which has a much higher pressure.⁷⁸ He explained that it is possible to grow the fracs downward instead of upward because of the low pressure being deeper than the higher pressure Eagle Ford Field reservoir.⁷⁹

Mr. Garza offered a study by Schlumberger which indicated that frac hits are common. He utilized *Far-Field Diversion Technology to Prevent Fracture Hits in Tightly Spaced Horizontal Wells*, in support of his testimony.⁸⁰ Mr. Garza read the following from this article:

An average distance to the nearest monitoring well [. . .] ranges from 360 feet all the way to 2,000 feet. The quick take away here is that in less than 400 feet of distance between the parent well and the children [well], two-thirds of those wells or 67 percent were frac hit. [T]he ones within 400 feet not only in this paper but in one of the earlier papers where they said less than 500 feet away you had to shut in wells.⁸¹

Mr. Garza stated that correspondence dated June 9, 1993, from the Texas Water Commission, required the interval from the land surface to a depth of 4,900 feet must be protected.⁸² Based on the a July 28, 1993 filed Commission Form titled *Application for Alternate Surface Casing Program*, under Rule 13(b)(2)(G) and accompanying letter from the Commission dated August 2, 1993, Mr. Garza testified that the Schumann A-7 Well met the rule requirements. Ultimately, the requirements were outlined in Commission Final Order No. 0202078, with the development of the Edwards Lime -A Field, with a 300-foot lease-line spacing exception to Statewide Rule 37 for the Schumann A-7 Well issued on November 15, 1993.⁸³

⁷⁷ Hearing Tr. Vol. 1, Pg. 188; Hearing Capital Star Ex. 10, Society of Petroleum Engineers, *Pre-Loads: Successful Mitigation of Damaging Frac Hits in the Eagle Ford*, SPE-1917812-MS, 2018.

⁷⁸ Hearing Tr. Vol. 1, Pg. 193.

⁷⁹ Hearing Tr. Vol. 1, Pgs.193-194.

⁸⁰ Society of Petroleum Engineers, *Far-Field Diversion Technology to Prevent Fracture Hits in Tightly Spaced Horizontal Wells*, SPE-191722-MS.

⁸¹ Hearing Tr. Vol. 1, Pg. 197, Lns. 9-14; Hearing Capital Star Ex. 11, Society of Petroleum Engineers, *Far-Field Diversion Technology to Prevent Fracture Hits in Tightly Spaced Horizontal Wells*, SPE-191722-MS, 2018.

⁸² Hearing Tr. Vol. 5, Pg. 11, Lns. 18-25.

⁸³ Hearing Tr. Vol. 5, Pg. 12 and 70; Hearing Capital Star Ex. 27.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 19 of 64

Mr. Garza presented evidence that the drilling and completion program for the Schumann A-7 Well followed a plan dated December 19, 1993. He indicated that the casing string design proposal included a proposed well schematic, cement casing specifications, and verification sampling program.⁸⁴ He asserted that a mud log was found for the Schumann A-7 Well and it identified the tops of the following formations: Austin Chalk at about 10,050 feet; Eagle Ford shale at about 10,225 feet; Buda Limestone at about 10,325 feet; Del Rio Clay at 10,400 feet; Georgetown Limestone at 10,425 feet; Edwards A Zone at 10,575 feet; and Edwards B Zone at 10,800 feet.⁸⁵ He stated the mud log identified drilling rates that showed relatively consistent rates from the Eagle Ford shale all the way through the Fashing Edwards Fields' Edwards Limestone Group (i.e., Edwards Lime -A- and -B- Fields), with a drilling rate change from 15 feet per hour in the Eagle Ford shale and Edwards Limestone Group and a rate reduction to 10 feet associated with the sandwiched formations such as the Buda Limestone, Georgetown Limestone and Del Rio Clay.⁸⁶

Mr. Garza testified about the Schumann A-7 wellbore schematic dated September 9, 2014, from the previous well owner, Momentum. The schematic is an as-built completion document that identifies the DV tool placement at 4,991 feet, surface string casing depth ending at 1,260 feet, production string having a diameter of 5 ½ inches at 11,000 feet along with details of packer assembly for the well.⁸⁷ Mr. Garza gave evidence about the Form G-1, *Gas Well Back Pressure Test, Completion or Recompletion Report, and Log*, for the Schumann A-7 Well dated February 4, 1994:

I've bolded a black box around the section, noting the nine-and-five-eighths inch casing [surface casing string] where they show cement to surface, and the five-and-a-half inch casing [production casing] where they show cement to 8,545, which is a thousand feet higher than what they had originally planned that was accepted. So that would put cement from the TD at 11,000 up to 8500 feet, [. . .] 2500 feet of cement.⁸⁸

Mr. Garza discussed samples collected from the Schumann A-7 Well on May 28, 2016. He indicated that one of the Schumann A-7 Well samples showed approximately 15 milligrams per liter (mg/l) of chloride and the other sample had chloride at 9 mg/l. He testified that the field gun barrel bottom sample, representing the field production, showed concentrations of chloride at 107,405 mg/l. The tank battery sample had chloride concentrations at 95,146 mg/l and 105,778 mg/l. He testified that this Schumann A-7 Well sample data does not indicate any communication with the Eagle Ford Field reservoir regarding the influx of water, but it is consistent with water that would be external

⁸⁴ Hearing Tr. Vol. 5, Pg. 14 and 15; Hearing Capital Star Ex. 28 and 29.

⁸⁵ Hearing Tr. Vol. 5, Pg. 18, Lns. 17-25.

⁸⁶ Hearing Tr. Vol. 5, Pg. 20; Hearing Capital Star Ex. 30.

⁸⁷ Hearing Tr. Vol. 5, Pg. 21; Hearing Capital Star Ex. 31.

⁸⁸ Hearing Tr. Vol. 5, Pg. 22, Lns. 7-16; Capital Star Ex. 32.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 20 of 64

to the downhole and would be from a fresh water source that was used for frac fluid or a foreign product that came from somewhere at or near the surface.⁸⁹

In summary, Mr. Garza reasoned that the chlorides are anomalous and from a foreign source not associated with the Fashing Edwards Fields' reservoirs.⁹⁰ In addition, Mr. Garza maintained that H₂S concentrations are in the depleted Fashing Edwards Fields formations, therefore it is not going to migrate to higher pressure zones such as the Eagle Ford Field reservoir.⁹¹

Mr. Garza stated that seeing the presence of iron sulfide at surface was not surprising. He indicated that in an old well you typically have the presence of sulfur and iron, which produces scale left in place for dozens of years. He argued it would not be a surprise if it came to the surface once or twice but would be a surprise if it just kept coming to the surface with foreign products originating from outside the well. Mr. Garza stated that the other telling factor that damage has occurred to the well is the type of fluid or liquid coming from the well. He reasoned that if the fluid appears to be inconsistent with the fluids associated with the well, then there is something changing the conditions of the well.⁹²

Mr. Garza claimed the supply of water is dependent on what is feeding it. He indicated that the behavior of this reservoir has been predominantly a completion drive system which has a 90 percent recovery efficiency. For an external source of water that is effective, it would need to be at least five to ten times the size of the aquifer.⁹³ Mr. Garza stated:

I don't know how to speculate whether it came from one location or another, but it's not deeper than 11,000 feet. If anything, [. . .] [I]t's basically a fresh kind of water. It's a foreign product that was introduced through the reservoir in my opinion.⁹⁴

Mr. Garza presented XTO's interpretation regarding the Fashing Edwards Fields wells watering out the Schumann A-7 Well. He argued that XTO's conclusion is not a correct interpretation based on production data. He utilized graphs associated with oil, gas and water production to present his argument that XTO's conclusion is faulty. He stated that there was a disproportionate decrease in water production as compared to a decrease in gas production over time, which equates to a 30 percent decline of water production and a 20 percent decline in gas production.⁹⁵ Mr. Garza described the water production by stating:

⁸⁹ Hearing Tr. Vol. 5, Pg. 25-26; Hearing Capital Star Ex. 33.

⁹⁰ Hearing Tr. Vol. 5, Pg. 93, Lns. 9-10.

⁹¹ Hearing Tr. Vol. 5, Pg. 162, Lns. 14-18.

⁹² Hearing Tr. Vol. 1, Pg. 190.

⁹³ Hearing Tr. Vol. 5, Pg. 88-89.

⁹⁴ Hearing Tr. Vol. 5, Pg. 157, Lns. 7-12.

⁹⁵ Hearing Tr. Vol. 5, Pg. 95-96.

[The trend] is flattening in the '80s or so, and then you'll see back on two different declines as you get past the '90s. The water has essentially fallen off. There is no indication at a high level that there's a water-out issue on these in aggregate. What happened was that that source of water didn't end up being as strong as they anticipated. And so, although they trapped some gas at that high pressure, pressure fell off and the water -- the water source was not as large as they originally anticipated, whatever that water source was.⁹⁶

Mr. Garza stated that 13 Fashing Edwards Fields wells operated by XTO, Capital Star, Wagner and Gulf Oil had frac hits from 2014 through September 2018. The impacted Fashing Edwards Fields wells were located from 75 feet to 1,500 feet away from the XTO well that was being fracked at the time and had decreased production, pressure spikes or pressure and fluid changes.⁹⁷

Mr. Garza concurred with XTO's contention that the vertical distance between the two reservoirs, using XTO's Type Log well as the primary argument of vertical distance between the two hydrocarbon reservoirs, is 250 feet.⁹⁸ Mr. Garza indicated that XTO and he agree that XTO's fracture height is about 145 feet with a frac length of about 800 to 900 feet.⁹⁹ He concluded, based on his evaluation of XTO's modeling, that 75 percent of the microseismic frac events were above the wellbore lateral (aka laterals) and the average microseismic frac height is 585 feet for the wells analyzed, with XTO establishing an average of 300 feet for the four wells modeled. Mr. Garza determined that the magnitude of the frac events increased near the toe of the horizontal wells, thus effecting off-set wells near the toe of the XTO wells, with the fracs migrating about 275 feet above the lateral of the horizontal wells and about 310 feet below the lateral of the wells.¹⁰⁰

Mr. Garza claimed that data from the four XTO wells, (Well Nos. 19H, 26H, 21H, 20H) associated with XTO's modeling simulation, demonstrated that about 60 percent of the microseismic frac events are growing below the laterals. Mr. Garza's interpretation is in direct contrast to XTO's interpretation, which concluded that 75 percent of the microseismic frac events traveled upward compared to about 25 percent (based on deduction) traveling downward.¹⁰¹ Mr. Garza argued that XTO's KOWR E Well 21 H well was being fracked at the same time the Schumann A-7 Well experienced flow to the surface in mid-August 2018.¹⁰² He concluded that the XTO's fracking operation at the 21 H Well impacted the Schumann A-7 Well, since the microseismic frac height has an average length of 300 feet or more, which is well within the 250 feet vertical separation between the Edwards Lime -A- Field and the Eagle Ford Field at a shallower elevation.

⁹⁶ Hearing Tr. Vol. 5, Pg. 25-40; Hearing Capital Star Ex. 34.

⁹⁷ Hearing Tr. Vol. 5, Pg. 40-43; Hearing Capital Star Ex. 35.

⁹⁸ Hearing Tr. Vol. 5, Pg. 43, Lns. 1-13; Hearing Capital Star Ex. 35.

⁹⁹ Hearing Tr. Vol. 5, Pg. 44, Lns. 1-4; Hearing Capital Star Ex. 35

¹⁰⁰ Hearing Tr. Vol. 5, Pg. 45; Hearing Capital Star Ex. 35.

¹⁰¹ Hearing Tr. Vol. 5, Pg. 46, Lns. 1-5.

¹⁰² Hearing Tr. Vol. 5, Pg. 185, Lns. 1-5.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 22 of 64

Mr. Garza concluded that the horizontal separation between the 21H Well and the Schumann A-7 Well is within the 300-foot distance of average seismic microseismic event as modeled by XTO.¹⁰³

Mr. Garza testified that FST would tend to propagate upward because reservoir pressure decreases going up. He concluded in this case it looks like there was downward propagation because of the depleted pressure in the Fashing Edwards Fields.¹⁰⁴ XTO provided completion data on seven wells with 314 fracs caused by FST. Mr. Garza indicated that XTO's maximum treating pressure for FST was about 9,500 pounds, resulting in bottom hole treating pressure at about 12,000 pounds as compared to 500 pounds in the depleted Fashing Edwards Fields reservoir. Therefore, the anticipated behavior of the frac operations is inconsistent with the normal expectations with the fractures growing upward.¹⁰⁵ Mr. Garza cited to a letter from Core Mineralogy, Inc. regarding sample testing from the Schumann A-7 Well, to support his interpretation. He read and testified:

In general, based on grain size, sorting uniformity of the grains, grain shape, grain gloss, and the very high percentage of quartz composition, the sands recovered from the blowout sample No. 123479 is most probably from a frac sand. [. . .] [The letter] goes on to say the water composition, the amount of sodium in the water is higher than the amount of chlorine, which is very uncommon as a natural water. They were just noting the quality of the water being an anomaly.¹⁰⁶

Mr. Garza presented an economic forecast for the Fashing Edwards Fields production using XTO, Capital Star and Wagner wells. Utilizing graphs, he testified that overall recoverable gross reserves in the Fashing Edwards Fields are 23.6 billion cubic feet ("bcf") of gas and 2.38 million barrels (MMbbl) of oil. He speculated that the projections indicate that within the next 10 years, about half the volume of gas will be recovered, but viable production is projected beyond 2070 based on production graphs, at which point the current economic limit of about 20 Mcf per day, is reached.¹⁰⁷

Mr. Garza concluded that about 50 stages or frac events are noted for each well that XTO completed. He indicated that these stages typically included changes in proppant volumes, additives and volumes, and pressures to maximize effectiveness.¹⁰⁸ Mr. Garza testified that approximately 400,000 pounds of proppant in each fracked stage was utilized, with approximately 18 million pounds of proppant used for each of XTO's well completions. He asserted that the average treating pressure was 8,400 pounds with a maximum treating pressure of 9,500 pounds. Mr. Garza estimated that the bottom hole

¹⁰³ Hearing Capital Star Ex. 35.

¹⁰⁴ Hearing Tr. Vol. 5, Pg. 48, Lns. 1-10.

¹⁰⁵ Hearing Tr. Vol. 5, Pg. 48-49.

¹⁰⁶ Hearing Tr. Vol. 5, Pg. 51. Lns. 10-20; Hearing Capital Star Ex. 35.

¹⁰⁷ Hearing Tr. Vol. 5, Pg. 55-58; Hearing Capital Star Ex. 36.

¹⁰⁸ Hearing Tr. Vol. 2, Pg. 19, Lns. 8-22; Hearing Capital Star Ex. 13.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 23 of 64

pressure would be about 12,000 pounds, certainly above the Eagle Ford Field's reservoir pressure of about 6,000 pounds and above the Fashing Edwards Fields reservoir pressure of 600 pounds.¹⁰⁹ Mr. Garza summarized the fracking as:

What you'll see in total is that this program was significant, consistent, and nothing out of the ordinary. [. . .] I didn't see anything that seemed unusual for the Eagle Ford. It seemed to be industry standard averages for Halliburton, for Schlumberger, for those type of completion companies.¹¹⁰

Mr. Garza studied XTO's FST design and concluded that after completing a number of wells in the Eagle Ford Field reservoir the XTO design is for an ideal scenario.¹¹¹ He testified that in his opinion, XTO's fracking design is to "frac upward because of the less overburdened stress above you than it is below you, assuming everything is the same pressure, not assuming that something is 10 percent of the pressure it was years ago" as in the Fashing Edwards Fields after years of oil and gas recovery.¹¹² Mr. Garza believes that XTO predicted frac heights of 1,000 feet using simulation, but, as he concluded, the data indicates that the microseismic fractures are only 810 feet. Therefore, XTO was planning to hit other wells, specifically other Eagle Ford Field wells when it fractured its wells. Mr. Garza contends that XTO's well data indicates that the actual frac heights are about twice what was estimated in simulations, which predicted fracking would occur from the bottom part of the lower Eagle Ford Field into the base of the Buda Limestone (below the Eagle Ford shale) and to the top of the upper Eagle Ford reservoir into the Austin Chalk which caps the Eagle Ford shale.¹¹³

Mr. Garza stated that 200-plus wells have been completed in the Eagle Ford Field and Fashing Edwards Fields reservoirs.¹¹⁴ He estimated that data establishes the average Eagle Ford Field well at 10,151 feet TVD and the average Edwards Lime -A-Field top perforation is 10,401 feet TVD, an approximately 250-foot difference due to the thickness of the Buda Limestone, Del Rio Clay and Georgetown Limestone separating the Eagle Ford Field from the Fashing Edwards Fields reservoirs.¹¹⁵ Mr. Garza confirmed through testimony that the majority of the Eagle Ford Field wells are about 300 to 400 feet apart, but noted that several Eagle Ford Field wells are much closure which may be problematic to wells not owned or operated by XTO.¹¹⁶

Mr. Garza alleged that XTO evaluated the horizontal Eagle Ford Field FST program and its effect on offset vertical Fashing Edwards Fields wells both operated by XTO and other operators and established a presentation document of his findings.¹¹⁷ He

¹⁰⁹ Hearing Tr. Vol. 2, Pg. 21-22.

¹¹⁰ Hearing Tr. Vol. 2, Pg. 23, Lns. 13-23; Hearing Capital Star Ex. 13.

¹¹¹ Hearing Tr. Vol. 2, Pg. 29, Lns. 1-11; Hearing Capital Star Ex. 14.

¹¹² Hearing Tr. Vol. 2, Pg. 28-29; Hearing Capital Star Ex. 14.

¹¹³ Hearing Tr. Vol. 2, Pg. 28-29; Hearing Capital Star Ex. 14.

¹¹⁴ Hearing Tr. Vol. 2, Pg. 30, Lns. 6-10; Hearing Capital Star Ex. 15.

¹¹⁵ Hearing Tr. Vol. 2, Pg. 30; Hearing Capital Star Ex. 12, 15 and 16.

¹¹⁶ Hearing Tr. Vol. 2, Pg. 36; Hearing Capital Star Ex. 15 and 16.

¹¹⁷ Hearing Tr. Vol. 2, Pg. 90, Lns. 10-16; Hearing Capital Star Ex. 17.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 24 of 64

testified that Capital Star owns about 47 percent of the wells in the geographical area evaluated by XTO for frac hits.¹¹⁸ Mr. Garza maintained that XTO's data establishes a low declining gas rate for most of the wells' production in the Fashing Edwards Fields. He concluded that a significant decrease of gas production correlates to FST near the time period where the change of production occurred, and the data substantiates the results of fracking on vertical wells in the Fashing Edwards Fields. Mr. Garza speculated the frac hits have significantly altered production associated with affected vertical wells.¹¹⁹ He presented evidence that documented that XTO filed a total of 47 drilling permits with the Commission in areas proximal to the Capital Star wells, with 32 of those permits issued since the August 16, 2018.¹²⁰ Mr. Garza stated:

This kind of analysis tells me that they're at least mindful, and should be, of what impact they have on other wellbores, their own and others. It's evident by the fact that they didn't just look at their own wells -- vertical wells. They looked at other offset operating vertical wells. It appears from the notation that they were clearly looking for that type of disruption. Was the impact of one program causing effect to other bystander wellbores?¹²¹

Capital Star introduced mineralogical data from Core Mineralogy, Inc. associated with samples from the Schumann A-7 Well, with a report dated September 19, 2018.¹²² The samples identified primarily drill cuttings, with some quartz sands which are thought to potentially be frac sands.¹²³ The primary component of the samples were crystalline limestones and other calcareous shales. The sands are relatively pure quartz, about 99 percent, with trace amounts of feldspar.¹²⁴ The quartz grains appear to be uniformly sorted. The mineralogical data indicates the sample is probably from a frac sand.¹²⁵

Mr. Garza testified that a release from the Schumann A-7 Well occurred during the second day of the hearing on the merits for the present case, on December 4, 2018, which caused a four-month adjournment with the hearing reconvening on April 8, 10 and May 16, 2019. The release from the Schumann A-7 Well was caused by failure of a valve under pressure at about 2,650 psig.¹²⁶ Mr. Garza indicated that the gate valve was not designed to handle the pressure, therefore the release occurred after conditions changed, probably due to a failure of a bridge in the tubing or wellhead which caused debris, such as sand, etc. obstructing the path to be free and impacting the psig gauge near the wellhead of the Schumann A-7 Well.¹²⁷ He stated that the failed valve was replaced with

¹¹⁸ Hearing Tr. Vol. 2, Pg. 96, Lns. 8-11; Hearing Capital Star Ex. 17.

¹¹⁹ Hearing Tr. Vol. 2, Pg. 93-97; Hearing Capital Star Ex.17.

¹²⁰ Hearing Capital Star Ex. 24.

¹²¹ Hearing Tr. Vol. 2, Pg. 103-104; Hearing Capital Star Ex. 17.

¹²² Hearing Tr. Vol. 2, Pg. 117-126; Capital Star Ex. 20.

¹²³ Hearing Tr. Vol. 2, Pg. 122, Lns. 8-13; Capital Star Ex.20.

¹²⁴ Hearing Tr. Vol. 2, Pg. 123, Lns. 3-23; Capital Star Ex.20.

¹²⁵ Hearing Tr. Vol. 2, Pg. 123, Lns.17-18; Capital Star Ex.20.

¹²⁶ Hearing Capital Star Ex. 23.

¹²⁷ Hearing Tr. Vol. 3, Pg. 25 and Pgs.107-109.

Oil and Gas Docket No. 01-0309061
 Proposal for Decision
 Page 25 of 64

a gate valve that can manage 5,000 psig.¹²⁸ Evidence indicated prior to the release on December 4, 2018, the pressure went from zero on December 2, 2018 to 2,650 psig on December 4, 2018. Evidence showed that on December 5 and 14, 2018, and March 2019, the casing pressure was 100 psig; 118 psig; and 120 psig; with tubing pressure changing from 2,650 psig; to 2,700 psig ;and 1,950 psig; respectively.¹²⁹ Mr. Garza stated:

A sudden burst of product not only to downhole but to surface is different. The energy of this reservoir [primarily the Edwards Lime -A- Field] in the Fields [inclusive of all three reservoirs] isn't sufficient enough to blow solids all the way to surface; 500 pounds to 700 pounds bottom hole pressure isn't sufficient enough to pack the tree full of solids, which is evident by the pressure we saw two times over on the same well, the Schumann A-7.¹³⁰

Mr. Garza stated he did not know the exact migration pathway the foreign material traveled from the XTO Well to the Schumann A-7 Well, but it was unlikely the frac hit migrated through three intervening zones (i.e., Buda Limestone, Del Rio Clay and Georgetown Limestone) to reach the Edwards Lime -A- Field reservoir.¹³¹ He indicated, it is true that the Schumann A-7 Well has no cement bond log that could be found during the asset transfer, but decades of no pressure communication between the tubing and casing support the Well's working history.¹³² Mr. Garza acknowledged that he does not know about the production casing regarding all Capital Star wells, but the Schumann A-7 Well has cement to a point, but not 100 percent coverage and does not include cement across the Eagle Ford Field's wellbore segment as it penetrates and terminates into the Edwards Lime -A- Field.¹³³

Mr. Garza testified he was unaware of any Capital Star data showing the other Capital Star wells (other than the Schumann A-7) took a frac hit from XTO's wells.¹³⁴

XTO Energy, Incorporated's Case as Presented at Hearing

XTO argued the Commission has consciously decided not to regulate fracture stimulation treatments. Instead, choosing a policy to further innovation. Citing to the Texas Supreme Court's *Garza* case, XTO reasoned it is clear the Commission could adopt rules for fracture stimulation treatment and could require permitting but has chosen not to adopt fracture stimulation treatment rules, a policy that has proven successful considering the transformation of the energy industry since *Garza* was decided.¹³⁵

¹²⁸ Hearing Tr. Vol. 3, Pg. 13, Lns. 11-15.

¹²⁹ Hearing Tr. Vol. 3, Pg. 16, Lns. 1-15; Hearing Capital Star Ex. 23.

¹³⁰ Hearing Tr. Vol. 3, Pg. 51-52.

¹³¹ Hearing Tr. Vol. 3, Pg. 89, Lns. 5-19.

¹³² Hearing Tr. Vol. 3, Pg. 89-90.

¹³³ Hearing Tr. Vol. 3, Pg. 105-106.

¹³⁴ Hearing Tr. Vol. 3, Pg. 91, Lns. 11-21.

¹³⁵ Hearing Tr. Vol. 1, Pg. 15, Lns. 7-22 citing to *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1 (Tex. 2008) where the Texas Supreme Court declined to create a new common law cause of action,

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 26 of 64

XTO pointed out that none of the existing rules are a good fit for fracture stimulation treatment issues. XTO advanced the proposition that Capital Star's entire case is predicated upon Capital Star's desire to enhance its ability to collect civil damages from XTO in a courthouse.¹³⁶ Again, citing to *Garza*, XTO argued that the Supreme Court stated, when it declined to create a new cause of action, that someone who is damaged by a fracture stimulation treatment already has a remedy, to file a lawsuit for damages to property.¹³⁷

XTO provided an outline of its communications with Capital Star regarding Capital Star's well issues. Capital Star noted well problems starting in April 2016 and communicated that to XTO. During subsequent communications, Capital Star alleged that analytical data showed frac materials present in its wells, which it attributed to XTO fracking operations. XTO disagreed with the laboratory analytical data interpretation by Capital Star. XTO determined the claim by Capital Star was not credible. Historically, XTO has drilled as close as 50 feet to its own Fashing Edwards Fields wells with no impact whatsoever.¹³⁸ In April 2018, counsel for Capital Star communicated with XTO and indicated that the Schumann A-7 Well had "weird behavior" after XTO drilled a horizontal well near the Capital Star well. XTO's surface location for their E-21H Well was drilled about 250 feet away from the Schumann A-7 Well, but fracking was performed over 10,300 feet away from the Schumann A-7 Well, thus XTO believed any issues with the Schumann A-7 Well was not caused by XTO's fracking operations. In August 2018, Capital Star placed FESCO gauges (i.e., real-time pressure gauges) on the Schumann A-4, Schuman A-5 and Schumann A-7 wells to have record and monitoring data available during XTO fracking operations. On August 16, 2018, XTO was fracking a stage in the E-21H, about 250 feet away from Capital Star's Schumann A-7 Well, and the FESCO gauge indicated that approximately 5,000 pounds of pressure was observed. XTO does not dispute that there was communication from the fracture operation in that one stage, Stage 8, but does not concede, as Capital Star contends, that every issue with the Capital Star's wells was caused by XTO fracking operations in the vicinity.¹³⁹

Testimony of Mr. Krumrey, XTO's Production Foreman

Mr. Frances Glenn Krumrey, Production Foreman for XTO, testified that XTO operates Fashing Edwards Fields wells in the vicinity of the Capital Star complaint

"trespass by fracture," giving great weight to the fact that neither the legislature nor the Commission have chosen to regulate fracture stimulations, "It [the Commission] could do administratively what other states (notably not Texas) have done legislatively and require operators to obtain a permit before fracking a well. But it has not done so, and this restraint, far from showing the absences of public policy, demonstrates the Commission pursues its legislative charge in a manner that facilitates technological innovation."

¹³⁶ Hearing Tr. Vol. 1, Pg. 16-17.

¹³⁷ Hearing Tr. Vol. 1, Pg. 17-18.

¹³⁸ Hearing Tr. Vol. 1, Pg. 20, Lns. 17-25; Vol.1, Pg. 21, Lns. 1-25.

¹³⁹ Hearing Tr. Vol. 1, Pg. 21-22.

Oil and Gas Docket No. 01-0309061
 Proposal for Decision
 Page 27 of 64

wells.¹⁴⁰ He stated that a “black gooey material” was observed in the Capital Star’s Urbanczyk 2-5 Well. He indicated that the black gooey material is a mix of H₂S and paraffin, a common occurrence.¹⁴¹ In addition, Mr. Krumrey reasoned that the black-looking water in Capital Star’s Exhibit 2 is iron sulfide in a mud-like solution with maybe a greasy appearance caused by paraffin.¹⁴² He attested that you observe mud-like black solution in open hole completions when you have sulfur and H₂S and gas, which the Urbanczyk 2-5 Well is an open hole completion with these components.¹⁴³ Mr. Krumrey gave testimony that XTO worked with Capital Star to run gyro surveys on the well for anti-collision purposes, which required greasing valves to ensure it was operational. Mr. Krumrey stated that the 5,500 pounds of pressure on the well is indicative of a sand bridge in the well. In order to get the well operational or prepare for plugging, the well would require washing the sand out and cleaning the wellbore and cost about 20 thousand dollars per day of equipment mobilization over two or three days or up to 80 thousand dollars of total expenditure.¹⁴⁴ He explained that XTO did not know that it’s Eagle Ford Field FST activities were potentially adversely affecting the Capital Star Schumann A-7 Well, completed in the Edwards Lime -A- Field, until after the FST on August 16, 2018.¹⁴⁵ Mr. Krumrey stated:

[. . .] [W]e’ve never seen any indication that I know of, not the last [. . .] eight years.¹⁴⁶

Mr. Krumrey explained that XTO has fracked its own wells in the Fashing Edwards Fields, referring to the Laskowski No. 1 Well and observed pressure spikes in its Kellner No. 2 Well.¹⁴⁷ He indicated that the Kellner No. 2 Well had about 3,200 to 3,600 pounds of pressure, which is unusual for a Fashing Edwards Fields well.

Testimony of Mr. Winston, XTO’s Land Manager

William Travis Winston, a land manger with XTO, stated that XTO has interest in the area along with Capital Star, Imperial Oil of California and Protégé of Tulsa Oklahoma. He confirmed that there is joint ownership of many of the wells within the area. XTO and Capital Star jointly own wells in the vicinity of the complaint wells, in particular on the Hurt Lease.¹⁴⁸

¹⁴⁰ Hearing Tr. Vol. 1, Pg. 96, Lns. 1-25.

¹⁴¹ Hearing Tr. Vol. 1, Pg. 98, Lns. 16-25; Hearing Capital Star Ex. 2.

¹⁴² Hearing Tr. Vol. 1, Pg. 100, Lns. 1-16.

¹⁴³ Hearing Tr. Vol. 1, Pg. 100, Lns. 16-20; Vol.1, Pg. 101. Lns. 1-14.

¹⁴⁴ Hearing Tr. Vol. 1, Pg. 105-107.

¹⁴⁵ Hearing Tr. Vol. 1, Pg. 109, 110.

¹⁴⁶ Hearing Tr. Vol. 1, Pg. 112, Lns. 1-4.

¹⁴⁷ Hearing Tr. Vol. 1, Pg. 116, Lns. 1-20; Pg. 122, Lns. 24-25; Pg. 123, Lns 1-9.

¹⁴⁸ Hearing Tr. Vol. 3, Pg. 120-121.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 28 of 64

Testimony of Ms. Anderson, XTO's Regional Geologist

Heather Anderson, regional geologist for XTO, indicated that the Fashing Edwards Fields were discovered around 1956 by Lone Star Producing.¹⁴⁹ She testified that a 1962 publication indicates that the Fashing Edwards Fields has H₂S concentrations over 2,000 parts per million ("ppm").¹⁵⁰ In addition, the lease area has a geologic fault expressed in the Eagle Ford Field reservoir as a normal fault located about 3,000 feet to the north of the Schumann A-7 Well. The fault's northern side is down-thrown with an offset about 700 feet in relationship to its south side, with the Edwards Limestone Group formation consisting of the Edwards Lime -A- and -B- Fields truncated across the displacement of the fault.¹⁵¹ Ms. Anderson affirmed that the seven complaint wells are completed in the Fashing Edwards Fields and parallel the known fault. She also confirmed that the Schumann A-7 is the furthest away from the fault of the seven complaint wells. A cross-section presented as evidence and discussed by Ms. Anderson at the hearing indicated that the fault is located in a structural high with six of the seven complaint wells located on the highest structure in the Edwards Limestone Group formation (Edwards Lime -A- and -B-), with the Schumann A-7 Well located down-dip to the fault on the flank of the structural high.¹⁵² She explained, according to XTO's internal study, wells located up dip and by definition in proximity to the fault, did show behavior of earlier water increase and higher water cut.¹⁵³ Ms. Anderson stated that it is the conclusion of literature in the record and previous operators and XTO's reservoir engineers that there was communication that ran across the fault.¹⁵⁴

A 1971 publication from Lone Star Producing titled, "*Fashing Field – Leaky Fault Threatens Giant*", indicates that the fault is leaky and water travels up the fault from the Edwards Limestone Group (i.e., Edwards Lime -A- and -B- Fields) and may cause water influx at the peak of the structure.¹⁵⁵ Ms. Anderson testified the publication's characterization of water migration is consistent with what XTO has observed in their wells in the Fashing Edwards Fields.¹⁵⁶ She indicated that the leaking from the fault could still be occurring.¹⁵⁷ To support her testimony, she referenced a Bureau of Economic Geology publication dated 1998, indicating the Edwards Lime -A- and -B- have dolomitized mudstone on the upthrown sides of the Edwards Limestone Group formation segment of the fault which was probably caused by fluids migrating through the fault and depositing the dolomitized mudstone.¹⁵⁸

¹⁴⁹ Hearing Tr. Vol. 3, Pg. 127, Lns. 1-8.

¹⁵⁰ Hearing XTO Ex. 5, *Fashing Field – Atascosa-Karnes Counties, Texas*, Lone Star Producing Company, 1962.

¹⁵¹ Hearing Tr. Vol. 3, Pg. 126, Lns. 1-9.

¹⁵² Hearing Tr. Vol. 3, Pg. 129.

¹⁵³ Hearing Tr. Vol. 5, Pg. 196-197.

¹⁵⁴ Hearing Tr. Vol. 5, Pg. 197, Lns. 1-12.

¹⁵⁵ Hearing Tr. Vol. 3, Pg. 156, Lns. 1-14; Hearing XTO Ex. 6, *Fashing Field – Leaky Fault Threatens Giant*, by Lone Star Producing, Petroleum Engineer Publishing Company, January 1971.

¹⁵⁶ Hearing Tr. Vol. 3, Pg. 156, Lns. 1-14; Hearing XTO Ex. 7.

¹⁵⁷ Hearing Tr. Vol. 3, Pg. 160, Lns. 1-5.

¹⁵⁸ Hearing XTO Ex. 8.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 29 of 64

Ms. Anderson summarized that publications indicate the original gas-water contact was essentially fault-controlled such that the fault sets up a conventional reservoir with gas accumulated against the fault structure.¹⁵⁹ She explained that the fault is a trapping mechanism for all three Fields and their formations: the Fashing Edwards Fields, aka the Edwards Lime -A- and -B- Fields composed of the Edwards Limestone Group formation and the Eagle Ford Field composed of the Eagleford shale. She stated:

There must be a source. There must be a trap. There must be a seal. And so, the trap for the Edwards conventional field [the Fashing Edwards Fields] is gonna be set up by your fault, fluids will migrate and stop in that -- you know where that fault lies. But then also it's sealed by the Georgetown [Limestone], Del Rio [Clay] and Buda [Limestone]. I believe the fault seals on a geologic time scale such that over millions of years, the fault seals. But then on a production time scale, you're affecting that reservoir. You're dropping pressure, you're getting fluid movement. And so, then that can affect the conductivity of the fault such that on a production time scale that fault becomes leaky, if you will, and so then you get water fluid movement across that fault.¹⁶⁰

Ms. Anderson testified regarding the relationship of the Eagle Ford Field and Fashing Edwards Fields reservoirs, with the top of the Upper Eagle Ford Field reservoir being about 10,298 feet deep (measured depth, "MD") and the top of the Edwards Lime -A- Field reservoir at about 10,679 feet MD, with the Buda Limestone, Del Rio Clay and Georgetown Limestone formations sandwiched between the two Fields and their reservoirs.¹⁶¹ Ms. Anderson contends that the vertical distance between the base of the Lower Eagle Ford Field's reservoir and the top of the Edwards Lime -A- Field's reservoir is about 250 feet, with the Upper and Lower Eagle Ford shale formations being about 132 feet thick and the Edwards Lime -A- being about 227 feet thick.¹⁶² She indicated that the approximately 250 feet thick zone between the Eagle Ford shale formation and the top of the Edwards Limestone Group are competent formations and a fracture could not propagate through the bottom of the Eagle Ford shale formation through the Buda Limestone, Del Rio Clay and Georgetown Limestone formations and make it to the Edwards Limestone Group (i.e., the Edwards Lime -A- and -B- Fields).¹⁶³ Ms. Anderson stated:

[W]e've looked at the different reservoir properties within the log, we discussed the reservoir properties and even drilling rates that Nico [Mr. Garza] presented in an exhibit today. These represent rocks below the Eagle Ford shale, again Buda [Limestone], Del Rio [Clay], Georgetown

¹⁵⁹ Hearing Tr. Vol. 3, Pg. 130, Lns. 1-12.

¹⁶⁰ Hearing Tr. Vol. 3, Pg. 160-161.

¹⁶¹ Hearing Tr. Vol. 3, Pg. 126, Lns. 17-21.

¹⁶² Hearing Tr. Vol. 3, Pg. 126, Lns. 9-25.

¹⁶³ Hearing Tr. Vol. 3, Pg. 159, Lns. 1-18; Vol. 5, Pg. 188, Lns. 13-25.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 30 of 64

[Limestone] and Edwards Limestone are, again, from a reservoir standpoint, these are competent limestone rocks, more limestone -- true limestones rather than a marl, which is kind of a muddy carbonate [marly rock, mudstone and carbonate¹⁶⁴], which is what the Eagle Ford shale represents. The reservoir properties again are such that they're more-dense. They have less porosity also. And so again they're gonna be stronger, more competent rocks. Also, you have -- because they are deeper, you therefore, by definition, have greater overburden as you go deeper. And so again that will -- again, they will be cohesive, they will be competent strong rocks and act as barriers and discontinuities to FST energy.¹⁶⁵

Ms. Anderson was asked what keeps the fractures from going down if the rock is competent in both places, regarding above and below the Eagle Ford Field.¹⁶⁶ She stated:

Pressure is not lower in the Buda [Limestone] and it must travel through the Buda [Limestone]. Pressure is not lower in the Del Rio [Clay], and it must travel through the Del Rio [Clay]. Pressure is not lower in the Georgetown [Limestone], and it must travel through the Georgetown [Limestone]. [. . .] I've not said that the fractures don't go deeper. I believe that I said the fractures would not propagate through the underlying formation. Again because of reservoir properties, pressures, overburden. [. . .] We target approximately 45 feet, [. . .] off of the Eagle Ford shale formation boundary there -- contact. And so, if the fracture does travel down some amount, you are still within the Eagle Ford shale formation. And again, as a fracture propagates, it will lose energy as well and again the reservoir properties are different within the Buda [Limestone]. So, you can expect different behavior.¹⁶⁷

Ms. Anderson was asked by the Technical Examiner about violating a rule. She responded that XTO did not violate a rule by not isolating the frac. She stated that XTO is a prudent operator and takes appropriate measures to ensure and maintain well bores and safe operations and environmentally conscious way. Ms. Anderson concluded in her testimony that it was the Schumann A-7 Well's integrity that caused the well to be impacted by the Eagle Ford Field reservoir FST.¹⁶⁸

Testimony of Mr. Uzzell, XTO's Drilling Engineer

Mr. Matt Uzzell, drilling engineer for XTO, testified about the well design to protect fresh waters based on a June 15, 2012 determination from the Groundwater Advisory

¹⁶⁴ Hearing Tr. Vol. 5, Pg. 192, Lns. 20-22.

¹⁶⁵ Hearing Tr. Vol. 5, Pg. 188-189.

¹⁶⁶ Hearing Tr. Vol. 5, Pg. 196, Lns. 8-9.

¹⁶⁷ Hearing Tr. Vol. 5, Pg. 193-196.

¹⁶⁸ Hearing Tr. Vol. 5, Pg. 197-199.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 31 of 64

Unit. He gave evidence that the determination by the Groundwater Advisory Unit established the usable-quality groundwater from the surface to a depth of 450 feet and from 4,000 to 4,900 feet. He indicated that the determination established the base of useable-quality groundwater (BUQW) at 4,900 feet.¹⁶⁹ He confirmed that these protection intervals are considered in the well design by XTO. Mr. Uzzell explained that XTO wells on the E and F Pads have surface casing to about 5,450 feet to protect the Carrizo Aquifer at 4,000 to 4,900 feet.¹⁷⁰ He stated that the production casing overlaps the surface casing by about 500 feet and extends all the way to the Eagle Ford shale formation at about 10,600 feet TVD with all the production intervals isolated in this design.¹⁷¹ Mr. Uzzell testified that all the XTO wells in the area have a similar design with minimal differences, but are protective of the Carrizo and isolate the production interval.

Mr. Uzzell indicated that XTO completed wells on the B, C, D and A Pads, in that sequential order, with the closest XTO well to the Schumann A-7, being the XTO E 21H Well on the E-Pad at about 250 feet away.¹⁷²

Testimony of Dr. Choi, PhD, XTO's Operational Engineer

Nancy Choi, PhD, an operational engineer for XTO, was the engineer during the installation of the XTO wells on the B through D Pads completed in 2016.¹⁷³ She verified that Capital Star contacted her by e-mail on May 2, 2016 and informed her that XTO's Eagle Ford Field FSTs were adversely affecting Capital Star's wells in the Fashing Edwards Fields.¹⁷⁴ Capital Star provided XTO with a sample from the Urbanczyk 2-5 Well which was potentially adversely impacted by the FST. Dr. Choi stated that XTO conducted testing on the Urbanczyk 2-5 Well sample and concluded that it was not FST sand, but formation sand. On May 24, 2016, Capital Star e-mailed XTO with a list of five wells that were potentially damaged and adversely affected by fracking. The list identified four Urbanczyk wells clustered together and an outlier, the Schumann A-7 Well located east of the Urbanczyk wells.¹⁷⁵ Again, XTO determined the impacts to the Capital Star wells not related to FST because the Urbanczyk 2-5 Well analyses showed the material sampled in the well was not FST sand.¹⁷⁶ Dr. Choi noted that the timing was coincidental with the FST schedule of the XTO wells on the C and D Pads located proximal to the Capital Star wells that were performed in April and May 2016, but she maintains that the Urbanczyk 2-5 well data did not show any impacts to the Capital Star wells.¹⁷⁷

Dr. Choi confirmed that 12 XTO wells have been fracked in the area with approximately 40 stages per well being completed on each horizontal well. She indicated

¹⁶⁹ Hearing XTO Ex. 9.

¹⁷⁰ Hearing Tr. Vol. 4, Pg. 13-14.

¹⁷¹ Hearing XTO Ex. 10.

¹⁷² Hearing Tr. Vol. 4, Pg. 13, Lns. 13-22.

¹⁷³ Hearing Tr. Vol. 4, Pg. 41, Lns. 4-7.

¹⁷⁴ Hearing Tr. Vol. 4, Pg. 21, Lns. 1-19.

¹⁷⁵ Hearing Tr. Vol. 4, Pg. 23.

¹⁷⁶ Hearing Tr. Vol. 4, Pg. 22, Lns. 1-14.

¹⁷⁷ Hearing Tr. Vol. 4, Pg. 23-24.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 32 of 64

that the fracking operations produced a lot of data. She concluded that no rate or pressure change anomalies were observed with the data results from the post-fracking reports for the B, C and D Pad wells.¹⁷⁸ On July 25, 2016, Dr. Choi consulted with Microseismic, Inc., who conducted a frac height study for the Edwards Lime -A- Field fracked wells and determine fracture heights to be an average of 300 feet long with 75 percent of the fracs located above the Buda Limestone formation.¹⁷⁹ The simulation testing also noted frac length on average 810 feet long. Simulation modeling indicated frac heights were from 100 to 160 feet in length in the upper Eagle Ford shale formation to the bottom of the lower Eagle Ford shale formation. Simulation modeling conducted on the Emma Tartt wells (19H, 26H, 21H and 20H) suggested that the fracs were expected to penetrate less than 10 feet into the Buda Limestone formation.¹⁸⁰ Results of the simulation modeling indicated that the fracs were not expected to penetrate into the Edwards Lime -A- Field formation located about 289 feet below the Eagle Ford shale formation.¹⁸¹ The modeling indicated the stresses in the Buda Limestone formation are much higher than the lower Eagle Ford shale formation. The results would be that the fracs would not grow downward. Dr. Choi reasoned that she would not anticipate that a fracture could be propagated from the Eagle Ford shale formation and go downward through the base of the Eagle Ford, Buda Limestone, Del Rio Clay, Georgetown Limestone and into the Edwards Limestone Group (Fashing Edwards Fields consisting of the Edwards Lime -A- and -B- Fields).¹⁸² She stated:

In general, from all the frac runs and things that I've seen, it tends to grow upward. But there could be some cases, depending on the stress, that the frac could grow down. But in overall in most of the things that I've seen in previous studies, I've seen fracs tend to grow upward.¹⁸³ The stresses, because of the rock weight, the stresses as you go up tend to have less stress and fracs tend to grow where there's less stress.¹⁸⁴

Dr. Choi explained that there is a lot of uncertainty with microseismic fracture technology. She stated industry does not have a consensus in what the vents actually mean.¹⁸⁵ She indicated that the industry knows that its uncertain, but industry still uses it to get a guide, an indication of where the fracs may be.¹⁸⁶ She testified:

One thing I would like to say is, as an industry as a whole, there's a lot of uncertainty with what microseismic is. [. . .] [T]his morning I did a quick search on OnePetro, [. . .] I typed in microseismic and uncertainty, and there were 1697 papers talking about the uncertainty of microseismic. I talked

¹⁷⁸ Hearing Tr. Vol. 4, Pg. 26-27.

¹⁷⁹ Hearing Tr. Vol. 5, Pg. 168, Lns. 7-18.

¹⁸⁰ Hearing Tr. Vol. 5, Pg. 168, Lns. 19-24.

¹⁸¹ Hearing Tr. Vol. 4, Pg. 28; Hearing XTO Ex. 11.

¹⁸² Hearing Tr. Vol. 4, Pg. 30, Lns. 20-25; Hearing XTO Ex. 11.

¹⁸³ Hearing Tr. Vol. 4, Pg. 29, Lns. 9-14; Hearing XTO Ex. 11.

¹⁸⁴ Hearing Tr. Vol. 4, Pg. 29, Lns.19-21.

¹⁸⁵ Hearing Tr. Vol. 5, Pg. 186-187.

¹⁸⁶ Hearing Tr. Vol. 5, Pg. 172-173.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 33 of 64

with an expert in our company, a geophysics manager, and was asking him about this event cloud that we see, and he was very hesitant to say microseismic is equal to fracture propagation, but he was -- he did say that one company [. . .] would take about 60 percent of the cloud that's seen in the microseismic and use that to sort of infer what the fracture may be. So, you don't take all of the points. You take -- that company took about 60 percent of where the cloud is.¹⁸⁷

Dr. Choi further addressed uncertainty of the microseismic with the following supporting testimony:

[A] paper that's titled, *Impact of Microseismic Location Uncertainties on Interpreted Fracture Geometry* [. . .] written by Schlumberger. And this entire paper talks about how there's a lot of uncertainty in the microseismic. And so, what they did was a thought experiment or [. . .] a modeling experiment. [. . .] And what they found was they would see a cloud, even because of the uncertainties in the measurements, where the sensors are, that even if they have a perfect experiment with one line, what they would observe is a cloud. [. . .] Its conclusions, [. . .] Conclusion No. 1 - The locations of spatial extremities of the microseismic data sets are typically related to statistical outliers and controlled by the location uncertainties. So, if it's outside of the main cloud, there's a lot of uncertainties with what the events are saying. [Also], Conclusion No. 3 - Even for simple fracture geometries, location uncertainties will result in a relatively wide microseismic cloud that could potentially be misinterpreted as complex fractures.¹⁸⁸

Testimony of Mr. Acord, XTO's Structural Engineer

Mr. Acord, a structural engineer at XTO, stated that on April 15, 2018, FSTs were completed on a horizontal well identified as the A 8H Well, located from 7,000 (toe) to 11,000 feet (heel) from the Schumann A-7 Well. Capital Star notified XTO in April 2018 that the Schumann A-7 was affected by the FST of the A 8H Well.¹⁸⁹ Mr. Acord stated that it is common to see pressure communication from one Eagle Ford Field well to another, typically either water communication or pressure communication directly. The impact is increased water production or a pressure response. Mr. Acord stated that often a boost in production will occur because of the increased energy that is generated by the FST.¹⁹⁰ Mr. Acord summarized that several wells in the Eagle Ford Field reservoir were either fracked or had offset FST pressure responses and displayed a temporary increase in production.¹⁹¹

¹⁸⁷ Hearing Tr. Vol. 5, Pg. 169, Lns. 8-24.

¹⁸⁸ Hearing Tr. Vol. 5, Pg. 170-171.

¹⁸⁹ Hearing Tr. Vol. 4, Pg. 45, Lns. 1-4; Vol. 4, Pg. 48, Lns.15-18.

¹⁹⁰ Hearing Tr. Vol. 4, Pg. 50.

¹⁹¹ Hearing XTO Ex. 12.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 34 of 64

Mr. Acord testified that Capital Star notified XTO about a release associated with the Schumann A-7 Well at about 5:30 p.m. on August 16, 2018. He indicated that the Schumann A-7 wellhead was tagged and locked out by Mr. Jeremy Hans, an employee of XTO, on August 17, 2018. XTO was responding to notification by Capital Star that they were responsible for the release due to FST, therefore out of caution XTO tagged the Schumann A-7 Well on August 17, 2018, until details regarding the release from the well could be assessed by XTO and Capital Star to determine the cause of the release.¹⁹²

Mr. Acord testified that the bottom hole pressure in the Fashing Edwards Fields reservoir is less than a 1,000 psi because the oil reservoir is mature compared to 6,000 psi in the Eagle Ford Field which is a relatively new field. Therefore the direction of liquid flow would be to the lower pressure.¹⁹³ He also indicated that the H₂S concentration in the Fashing Edwards Fields is about 20,000 ppm compared to a concentration range of 50-200 ppm in the Eagle Ford Field.¹⁹⁴ He noted that a review of the well testing data from October 2018 for the E-21 H Well and E-22 H Well did not show any pressure or H₂S anomalies which would be expected if communication was occurring between the Edwards Lime -A- Field and the Eagle Ford Field reservoirs.¹⁹⁵ He stated that up until the August 2018 event on the Schumann A-7, he was unaware of any XTO Eagle Ford Field FST affecting a vertical Fashing Edwards Field well, but is aware that XTO FST may have communicated the Schumann A-7 Well.¹⁹⁶ He concluded that the Fashing Edwards Fields well was affected by the FST through the wellbore such as collapsed casing or cement compromise or backchanneling. He also attested that H₂S has not migration from one reservoir to another. Mr. Acord concluded that the Schumann A-7 well bore was affected within the Eagle Ford shale formation itself.¹⁹⁷

Mr. Acord stated that XTO has a vertical well identified as the Kellner No. 2 Well completed in the Fashing Edwards Fields and a vertical well identified as the Laskowski No. 1 completed in the Austin Chalk, both having 3,000 psi or more on the wellhead. Mr. Acord reasoned that it is very likelihood that these wells have been adversely impacted by XTO FST in the Eagle Ford Field reservoir.¹⁹⁸ In addition, Mr. Acord indicated that two Wagner Wells, the Wagner No. 4 and 5, have also been impacted by XTO's FST.

Mr. Acord noted that the lessons learned from the adversely impacted wells is to move the perforations during the completion operations so fracturing across the wellbores do not directing impinge and effect another operator's well if it's within a certain distance.¹⁹⁹ Mr. Acord suggested that frac communications or frac hits in the same zone have been going on for years. He indicated that operators conducting FST in a particular zone usually establish a frac watch list for all operators in a zone that might be impacted.

¹⁹² Hearing Tr. Vol. 4, Pg. 57-60; Hearing XTO Ex. 15.

¹⁹³ Hearing Tr. Vol. 4, Pg. 62-63.

¹⁹⁴ Hearing Tr. Vol. 4, Pg. 65, Lns. 1-17.

¹⁹⁵ Hearing Tr. Vol. 4, Pg. 67-68.

¹⁹⁶ Hearing Tr. Vol. 4, Pg. 61-62.

¹⁹⁷ Hearing Tr. Vol. 4, Pg. 76-77.

¹⁹⁸ Hearing Tr. Vol. 4, Pg. 70.

¹⁹⁹ Hearing Tr. Vol. 4, Pg. 74, Lns. 20-25.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 35 of 64

Mr. Acord maintains that XTO tries to do the same. He concluded that the industry has been dealing with these issues up without regulating it.²⁰⁰

Testimony of Ms. Freeling, XTO's Senior Reservoir Engineer

Ms. Tracy Freeling, reservoir engineer for XTO, testified that prior to the May 2016 e-mail from Capital Star, she was unaware of any adverse impact on any Fashing Edwards Fields wells from an Eagle Ford Field FST.²⁰¹ She stated that the Urbanczyk 2-5 Well was not affected by XTO FST based on sampling data which is consistent with Dr. Choi's statement.²⁰²

Ms. Freeling performed an assessment of XTO operated wells in the Fashing Edwards Fields. She assessed the time period for possible frac communication between wells from 2010 to late-June 2018.²⁰³ Her initial assessment concentrated on the Tart Lease area starting in late-2010 to 2014; and a subsequent assessment looked at XTO wells installed in the Eagle Ford Field in 2016, generally being installed in the Eagle Ford Field from east to west across the lease area. She stated that the 2016 data assessment started with Pad B wells (most easterly) and progressed to XTO wells on the Pad C and Pad D. Her results of the 2016 frac communication assessment concluded that no effects of fracking were observed from production data associated with XTO wells installed, completed and fracked on Pad B, Pad C, Pad D and Pad A (most westerly) through June 2016, but the data was inconclusive for the Urbanczyk GU 2 No. 5 Well located close to the D Pad;²⁰⁴ and the Schumann A-3 Well located close to Pad E.²⁰⁵ She also concluded that the Wagner GU No. 4 Well, located close to Pad E, shows a potential impact from fracking by a XTO Eagle Ford Field well, but certainty was not ensured based on data.²⁰⁶ Moving into 2018 data, Ms. Freeling assessed Pad C and Pad D wells and did not determined any impacts to any of the wells in the three reservoirs (i.e., Fashing Edwards Fields or Eagle Ford Field) from XTO's wells installed in the Eagle Ford Field. She did note that the 2018 data clearly had some sort of impact on the Schumann A-7 Well located near Pad E, but it was not evident or observed in the 2016 data set.²⁰⁷

Testimony of Mr. Ely, XTO Consulting Engineer

John Ely, representing XTO as an engineering consultant, stated that his company is the largest frac consulting company. The company was started 28 years ago doing oversight and QC, and developed into a design, implementation and optimization company. Mr. Ely was designated as an expert in fracture simulation.²⁰⁸

²⁰⁰ Hearing Tr. Vol. 4, Pg. 75, Lns. 1-25.

²⁰¹ Hearing Tr. Vol. 4, Pg. 83-84.

²⁰² Hearing Tr. Vol. 4, Pg. 84-85.

²⁰³ Hearing Tr. Vol. 4, Pg. 93-95.

²⁰⁴ Hearing Tr. Vol. 4, Pg. 135, Lns. 9-12.

²⁰⁵ Hearing Tr. Vol. 4, Pg. 136, Lns. 1-10; Vol.4, Pg. 138, Lns. 1-10.

²⁰⁶ Hearing Tr. Vol. 4, Pg. 141, Lns. 17-24; Vol. 4, Pg. 145, Lns. 1-21.

²⁰⁷ Hearing Tr. Vol. 4, Pg. 136-148.

²⁰⁸ Hearing Tr. Vol. 4, Pg. 156-159.

Mr. Ely testified that FST typically migrate upward based on his experience.²⁰⁹ He stated that he could not conceive that FST would migrate through the three formations between the Eagle Ford Field and Edwards Lime -A- Field to affect a number of Fashing Edwards Fields wells.²¹⁰ Mr. Ely concluded that based on his experience, the Schumann A-7 was impacted by direct communication which means:

“[W]e had a fairly wide fracture in the Eagle Ford [Field]. We communicated to open pipe, and with no cement we went downward into the Edwards [Limestone Group] Formation. [. . .] And we came right straight up the tubing because there was nothing there. And we've shown evidence of that in later testimony, I think. [. . .] [T]hat is the only way you could have got that kind of pressure that quickly, it had to be direct communication. I can't think of anything else that makes any sense with the evidence that we have of the surface pressure gauge and what occurred at the surface.²¹¹

Mr. Ely indicated that he looked at post-op frac reports for all the XTO wells and found an anomaly in Stage 8 of the XTO Well E 21H.²¹² He concluded that when the rate (i.e., Volume) goes up and the pressure goes down, you have found an easy path.²¹³ He attested that XTO is pumping the frac at 9,000 pounds and the Schumann A-7 Well has about 10,000 pounds up the tubing which translated to about 5,000 pounds at the surface. He stated that when the pressure is the same in the fracked well as at the secondary location well, you don't have any restrictions between them, therefore it probably is direct communication.²¹⁴ If it went through a fault to communicate with the secondary well, you have narrowing path. This opened something wide open, which indicates direct communication.²¹⁵ Mr. Ely stated:

It must be direct communication”.²¹⁶ [. . .] It is common that Eagle Ford Field wells have direct communication with each other, it has been happening for years, maybe about 13 years.²¹⁷ The industry is working hard to protect wells.²¹⁸

²⁰⁹ Hearing Tr. Vol. 4, Pg. 159, Lns. 8-15.

²¹⁰ Hearing Tr. Vol. 4, Pg. 160, Lns. 12-21.

²¹¹ Hearing Tr. Vol. 4, Pg. 161-162.

²¹² Hearing Tr. Vol. 4, Pg. 164, Lns. 13-22.

²¹³ Hearing Tr. Vol. 4, Pg. 171.

²¹⁴ Hearing Tr. Vol. 4, Pg. 176, Lns. 5-11.

²¹⁵ Hearing Tr. Vol. 4, Pg. 176.

²¹⁶ Hearing Tr. Vol. 4, Pg. 172, Lns. 18-25.

²¹⁷ Hearing Tr. Vol. 4, Pg. 173.

²¹⁸ Hearing Tr. Vol. 4, Pg. 174.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 37 of 64

Testimony of Mr. Johnston, XTO Consulting Engineer

Mr. Rick Johnston, consulting engineer for XTO, testified that an e-mail dated August 6, 2018, from Lazaro Rodriquez, Jr., identifies that XTO will be fracking several wells (E21H, E22H, E23H, E24H and 5H) in close proximity to the Capital Star wells, Schumann A-4, A-5 and A-7. The e-mail was submitted by XTO to document that Capital Star knew about the fracking of XTO wells.²¹⁹ Mr. Johnston claimed that Capital Star was aware that XTO was going to be fracking the E-21 H XTO Well, the closest well to the Schumann A-7 Well.²²⁰

Mr. Johnston indicated that Capital Star provided a liquid sample, identified as sample no. 11411, that was collected from the Schumann No. 3 Well on May 14, 2016. Mr. Johnston affirmed that XTO hired Core Mineralogy out of Lafayette, Louisiana, the same lab that analyzed the Capital Star's samples. Mr. Johnston stated:

[T]he purposes of the analysis was to characterize the organic material of the emulsion in the interphase and give an opinion as to what the cause of the emulsion in the interphase was. [T]hey say that it's an emulsified layer containing a surfactant, possibly polyethylene glycol stearate, and showed a very high match with soap stick commonly used in producing wells. It then goes on and says, based on the published data in the public domain, polyethylene glycol and polyethylene oxide are common additives used in frac fluid.²²¹

Mr. Johnston testified that he believes the oil-water interface in sample no. 11411 is related to an accumulation of iron sulfide in the wells, which produce H₂S.²²² He claimed that at the time of the sample collection on May 14, 2016, the well that was sampled was located some distance away from the XTO well that was fracked. Mr. Johnston concluded that the analysis indicates a surfactant, which is a component of a soap stick, which was used in the Capital Star Schumann well. He stated:

So, I think there's a reasonable conclusion that perhaps this emulsion in what they analyzed is a result of the soap sticks that were put in the well. Soap sticks are used to help try to lift the liquids out of low volume, low pressure gas wells.²²³

Mr. Johnston referenced five samples in his testimony that were collected from the Schumann A-7 Well in April 2016, showing varying degrees of sediment and color differences. He introduced the Core Mineralogy analyses for the Schumann A-7 Well with the laboratory's conclusions. Mr. Johnston reasoned the differences of color

²¹⁹ Hearing XTO Ex. 25.

²²⁰ Hearing Tr. Vol. 4, Pg. 180, Lns. 4-9.

²²¹ Hearing Tr. Vol. 4, Pg. 182.

²²² Hearing Tr. Vol. 4, Pg. 186, Lns. 1-15; Hearing XTO Ex. 27.

²²³ Hearing Tr. Vol. 4, Pg. 183, Lns. 19-23.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 38 of 64

associated with the five samples were caused by iron sulfide in the samples, with black solids being mineral variations of iron sulfide that is produced by an H₂S reaction and have nothing to do with FST.²²⁴ Mr. Johnston noted that this is supported by technical papers that recognize that corrosion of pipe is a problem caused by carbon dioxide and H₂S.²²⁵ He suggested the corrosion is surface corrosion which will react with the walls of the tubing causing thinning over a period of time. He maintained that turbulence from fracking may cause flow which will knock the iron sulfide scales from the wall of the tubing and result in samples with different variations in color like we have in this case.²²⁶ Mr. Johnston asserted that the iron sulfide supports a direct connection in the Eagle Ford Field to the Schumann A-7 wellbore. Mr. Johnston indicated that the communication with the fracked well was in the Eagle Ford Field because the pressure traveled down the backside of the casing to the perforations in the Fashing Edwards Fields reservoir, and then up the tubing where the pressure was measured at 5,044 psi at the well head.²²⁷ He attested that he agrees and support Mr. Ely's testimony about a direct communication route.²²⁸ Mr. Johnston stated:

We believe that the frac job -- the fracture network from the stimulation in the E 21 H on Stage 8, as it grew laterally in the Eagle Ford [Field], it finally got to the point where it got to the hole that was drilled for the Schumann A-7, due to inadequate cement job, hydraulic seal, the frac job went down the area between the casing and the hole, down to the perforated interval in those perforations up to the surface. And then it went over and blew the fluid sampler apart on the surface, and that's where it flowed to the surface.²²⁹

Mr. Johnston indicated that the threaded pipe is not rated to 5,000 pounds, so that's why it failed right there.²³⁰

Mr. Johnston stated that the blowout alleged by Capital Star to have occurred on the Schumann A-7 was not a blowout:

That's an unreasonable characterization to call that a blowout. A blowout is when your flow control equipment fails. They were able to go close the master valve and stop the flow. That is not a blowout. It's a mischaracterization to say that it is.²³¹

Mr. Johnston gave testimony about a scope of work proposal dated May 2006 that was developed for the Urbanczyk 2-5 Well. He stated:

²²⁴ Hearing Tr. Vol. 4, Pg. 190; Hearing XTO Ex. 29.

²²⁵ Hearing XTO Ex. 30.

²²⁶ Hearing Tr. Vol. 4, Pg. 193-194.

²²⁷ Hearing Tr. Vol. 4, Pg. 195.

²²⁸ Hearing Tr. Vol. 4, Pg. 195, Lns. 11-20.

²²⁹ Hearing Tr. Vol. 4, Pg. 196, Lns. 3-13.

²³⁰ Hearing Tr. Vol. 4, Pg. 198.

²³¹ Hearing Tr. Vol. 4, Pg. 196.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 39 of 64

[F]irst few sentences read the Urbanczyk 2-5 ST is a single well originally drilled in 1994 and completed as a dual in the Edwards -A- and -B- [Edwards Lime -A- and -B- Fields]. In 1995, sustained flow became difficult, presumably from water production/poor primary cement job and subsequently the well was sidetracked in 1997. Post side-track, a four-and-a-half-inch perforated liner was cemented in place adjacent to the Edwards -A- [Edwards Lime -A- Field]. The well was acidized in 1997 and had an initial rate of 600 Mcf a day. And they go on to say that the well has not again been treated with acid, and current production is 135 a day. So, this is an AFE (proposal) to go in and acidize the well. I guess what I'm really focused on is the idea that they recognized that they had a poor cement job in this well.²³²

Mr. Johnston stated it is common in this field for wells that drill into the Fashing Edwards Fields to have problems getting a good cement job because of the natural porosity and fracturing in the Edwards Limestone Group which often prevents a good cement job.²³³ He alleged that the Urbanczyk 2-5, which has been identified by Capital Star as one of the wells affected by fracking, may have a poor primary cement job similar to the Schumann A-7 Well's cement job. Mr. Johnston maintained that the poor cement job may have resulted in the well potentially being affected by nearby FST.²³⁴ He argued that the distinction is wells that have a poor cement job, or problems with their cement jobs, are not compliant with Statewide Rule 13. He further summarized his position in the following statement below:

They're saying the top of the cement is at 10,660, and the well is perforated with a top perforation of 10750. So that means the top of the cement is below the base of the Eagle Ford [Field]. It's probably gonna be down somewhere in the Georgetown [Limestone]. You're only gonna have about a -- 90 feet of cement on top of your perforations. [. . .] Now I will also say that they went in and they squeezed at 10,604. They did a couple of other squeezes. But the potential is still there that this is a conduit. At the time of well installation in 2006, I don't believe that the previous versions [of Rule 13] required a hundred-foot of cement by CBL [cement bond log]. [. . .] The current rule clearly does, and it's always been the rule of thumb at the Commission. But they finally put it into the rule [Rule 13] -- I think it was in 2014.²³⁵

Mr. Johnston obtained a copy of the Urbanczyk 2-5 cement bond log dated April 1994. The top of the cement on the bond log is at 10,660 feet. He testified that you have

²³² Hearing Tr. Vol. 4, Pg. 202 and 203; Hearing XTO Ex. 33.

²³³ Hearing Tr. Vol. 4, Pg. 211, Lns. 1-5; Hearing XTO Ex. 35.

²³⁴ Hearing Tr. Vol. 4, Pg. 203, Lns. 8-13.

²³⁵ Hearing Tr. Vol. 4, Pg. 205-206.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 40 of 64

small stringers of cement that have greater than 90 percent bond, but you don't have nice thick intervals of good hydraulic seal.²³⁶ He stated:

If you page up the hole to a depth of about 10,200 [. . .] the top of the Buda [Limestone] is gonna be at a depth of, oh, about 10,245. So that's gonna be the base of the Eagle Ford [Field]. You can see from that point down the hole you have some good bond index between 10,550 and 10,600, but it's not a good cement job, and potentially will be a pathway for communications.²³⁷

Mr. Johnston also testified about the Urbanczyk Well 2-3 and the Urbanczyk 1-3 Well, which are two complaint wells. He stated that the Urbanczyk Well 2-3 and the Urbanczyk 1-3 Well had a cement squeeze job performed above and below the Edwards A and B Zones to protect the Carrizo's freshwater sand. He advanced that the reason for a cement squeeze is when cement is needed.²³⁸ Mr. Johnston indicated that below the DV tool depth in most of the Fashing Edwards Fields wells, bare steel is in the well down to the production casing, which is located above the Edwards Limestone formation.²³⁹ Therefore, Mr. Johnston argued the scenario is that frac energy comes to a bare pipe hanging in the hole at the Eagle Ford Field reservoir depth and travels the path of least resistance which is downward outside of the casing to the perforations into the well tubing an up to the surface.²⁴⁰ He insisted that the majority of Fashing Edwards Fields wells in proximity to the Eagle Ford Field horizontal wells will not result in impacts because they have adequate cement.²⁴¹

In addition to the cement issues with the Urbanczyk 2-3 Well, Mr. Johnston maintained that a completion summary report dated September 4, 1980 for the Urbanczyk 2-3 Well, established the Edwards A Zone (i.e., upper zone or U) with 3,748 psi and the Edwards B Zone (i.e., lower zone or L) with 2,842 psi, compared to current pressures in the Edwards A Zone at about 700 psi.²⁴² He concluded that with low pressure and low volume observed in a well, it can cause unforeseen problems to arise that results in production to dramatically drop off, as documented in a March 23, 2001 work procedure memo that observed an abrupt change from 600 Mcf of gas to 60 Mcf a day in September 2000. Mr. Johnston stated this production issue predates any Eagle Ford Field well fracks.²⁴³

Mr. Johnston also testified in the hearing about the Urbanczyk Well 3-U, Urbanczyk Well 1-3 and Urbanczyk Well 1-2L. He discussed in his testimony about a weekly report dated April 16, 1992, for the Urbanczyk Well 3-U and two activity reports dated March 18,

²³⁶ Hearing Tr. Vol. 4, Pg. 208, Lns. 14-25.

²³⁷ Hearing Tr. Vol. 4, Pg. 209-210; Hearing XTO Ex. 34.

²³⁸ Hearing Tr. Vol. 4, Pg. 215-220; Hearing XTO Ex. 39 and 40.

²³⁹ Hearing Tr. Vol. 4, Pg. 222, Lns. 16-25.

²⁴⁰ Hearing Tr. Vol. 4, Pg. 222, Lns. 1-7.

²⁴¹ Hearing Tr. Vol. 4, Pg. 229, Lns. 1-13.

²⁴² Hearing Tr. Vol. 4, Pg. 211-212; Hearing XTO Ex. 35.

²⁴³ Hearing Tr. Vol. 4, Pg. 221; Hearing XTO Ex. 41.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 41 of 64

2005 and April 15, 1992, for the Urbanczyk Well 1-3 and Urbanczyk Well 1-2L, respectively. He indicated that all the reports describe a sample that was collected from their respective wells that identify a dark substance as iron oxide in the three different wells discussed in the reports. He noted that the reports identify the same kind of dark soft rubbery material that Capital Star is alleging is associated with frac fluids. In response to Capital Star's allegation that the black substance is caused by fracking fluids being introduced in the well bore, Mr. Johnston argued that fracking was not occurring in 1992 or 2005, and maintained that the black substance is iron oxide, which has been occurring within these wellbores for years.²⁴⁴ He insisted that the soft black rubbery material in the bottom of the Fashing Edwards Fields wells are just normal production operations of a reservoir that has 20 to 30,000 parts per million H₂S with non-stainless steel pipe without corrosion inhibition which is supported by the April 2016 Core Mineralogy analysis.²⁴⁵

Mr. Johnston closed out his testimony by indicating that XTO did not violate Statewide Rule 7, 10, 13 and 36, based on evidence we have right now.²⁴⁶

- He stated that Statewide Rule 7 requires the confinement of fluids to their normal zone of origin and XTO has not violated that rule. He has concluded that XTO put frac fluid into the Schumann A-7 Well, but it is not formation fluid. He stated that if the Schumann A-7 Well had competent cement above the Edwards Limestone Group formation the frac fluids would not have migrated to the perforations of the Edwards Lime -A- Field well and traveled to the surface through the well bore.²⁴⁷
- Mr. Johnston maintains that XTO did not violate Statewide Rule 10, which prohibits commingled well production of separate fields without a Commission exception. He stated that XTO's operational engineer, Mr. Acord, testified that the H₂S from the production of XTO's E 21H Well, has never been observed in the Fashing Edwards Fields E-Pad wells.²⁴⁸
- Mr. Johnston indicated that the way that the Capital Star wells are completed, it doesn't appear that XTO has violated Statewide Rule 13. He maintains that the drilling engineer (Mr. Uzzell) for XTO testified about XTO's well casing and cement and contends that the XTO wells are cased and cemented in a manner such that all useable-quality water zones are isolated, all productive intervals are isolated and all flow or corrosive zones are isolated. Therefore, Mr. Johnston maintains that XTO has met the Statewide Rule 13 requirements, which has been expanded in recent years.²⁴⁹

²⁴⁴ Hearing Tr. Vol. 4, Pg. 213-215; Hearing XTO Exs. 36, 37 and 38.

²⁴⁵ Hearing Tr. Vol. 4, Pg. 223, Lns. 1-11.

²⁴⁶ Hearing Tr. Vol. 4, Pg. 228.

²⁴⁷ Hearing Tr. Vol. 4, Pg. 225, Lns. 1-9.

²⁴⁸ Hearing Tr. Vol. 4, Pg. 226.

²⁴⁹ Hearing Tr. Vol. 4, Pg. 225-226.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 42 of 64

- Mr. Johnston testified that XTO has not violated Statewide Rule 36, which is the H₂S rule. Again, he contends that the XTO E 21H Well that frac-hit the Schumann A-7 Well indicates zero H₂S concentrations based on the reports. Mr. Johnston contends the rule is not triggered until you have production with H₂S in excess of a hundred parts per million, and XTO has not experienced that concentration.²⁵⁰

Capital Star's Asserted Violations of Statewide Rules

Capital Star did not specifically argue any alleged violations of statewide rules by XTO during the hearing. Capital Star chose instead to argue these violations for the first time in its written closing. Below is a summary of those arguments.

Statewide Rule 7

Capital Star argues that XTO has violated Statewide Rule 7 by not confining fluids to the original strata by designing its fractures to exceed the thickness of the Eagle Ford formation, by a factor of two or more.²⁵¹ Capital Star submits that the Eagle Ford is 150 feet thick, the XTO's fracture stimulations being performed are at heights between 250 and 500 feet, as depicted in XTO's Exhibit No. 44 and further detailed in XTO's Exhibit No. 37, Pg. 6.²⁵² In support, Capital Star offers for consideration the following from the cross examination of Dr. Choi, XTO's Operations Engineer:

- Q: Could you tell me please ma'am, what is the thickness of the Eagle Ford here, upper and lower...roughly.
- A: 137 feet.
- Q: Go back to XTO Exhibit 44, page 12, what does it say?
- A: [Reading out loud] Fracture heights range from 150 to 500 feet with an average height of 300 feet.
- Q: All right. It appears to me that an average fracture height of 300 feet, left alone 500 feet far exceeds the thickness of the Eagle Ford, both upper and lower am I mistaken?
- A: No, you're not mistaken.
- Q: So this report indicates that you're fracturing outside the Eagle Ford?
- A: From the microseismic analysis, from this company's analysis, yes.
- Q: Okay. And does your modeling, which is represented by your Exhibit 46 on its last page, you have a fracture height of 283 feet?
- A: Uh-huh-yes.
- Q: Does that exceed the thickness of the upper and lower Eagle Ford.
- A: Yes.
- Q: Does it substantially exceed it?
- A: Yes.²⁵³

²⁵⁰ *Id.*

²⁵¹ Closing Statement of Capital Star, Pg. 18.

²⁵² *Id.* at Pg. 17.

²⁵³ Closing Statement of Capital Star, Pg. 17-18, citing to Hearing Tr. Vol. 5, Pg. 181.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 43 of 64

Capital Star submits XTO is in violation of Statewide Rule 7 and XTO's conduct is forcing surrounding wells out of compliance with the Rule, by frac invasion.²⁵⁴

Statewide Rule 10

Capital Star alleges XTO, through its fracking operations, is forcing operators in the Fashing Edwards Fields out of compliance with Statewide Rule 10 by placing the Eagle Ford stratum (i.e. shale) in pressure communication with the Edwards stratum (i.e. limestone).²⁵⁵ Capital Star believes XTO has "placed the two strata in a position of cross-flow, in violation of the rule."²⁵⁶ Capital Star argued:

This pressure communication is not simply momentary, during the frac jobs. Instead, for reasons and by paths of uncertain nature, the Edwards strata [sic Edwards Limestone Group] is in places being repressurized, with Edwards wells seeing continued pressures much higher than the normal field operating pressure.²⁵⁷

Capital Star cites to its Schumann A-7 Well, XTO's Kellner 2 Well, and Wagner's Wagner 4 and 5 Wells, as examples where high pressures have endured for months.²⁵⁸ Capital Star points to the hearing to show that XTO has acknowledged the violation:

- Q: Paradoxically, if Capital Star were to open the Schumann A-7 and produce both Eagle Ford oil and Edwards gas would that constitute commingled production of two separate fields?
- A: Yes.²⁵⁹

Capital Star admits that the "exact cause of the pressure migration from Eagle Ford to the Edwards is not known."²⁶⁰ XTO suggests that perhaps the cause lies in the cementing, given the fact that the Capital Star wells are older and "the casing standards in the 1950s and 1960s were less rigorous than they are today, and there is now a recognized problem concerning poor cement jobs in the Edwards."²⁶¹ Capital Star argues XTO is borrowing trouble in its drill and fracture stimulating of new horizontal wells so close to old wellbores creating forced Statewide Rule 10 violations in surrounding Edwards wells.²⁶²

²⁵⁴ Closing Statement of Capital Star, Pg. 18.

²⁵⁵ *Id.*

²⁵⁶ *Id.*

²⁵⁷ *Id.*

²⁵⁸ *Id.*

²⁵⁹ *Id.*

²⁶⁰ *Id.*

²⁶¹ *Id.*

²⁶² *Id.*

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 44 of 64

Statewide Rule 13

Capital Star argues that XTO is in violation of Statewide Rule 13 as XTO has “proven unable to prevent the migration of fluids from the Eagle Ford stratum field to the Edwards stratum field.”²⁶³ Based on this argument, Capital Star requests:

Designation of a “potential flow zone” as the surface area above all proration units for the Edwards field and within a ¼ mile radius of the outermost of these, from the top of the Austin Chalk to the base of the Edwards formation, with provision that no Eagle Ford wells above the zone be fracture stimulated until all of the Edwards wells are plugged.²⁶⁴

There was repeated discussion during the hearing about the fault bounding the north side of the field, (i.e., referring to the Edwards Limestone Group which makes up the Fashing Edwards Fields) which XTO believes is not sealing. Capital Star admits the geology of the field is somewhat complex. Citing to Ms. Heather Anderson, XTO’s Regional Geologist, Capital Star quotes Ms. Anderson’s testimony as she described XTO’s Exhibit No. 3, “so you can see that on the north side of the fault we have the Eagle Ford juxtaposed, the Edwards -A- on the upthrown side of the fault, which would be the south side of the fault.”²⁶⁵ As proof of XTO’s violation, Capital Star again offers the testimony of Ms. Anderson, in which she stated the fault may be leaking.²⁶⁶

Next, in support of its argument, Capital Star points to the testimony of its own witness, Mr. Garza, a professional engineer, who testified about the fault and the natural fracturing in the Edwards fields:

The complexity there is if you have natural fractures that exist, which they do for a fault that exists, if you’re taking that pathway of least resistance, then it has a higher ability to sustain transmissibility...if that’s the pathway its takes, then you’re going to have a more likely chance of having sustained pressure.²⁶⁷

You’re looking at an area that’s complex and has a lot – not necessarily geologically complex but structurally complex with wellbores.²⁶⁸

In further support of its position, Capital Star references XTO’s Exhibit No. 44, an internal company analysis dated January 15, 2013, which states:

²⁶³ *Id.* at Pg. 20.

²⁶⁴ *Id.*

²⁶⁵ Closing Statement of Capital Star, Pg. 19, citing to Hearing Tr. Vol. 3, Pg. 136, referencing Hearing XTO Ex. No. 3.

²⁶⁶ *Id.* at Pg. 19, citing to Hearing Tr. Vol. 3, Pg. 160.

²⁶⁷ *Id.* at Pg. 19, citing to Hearing Tr. Vol. 2, Pg. 87.

²⁶⁸ *Id.* at Pg. 19, citing to Hearing Tr. Vol. 2, Pg. 103.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 45 of 64

The NE-SW microseismicity trends and the large fracture lengths for many stages indicate possible reactivation of an existing fault and finds average fracture length of 810 feet, although some are quite a bit longer. [...] There are indications that the pre-existing faults and fractures are being reactivated during the frac treatment.²⁶⁹

Capital Star argues this proves:

The strata between the Austin Chalk and the Edwards are not really “competent” rock, as described by Ms. Anderson, but rather a previously compromised stratigraphic package, which is being compromised again, by XTO.²⁷⁰

Capital Star offers “that due to the natural fractures, XTO considers it has historically been difficult to get a good cement job across the Edwards formation.”²⁷¹ Citing to XTO’s witness, Ms. Freeling, Capital Star submits that XTO knows it is difficult to get a good cement job in the Edwards based on records obtained from a predecessor operator and.²⁷² Further, Capital Star points to XTO’s witness Mr. Johnson, who stated, “It’s common in this field for wells that drill into the Edwards to have problems getting a good cement job. The reason for this is the natural fracturing and porosity in the Edwards prevents you from being able to get a good cement job.”²⁷³ Next, Capital Star cites to Mr. Johnson’s testimony regarding XTO Exhibit No. 5, a paper on the Fashing Field, quoting, Mr. Johnson:

Well, Class H cement to meet the fluid loss and compressive strength requirements of current Rule 13 in gonna have a weight on the order of 13 to 15 pounds per gallon in excess of the 11 pounds that this paper talks about. So it kind of makes sense why people are having trouble with their primary cement jobs if 11-pound mud is adequate to cause lost circulation.²⁷⁴

Capital Star contends that if XTO’s witnesses (Freeling and Johnson) are correct about the difficulty of getting good cement jobs in the Edwards, then XTO’s development of the Eagle Ford with horizontal wells at such close proximity to older vertical wells has been imprudent. Capital Star again references the age of the vertical Edwards wells, wells with completions standards below those of today:

That this practice by XTO, continuing even after receiving notice of problems from Capital Star, is not only unwise, but negligent, and a breach of the “good engineering practices” called for in Statewide Rule 13. XTO is

²⁶⁹ *Id.* at Pg. 19, citing to Hearing XTO Ex. No. 44.

²⁷⁰ *Id.* at Pg. 19.

²⁷¹ *Id.* at Pg. 20.

²⁷² *Id.* at Pg. 20, citing to Hearing Tr. Vol. 4, Pg. 96, 134, and 236.

²⁷³ *Id.* at Pg. 20, citing to Hearing Tr. Vol. 4, Pg. 211.

²⁷⁴ *Id.* at Pg. 20, citing to Hearing Tr. Vol. 4, Pg. 229.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 46 of 64

drilling through such a heavy pincushion that it has obliged to wrap its wells like a boomerang around some vertical completions in order to avoid colliding with them. These practices have forced Rule 13 violations in surrounding wells, and in so doing XTO has violated Statewide Rule 13. Repeatedly, and with prior knowledge that additional violations were likely, and remain so as of the date of this closing statement, given XTO's plans for additional fracture stimulations across the top of the Fashing (Edwards Lime) field.²⁷⁵

Statewide Rule 36

Capital Star argues "XTO is exposing the public to risk of H₂S exposure in ways not generally contemplated by Rule 36:

H₂S ROE calculations are based on the existing pressure of the Edwards field, not a pressure ten times higher, which results when the Eagle Ford is placed in pressure communication with it. Current depletion scenarios for the Edwards field do not envision an operating pressure of 6,000 psig, so the field infrastructure is not equipped to handle that circumstance. The downhole infrastructure in this field was not designed or built to handle the shock waves it has been suffering. Absent communication with the Eagle Ford, the Edwards field pressure is currently about 500 psig. Invasion of the Edwards field by 6,000 psig of pressure creates a risk of harm to the public, because there are two paved roads crossing the field. ROE calculations made for 500 psig of pressure are no longer valid at 6,000 psig, so in the event of a leak, the traveling public is at risk. Mr. Garza testified at (TR 5-53-55 and TR 5-162) that XTO's frac bashing of Edwards Field wells was creating a public health hazard, due to heightened H₂S exposure risk.

....

Rule 36 was implemented by the Commission in response to a gruesome mass casualty event at Denver City in the mid-1970s and our safety controls are now so much better, that we face a risk of complacency about the hazard issues. The Edwards field has an H₂S concentration slightly exceeding 20,000 ppm, a level instantly fatal upon inhalation. XTO's denial of the pervasive risk it is imposing on completions across the Fashing Edwards field by its Eagle Ford fracture stimulation program places its own financial benefit above the harm to Edwards field operators, and to the affected public. XTO has violated Rule 36 by forcing adjoining wells out of compliance with the Rule. Further, XTO should be filing a contingency plan for accidental release of H₂S caused by its frac invasions of the Fashing (Edwards) field, for its own Edwards operated wells (in some of which CSOG owns a nearly 50% working interest), assuming for ROE calculations

²⁷⁵ Closing Statement of Capital Star, Pg. 20.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 47 of 64

a field pressure spiking to 6,000 psig, but not doing so. This is also a violation of the rule, since there has been abundant evidence XTO is repressuring the Edwards formation.²⁷⁶

Violation of Tex. Nat. Res. Code §85

Capital Star reasons that the Commission, by its failure to “provide rules for shooting wells,” has failed in its duty to prevent waste:

The failure to implement rules does not abrogate the Commission’s duty to do so, or in the absence of doing so, to protect offset operators from the consequences of “shooting wells” in such a manner as to cause waste or injury to offset operators. The Legislature would not have so specifically made the requirement if it had not recognized a potential hazard in such practices. Lacking a statewide rule or special field rule regulating “shooting wells” was are left with a contested case approach to their regulation. These cases generally arise in complaint hearings asserting between-well interference, for instance those listed in Exhibit “A” form earlier years. Now this case joins that line of precedents, which will doubtless continue in future years as the length of horizontal wells grows even longer, and their fracture stimulations become increasingly profound for such reason.²⁷⁷

Capital Star further alleges that XTO is in violation of Tex. Nat. Res. Code §85 by causing waste within the Fashing Edwards field.

XTO by its actions in fracture stimulating wells across the top of the Fashing Edwards field has caused injury to adjoining wells, and it has failed to prevent fluids from escaping the Eagle Ford strata. XTO has drowned the Edwards Strata with water, and killed Edwards strata wells, reducing the ultimate recovery of gas from the Edwards formation. In so doing XTO has caused waste, in violation of Chapter 85 of the Texas Natural Resources Code.²⁷⁸

Capital Star’s Motion to Shift the Burden of Proof

Capital Star alleges that XTO has admitted to “a number of frack bashings.” Capital Star argues that, in cases where there have been admissions against interest for rule violations, the burden of proof shifts to the admitting party:

Capital Star asserts that the admission by XTO of rule violations essentially converted this complaint hearing to a show cause hearing, with XTO

²⁷⁶ *Id.*

²⁷⁷ *Id.*

²⁷⁸ *Id.*

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 48 of 64

bearing the duty to show cause why its conduct was not in violation of Commission rules and having that burden of proof.²⁷⁹

XTO's Response to Alleged Violations of Statewide Rules

Statewide Rule 7 and 13

XTO responds to Capital Star's arguments by first pointing out that Statewide Rule 7 was the only rule violation alleged by Capital Star in its initial complaint filing. XTO remarks that Statewide Rule 7 is a precursor to Statewide Rule 13 and requires that zones encountered in wells be isolated, which is also what Statewide Rule 13 and its predecessors require:

Capital Star apparently interprets Rules 7 and 13 to be analogous to a disposal or injection well permit requiring confinement of disposal/injected liquids. But these rules do not deal with zonal confinement of disposed/injected fluids. Instead they deal with confinement or productive zones encountered in wellbores by the setting and cementing of casing. The Rule 13 violation apparent in this docket is Capital Star's violation in regard to the lack of cement behind the production casing of the Schuman A7. If that well had 600' of cement in the annulus above the Edwards then the events of August 16, 2018 would never have occurred. XTO presented the testimony of Jonathan "Matt" Uzzell concerning the wellbore design, construction and cementing procedures utilized by XTO. XTO's wells are in complete compliance with current Statewide Rule 13, and necessarily in compliance with Statewide Rule 7.²⁸⁰

Statewide Rule 10

XTO contends that no operator in the Fashing Edwards or Eagle Ford is violating Statewide Rule 10, as no operator is commingling production of different strata through the same string of tubulars. XTO's hydraulic fracturing consultant testified that "he has never before seen Eagle Ford fracture pressure communication with an Edwards well."²⁸¹ Thus, the type of pressure breakthrough that is shown in Stage 8 of the E 21H well is very remarkable.²⁸² XTO argues:

Notwithstanding, neither Capital Star nor any other operator is producing the Edwards and the Eagle Ford on a commingled basis in violation of Rule 10. Capital Star's Schuman A7 is apparently showing Eagle Ford pressure but Capital Star has refused to re-enter that well to attempt remedial work.²⁸³

²⁷⁹ *Id.*

²⁸⁰ *Id.*

²⁸¹ *Id.* at Pg. 25.

²⁸² *Id.*

²⁸³ *Id.*

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 49 of 64

XTO submits that with Capital Star being unwilling to re-enter its well, it is impossible to determine whether waste has or will occur with regard to that well.²⁸⁴

Statewide Rule 36

XTO argues that if the Eagle Ford Field, which produces at substantially less than 100 ppm H₂S, is communicating with the Fashing Edwards Fields and is being produced through the Edwards, then the effect would be a “sweetening” of the production from the Fashing Edwards Fields.²⁸⁵

XTO stated previously that the direct frac hit on the Schumann A-7 well occurred at approximately 13 minutes’ time at the very end of the frac stage of XTO’s well, a very brief and unusual event. XTO insists the fault here lies with Capital Star. Had Capital Star simply closed the master valve of the Schumann A-7, there would not have been flow to surface. Additionally, XTO offers that there “is no evidence as to whether H₂S escaped at the surface.”²⁸⁶

Tex. Nat. Res. Code § 85

XTO explains that fracture stimulations are necessary and used by the industry as a whole in order to recover reserves that would otherwise go unrecovered. XTO refutes that waste is occurring, as fracture stimulations prevent waste, not cause waste.²⁸⁷ Additionally, XTO argues, “there is no evidence in the record to indicate that waste has or will occur as a result of XTO’s Eagle Ford Operations.”²⁸⁸ Given the fact that there are problems unique to the wellbores of Capital Star’s Schumann A-7 and Urbanczyk 2-5, whether those wells can be returned to production is unknown. XTO believes waste will occur if Capital Star is granted its requested relief.²⁸⁹ XTO explains:

The record clearly shows that the 38 Eagle Ford wells drilled by XTO to date will each recover 500,000 barrels of oil each, for a total of 19,000,000 barrels. And, the 35 Eagle Ford horizontals that are in XTO’s current drilling program will together recover an additional 17,500,000 barrels of oil. If there is an “either/or” waste determination to be made in this case the answer is clear...the Eagle Ford oil production volumes far outweigh the public interest benefit of the Edwards gas production. But this doesn’t have to be an “either/or” determination...XTO will continue to produce its Edwards wells along with its Eagle Ford horizontals. But Capital Star is trying to force this “either/or” decision on the Commission. Capital Star’s request that the

²⁸⁴ *Id.*

²⁸⁵ *Id.*

²⁸⁶ *Id.*

²⁸⁷ *Id.* at Pg. 26.

²⁸⁸ *Id.*

²⁸⁹ *Id.*

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 50 of 64

Commission enter an order which would be essentially a “moratorium” on Eagle Ford development until all Edwards wells are plugged would, if granted, certainly cause waste.²⁹⁰

Finally, XTO, in its response to Capital Star’s argument about the statutory requirement for the Commission to adopt rules for shooting wells and having yet to do so, XTO states:

Shooting wells can only be an effort at describing completion of wells which is something that the Commission regulates in a very well settled regulatory regime as noted in *Garza*.²⁹¹

EXAMINERS’ ANALYSIS

The Examiners find Capital Star failed to present sufficient evidence to prove the violations of Statewide Rules as alleged or support its requested for relief.

Violations

Burden of Proof

Capital Star argued in its closing and again in its reply to XTO’s closing, that the burden of proof shifted to XTO due to XTO admitting to frac hits.²⁹² The Examiners decline to shift the burden of proof as urged by Capital Star. The Examiners are not convinced that an “admission against interest” automatically shifts the burden. Nor do the Examiners find that XTO’s admission proves the violations alleged by Capital Star. While an admission against interest may be considered proof of something, it is only proof as to what was admitted, it is not proof of the argued consequences of the admission. XTO’s admission does not prove the violations alleged in and of themselves. As the complainant, Capital Star is required to prove its allegations. The burden remains with Capital Star.

Statewide Rule 7

Capital Star contends XTO is in violation of Statewide Rule 7, as XTO’s fracture stimulations were designed to exceed the thickness of the Eagle Ford formation. Statewide Rule 7 states:

Whenever hydrocarbon or geothermal resource fluids are encountered in any well drilled for oil, gas, or geothermal resources in this state, such fluid shall be confined in its original stratum until it can be produced and utilized without waste. Each such stratum shall be adequately protected from infiltrating waters. Wells may be drilled deeper after encountering a stratum bearing such fluids if such drilling shall be prosecuted with diligence and

²⁹⁰ *Id.*

²⁹¹ *Id.*

²⁹² Reply of Capital Star to the Closing Statement of XTO Energy, Pg. 8.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 51 of 64

any such fluids be confined in its stratum and protected as aforesaid upon completion of the well. The commission will require each such stratum to be cased off and protected, if in its discretion it shall be reasonably necessary and proper to do so.²⁹³

Capital Star argues that XTO is knowingly violating Statewide Rule 7 in the design of its FSTs and not confining fluids to the Eagle Ford Field. This allegation appears to be based solely on the design of XTO's fractures.²⁹⁴ Capital Star's expert witness, Mr. Garza, used the Microseismic Inc. model simulation output parameters as "absolute maximum values" to argue that the fracture lengths generated from the model exceed the 250-foot vertical separation between the Eagle Ford and Fashing Edwards Fields. This led him to conclude that a communication route was established between the Eagle Ford and the Edwards Lime -A- Fields. Based on these model output parameters, Capital Star claims that appropriate isolation and confinement of production liquids to the Eagle Ford Field was not maintained by XTO, therefore Statewide Rule 7 was violated.

Dr. Choi, one of XTO's expert witnesses, stated that the industry recognizes there is a lot of uncertainty with microseismic fracture technology. Simulation modeling is used as an indication of where the fractures may be.²⁹⁵ It is not intended to be an accurate representation of what occurs in the field.²⁹⁶ In addition to her own testimony, Dr. Choi offered several technical articles in support of this fact. Exhibits introduced by XTO during Dr. Choi's testimony show that the model depicts the design of the fracture based on degrees of certainty. A cloud or cluster of fractures nearest to the fracking energy source establishes the higher degree of certainties associated with the estimated fracture heights and lengths. Dr. Choi testified that a designed fracture simulation is expected to use 60 percent of the cloud, with the remaining 40% being potential outliers in terms of predictive certainties.

XTO indicated they expected the energy generated by its FST operations to dissipate quickly once the Buda Limestone was encountered. Simulation modeling conducted on the Emma Tartt wells (19H, 26H, 21H and 20H) suggested that the fractures would penetrate less than 10 feet into the Buda Limestone formation.²⁹⁷

Instead of fractures into the Fashing Edwards Fields, XTO's witnesses established a more likely route of communication between the wells completed in each field. Using the pressure spikes observed at the Schumann A-7 Well, XTO argued that the older well's casing was adversely impacted within the Eagle Ford Field by the fracking of XTO's KOWR E-21 H Well. The KOWR E-21 H Well is located approximately 300 feet in a lateral direction from the Schuman A-7 Well's casing as it traverses the Eagle Ford Field down to the deeper Fashing Edwards Fields. XTO pumped the frac materials into the Eagle

²⁹³ 16 Tex. Admin. Code § 3.7.

²⁹⁴ Closing Statement of Capital Star, Pg. 18.

²⁹⁵ Hearing Tr. Vol. 5, Pg. 172-173.

²⁹⁶ Hearing Tr. Vol. 5, Pg. 186-187. Hearing Tr. Vol. 5, Pg. 170-171.

²⁹⁷ Hearing Tr. Vol. 5, Pg. 168, Lns. 19-24.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 52 of 64

Ford Field wells at 9,000 pounds and the Schumann A-7 Well had about 10,000 pounds up the tubing—which translated to about 5,000 pounds at the surface. When the pressure is the same in the fracked well as at the secondary location well, there would be few restrictions between them, indicating direct communication.²⁹⁸

Capital Star's own witness, Mr. Garza, stated he did not know the exact migration pathway the foreign material traveled from the XTO Well to the Schumann A-7 Well, but conceded it was unlikely the fractures migrated through three intervening zones (i.e., Buda Limestone, Del Rio Clay and Georgetown Limestone) to reach the Edwards Lime -A- Field reservoir.²⁹⁹ The Examiners find Capital Star did not provide evidence sufficient to show that the FSTs performed by XTO penetrated the intervening stratigraphic units (the Buda Limestone, Del Rio Clay and Georgetown Limestone) between the Eagle Ford and Edwards Lime -A- Field and caused a transfer of liquids to the Edwards Lime -A- Field. Instead, the Examiners' conclude that the communication route likely occurred through the adversely impacted Schumann A-7 Well, resulting in the fluids entering the tubing at some location and migrating to the surface, as XTO contends. Any commingling of fluids from the relevant fields likely occurred through the compromised wellbore of the Schumann A-7 Well, not as a result of communication between the formations. Accordingly, the Examiners find Capital Star failed to prove XTO has violated Statewide Rule 7 due to the design of XTO's FST, or otherwise.

Statewide Rule 10

Capital Star argues that by XTO's actions, XTO has forced Fashing Edwards Fields wells to be out of compliance with Statewide Rule 10, by placing the Eagle Ford stratum in pressure communication with the Edwards stratum.³⁰⁰ Statewide Rule 10 states in part, as a general prohibition:

Oil and gas shall not be produced from different strata through the same string of tubulars except as provided in this section. As used in this section, "different strata" means two or more different commission-designated fields, or one or more commission-designated fields and any other hydrocarbon reservoir.³⁰¹

Statewide Rule 10 does not discuss pressure in relation to production. If an area of high pressure has an area of lower pressure around it, the gas/liquid will flow into the area of lower pressure. This is the basis for Capital Star's argument that if XTO's actions have created a pathway from the higher pressurized Eagle Ford to the lower pressurized Fashing Edwards Fields, oil from the Eagle Ford would migrate downward, thereby allowing the Eagle Ford oil to be produced from a different strata through the same string of tubulars perforated in the Fashing Edwards Fields.

²⁹⁸ Hearing Tr. Vol. 4, Pg. 176, Lns. 5-11.

²⁹⁹ Hearing Tr. Vol. 3, Pg. 89, Lns. 5-19.

³⁰⁰ Closing Statement of Capital Star, Pg. 18.

³⁰¹ 16 Tex. Admin. Code § 3.10(a).

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 53 of 64

Capital Star provided a report from a surface sample taken from the Schumann A-7 Well after the August 2018 frac hit.³⁰² The report stated the materials recovered were “most probably from a frac sand.”³⁰³ In December 2018 the Schumann A-7 Well again showed an increased pressure on the tubing with a surface discharge. A sample of the discharge was taken and sent to a lab for analysis. The sample showed a liquid with an API gravity of 39.4, consistent with Eagle Ford oil, gas condensate in the Fashing Edwards Fields has an average API of 50.3.³⁰⁴

The two fields, the Eagle Ford and the Edwards Lime -A-, do not have any natural communication. There are three layers between the two, isolating these fields. Evidence shows the Edwards Lime A has a psi of about 600 and the Eagle Ford has approximately 6,000 psi. This is evidence of the fact that no natural communication is occurring. Capital Star provided evidence that over a period of time it saw increased pressures on a number of its wells. But Capital Star also admits “for reasons and by paths of an unknown nature, the Edwards strata is in places being repressurized.”³⁰⁵

The Examiners find insufficient evidence to show a continual pressure communication exists between the Eagle Ford and Fashing Edwards Fields. The Examiners find a pressure communication did occur in August of 2018 during an XTO frac operation. However, the evidence does not show any production of hydrocarbons from the Eagle Ford at this time. After the August event, Capital Star shut-in the Schumann A-7 Well.

The Examiners find insufficient evidence to support Capital Star’s contention that XTO has forced *numerous wells* (emphasis added) out of compliance with Statewide Rule 10. The evidence shows only one discharge of hydrocarbons that may fit Capital Star’s argument. In December 2018, what appears to be oil was produced via the Schumann A-7 Well when the well again experienced a large increase in pressure. It is unknown what caused the pressure increase in the well, but evidence presented at the hearing indicate more likely than not it was the XTO frac hit which ultimately led to a release of fluids from the wellhead at the surface. Given the API gravity of the liquid produced to surface, the Examiners conclude that it is more likely than not, oil from the Eagle Ford was produced via a well completed in the Fashing Edwards Fields. When a gas well is frac hit by an oil well it is not uncommon to find minimal, burp-like production.

By seeking to apply only the general prohibition of Statewide Rule 10, without considering the rest of the Statewide Rule, Capital Star’s argument promotes a skewed finding. The purpose of Statewide Rule 10 is to prevent downhole commingling, to protect correlative rights. As the volume of the December 2018 discharge is unknown, as the well

³⁰² Hearing Tr. Vol. 4, Pg. 159-160, conclusion of Mr. Ely, based on the timing of XTO’s frac and the pressures seen on the Schumann A-7’s FESCO gauge, XTO’s frac likely encountered open pipe (pipe without cement or with inadequate cement).

³⁰³ Hearing Tr. Vol. 5, Pg. 156, Closing Statement of Capital Star, Pg. 6.

³⁰⁴ Hearing Capital Star Ex. 23, Closing Statement of Capital Star, Pg. 6.

³⁰⁵ Hearing Tr. Vol. 5, Pg. 14-16. Close Statement of Capital Star, Pg. 18.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 54 of 64

has been shut-in since August 2018, the Examiners are unable to determine if a continual pathway exists that is allowing the production of Eagle Ford oil via a Fashing Edwards Fields gas well. The pressure seems to be localized within the Schumann A-7 wellbore. There was insufficient evidence of differential pressure or communication with the Fashing Edwards Fields. No evidence was presented of other impacted wells within the reservoir to lead the Examiners to conclude communication between the reservoirs exists. The Examiners find the evidence does not support Capital Star's belief of pervasive violations, nor is the evidence sufficient to support a single violation of Statewide Rule 10.

Statewide Rule 13

Capital Star alleges that as XTO has proven unable to prevent the migration of fluids from the Eagle Ford stratum field to the Edwards stratum field, it is in violation of Statewide Rule 13.³⁰⁶ Statewide Rule 13 states in part:

Intent. The operator is responsible for compliance with this section during all operations at the well. It is the intent of all provisions of this section that casing be securely anchored in the hole in order to effectively control the well at all times, all usable-quality water zones be isolated and sealed off to effectively prevent contamination or harm, and all productive zones, potential flow zones, and zones with corrosive formation fluids be isolated and sealed off to prevent vertical migration of fluids, including gases, behind the casing. When the section does not detail specific methods to achieve these objectives, the responsible party shall make every effort to follow the intent of the section, using good engineering practices and the best currently available technology. In accordance with §3.17 of this title (relating to Pressure on Bradenhead), operators must notify the Commission of bradenhead pressure. The Commission will evaluate notices of bradenhead pressure on a case-by-case basis to determine further action and will provide guidance to assist operators in wellbore evaluation.³⁰⁷

Capital Star references Statewide Rule 13's intent regarding the migration of fluids from the Eagle Ford Field to the Edwards Lime -A- Field. Statewide Rule 13 addresses the requirements for well design, well specifications, casing, tubing, and drilling. The intent of Statewide Rule 13 is to ensure casing is securely anchored in the hole to effectively control the well at all times. The rule is intended to protect groundwater, seal off production zones, isolate flow zones and prevent vertical migration of fluids behind the casing. Capital Star failed to submit any evidence that demonstrated XTO's wells failed to meet the Statewide Rule 13 well-specification requirements. XTO presented evidence that its wells were designed to protect the usable-quality groundwater identified to be from surface to 4,900 feet. No evidence was submitted by Capital Star to demonstrate that freshwater was not protected by wells completed in the Eagle Ford or the Fashing Edwards Fields by XTO. In addition, no evidence was submitted by Capital Star to

³⁰⁶ Closing Statement of Capital Star, Pg. 20.

³⁰⁷ 16 Tex. Admin. Code § 3.13(a)(1).

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 55 of 64

establish that XTO was not properly sealing off production zones associated with its well design as required in Statewide Rule 13. Further, Statewide Rule 13 references Statewide Rule 7 to meet the requirement to isolate strata. Therefore, sealing off producing reservoirs under Statewide Rule 13 is specific to XTO's well bore or Capital Star's well bore.

The Examiners find no evidence of the migration of fluids from the Eagle Ford Field to the Fashing Edwards Fields associated with a failure of well design as covered by Statewide Rule 13 for any well, including the Schumann A-7 Well. It should be noted that scrutiny of the Schumann A-7 Well was not performed by the Examiners since it is beyond the scope of this complaint and no direct evidence was presented in the case to establish noncompliance with Statewide Rule 13 by Capital Star.

Capital Star argues XTO's activities have shown the Edwards stratum is a potential flow zone. Capital Star requests "designation of a "potential flow zone" as the surface area above all proration units for the Edwards field and within a ¼ mile radius of the outermost of these, from the top of the Austin Chalk to the base of the Edwards formation, with provision that no Eagle Ford wells above the zone be fracture stimulated until all of the Edwards wells plugged.³⁰⁸ Statewide Rule 13 defines potential flow zone as:

A zone designated by the director or identified by the operator using available data that needs to be isolated to prevent sustained pressurization of the surface casing/intermediate casing or production casing annulus sufficient to cause damage to casing and/or cement in a well such that it presents a threat to subsurface water or oil, gas, or geothermal resources. The Commission will maintain a list of known zones by district and county that are considered potential flow zones and make this information available to all operators. The Commission will revise this list as necessary based on information provided, or otherwise made available, to the Commission.³⁰⁹

The Examiners find a direct hit of the Schumann A-7 Well by XTO's FST operation has resulted in potential localized differential pressures in the wellbore of the Schumann A-7. Capital Star failed to prove that a potential flow zone would be caused and sustained to impact shallow zones through natural migration pathways. Capital Star failed to prove the entirety of its statement outside of an isolated instance regarding the Schumann A-7 frac hit. If Capital Star concludes that the Fashing Edwards Fields are a potential flow zone it should pursue its request by submitting available data, of which none was provided here, to the director as outlined in Statewide Rule 13 so the claim can be properly evaluated by the Commission.

The Examiners find Capital Star has failed to prove XTO has violated Statewide Rule 13.

³⁰⁸ Closing Statement of Capital Star, Pg. 20.

³⁰⁹ 16 Tex. Admin. Code § 3.13(a)(2)(N).

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 56 of 64

Statewide Rule 36

Capital Star alleges XTO has violated Statewide Rule 36 by forcing adjoining wells out of compliance with the Rule due to XTO causing increased pressure in the Edwards formation.³¹⁰ Capital Star does not cite to a specific section of Statewide Rule 36, simply quoting the following language of the Rule:

Applicability. Each operator who conducts operations as described in paragraph (1) of this subsection shall be subject to this section and shall provide safeguards to protect the general public from the harmful effects of hydrogen sulfide. This section applies to both intentional and accidental releases of hydrogen sulfide.³¹¹

As previously discussed, the cause and source of the pressure increases seen in various wells in the Fashing Edwards Fields is unknown. What is known is that when XTO directly frac hit the Schumann A-7 Well in August of 2018, a pressure spike occurred causing a discharge at the surface. Additionally, XTO also conceded that while it cannot be certain, Capital Star's Urbanczyk 2-5 Well, which XTO believes has a mechanical issue, may have experienced frac pressure as well.³¹² It is important to note that Capital Star has characterized the August 2018 and December 2018 events as blowouts. As the evidence shows no loss of wellhead control, the Examiners find neither of these events were a blowout.

Statewide Rule 36 regulates oil and gas operations in a sour gas/hydrogen sulfide field. Hydrogen Sulfide ("H₂S") is a highly dangerous gas, which at high enough concentrations, will cause immediate death. Capital Star argues it is concerned for possible public exposure to H₂S not generally contemplated by the Rule due to the Eagle Ford being in pressure communication with the Fashing Edwards Fields.³¹³ Capital Star points to the fact that the Fashing Edwards Fields wells are not designed for the pressures resulting from XTO's frac operations.³¹⁴ XTO argues if there is truly communication between the fields, the H₂S concentration in the Fashing Edwards Fields would be seeing a sweetening effect.³¹⁵

XTO argues that the Schumann A-7 direct frac hit was a unique occurrence. XTO believes that had the master valve of the Schumann A-7 well been closed at the time of the frac hit, the pressure increase, and discharge would not have occurred. XTO's solution to future issues is to advise Wagner (the operator in the Fashing Edwards Fields below which XTO's current 37 well drilling program exists) to close the master valve and XTO will do the same for its wells in the Fashing Edwards Fields.³¹⁶

³¹⁰ Closing Statement of Capital Star, Pg. 21.

³¹¹ 16 Tex. Admin. Code § 3.36.

³¹² Hearing Tr. Vol. 4, Pg. 133-135, 138 and Tr. Vol. 5, Pg. 134, Ln. 9-11.

³¹³ Closing Statement of Capital Star, Pg. 21.

³¹⁴ *Id.*

³¹⁵ Closing Statement of XTO, Pg. 25.

³¹⁶ *Id.* at Pg. 26.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 57 of 64

The Examiners too are concerned with possible H₂S leaks that may occur. The one observed discharge to surface was not the result of a loss of wellhead control, however, and it appears there was no associated release of H₂S. If there was a release, Capital Star failed to provide evidence to show it. Capital Star alleges XTO is in violation due to XTO causing the pressure increase in the Fashing Edwards Fields. As discussed previously, the Examiners found that but for the Schumann A-7, and possibly the Urbanczyk 2-5, Capital Star failed to prove XTO's frac operations are responsible for the various pressure changes seen in various wells in the Fashing Edwards Fields.

The Examiners find Capital Star failed to prove XTO was forcing adjacent wells out of compliance with Statewide Rule 36 due to XTO causing the increased pressures in the Fashing Edwards Fields.

Tex. Nat. Res. Code §85

Waste

Capital Star argues XTO's actions in fracture stimulating wells across the top of the Fashing Edwards Fields is in violation of Chapter 85 of the Texas Natural Resources Code. Capital Star cites to Tex. Nat. Res. Code § 85.046(a)(2) and (a)(6) which states:

85.046 WASTE (a) the term "waste," among other things, specifically includes:

(2) drowning with water a stratum or part of a stratum that is capable of producing oil or gas or both in paying quantities;

(6) physical waste or loss incident to or resulting from drilling, equipping, locating, spacing, or operating a well or wells in a manner that reduces or tends to reduce the total ultimate recovery of oil or gas from any pool.³¹⁷

Capital Star did not present sufficient evidence to show a reduced recovery or performance of wells in the Edwards Fields caused by XTO's fracking operations or the confirmed XTO frac hit on the Shuman A-7 Well. Capital Star did not provide sufficient evidence of the Edwards Fields being drown with water due to XTO's fracking operations. The Examiners conclude Capital Star has chosen to cease producing its wells, thus eliminating the ability to provide sufficient evidence regarding waste.

The Examiners find Capital Star has failed to prove a violation of Tex. Nat. Res. Code § 85. 046(a)(2) and (a)(6).

³¹⁷ Tex. Nat. Res. Code § 85.046(a)(2)(b).

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 58 of 64

Failure of Duty

Lastly, Capital Star alleges the Commission has failed in its duty to “provide rules for shooting wells.” Capital Star cites to Chapter 85, Section 202 of the Texas Natural Resources Code regarding the Commission’s duties, of which, Capital Star cites to “(6) to provide rules for shooting wells....”³¹⁸ Capital Star argues “the failure to implement rules does not abrogate the Commission’s duty to do so, or in the absence of doing so, to prevent offset operators from the consequences of ‘shooting wells’ in such a manner as to cause waste or injury to offset operators.”³¹⁹

The Texas Natural Resources Code does not define what “shooting wells” means, nor does Capital Star offer a definition. For a definition, the Examiners looked to various oil and gas treaties on oil and gas law. One industry treatise defines shooting a well as “exploding nitroglycerine or other high explosive in a hole, to shatter the rock and increase the flow of oil or gas.”³²⁰ This would seem to exclude modern FST operations from the purview of the governing statute. The Examiners further note that the cited section of the Texas Natural Resources Code was adopted in 1977, before hydraulic fracture stimulation was as prevalent as it is today.

Even if the term, “shooting wells” was projected to encompass any technique intended to “shatter the rock to increase the flow of oil or gas,” Capital Star did not submit argument or evidence sufficient to show that the existing rules promulgated by the Commission concerning the drilling and completion of oil and gas wells are not “rules for shooting wells” under the governing statute. Certainly, tens of thousands of FST operations completed without incident throughout the State during the previous twenty years do not suggest that the Commission has been remiss in exercising its rulemaking authority in this regard. The Examiners find Capital Star failed to prove the Commission failed in its duty to adopt rules regarding hydraulic fracturing. As Capital Star has failed to prove waste has occurred or damage other than a momentary injury to offset operators caused by the fracture stimulations, Capital Star’s allegation lacks merit.

Application of Rules

When an operator assumes regulatory responsibility for a well, it is responsible for operating the well within Commission rules. The Statewide Rules Capital Star is alleging XTO violated are Rules that are to regulate the operations of an operator of a well, not a third party who may be operating in the vicinity. Capital Star admitted at the inception of the proceedings that its desired outcome was for a finding of violations of Commission rules that would aid Capital Star in its civil suit. Ultimately, the Examiners find Capital Star’s attempt to apply these Rules to XTO was unsuccessful, due not just to the evidence presented, but also due to how and for whom the Rules are intended to be applied.

³¹⁸ Closing Statement of Capital Star, Pg. 22, citing Tex. Nat. Res. Code § 85.202(a)(6).

³¹⁹ Closing Statement of Capital Star, Pg. 22.

³²⁰ Williams & Meyers Oil and Gas Law, Manual of Terms, Pg. 995, December 1997.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 59 of 64

RECOMMENDATION, PROPOSED FINDINGS OF FACT AND PROPOSED CONCLUSIONS OF LAW

The Examiners find Capital Star failed to prove XTO violated Statewide Rules 7, 10, and 13. Capital Star also failed to prove that XTO forced other operators to be in violation of Statewide Rule 36 or that XTO violated the Texas Natural Resources Code. There was no evidence or argument sufficient to show that the Commission failed to act in accordance with its duties as specified in the relevant governing statutes.

The Examiners recommend the Commission deny Capital Star's requested relief and dismiss the complaint. The Examiners recommend adoption of the following findings of fact and conclusions of law.

FINDINGS OF FACT

1. The following is the procedural history for this Docket:
 - a. On January 9, 2018, Capital Star Oil & Gas ("Capital Star") filed a complaint with the Commission District Office against XTO Energy, Incorporated ("XTO") for failure to confine frac fluids to their Field, the Fashing Edwards Fields. The initial Notice to the District Office identified five wells that were impacted by Fracture Stimulation Treatment ("FST"), but ultimately seven wells were identified by Capital Star as being potentially impacted by XTO FST.
 - b. On February 1, 2018, Capital Star filed the complaint application with the Commission's Docket Services.
 - c. On July 10, 2018, the Hearings Division of the Commission sent a Notice of Hearing ("Notice") via first-class mail to the complainant, respondent and all affected persons setting a hearing for August 7, 2018 through August 10, 2018. The Notice contains (1) a statement of the time, place, and nature of the pre-hearing conference; (2) a statement of the legal authority and jurisdiction under which the hearing is to be held; (3) a reference to the particular sections of the statutes and rules involved; and (4) a short and plain statement of the matters asserted.
 - d. On July 23, 2018, a motion to convert the hearing on the merits to a prehearing conference was granted. Therefore, the August 7, 2018, original start date for the hearing on the merits, a prehearing conference was held for the purpose of identifying the issues involved, relief requested and adoption of a procedural schedule. At the pre-hearing conference, the parties agreed to commence the hearing on the merits on December 3, 2018, and subsequent dates scheduled, as necessary. Consequently, all parties received more than 10 days' notice of the hearing and an opportunity for hearing.

Oil and Gas Docket No. 01-0309061

Proposal for Decision

Page 60 of 64

- e. The hearing on the merits was held on December 3 and 4, 2018; April 8 and 10, 2019; and May 16, 2019. Capital Star and XTO attended and participated in all days of the hearing on the merits.
2. Capital Star operates vertical gas wells in the Edwards Lime -A- and Edwards Lime -B- Fields (collectively referred to as the “Fashing Edwards Fields”) in Atascosa County, Texas.
3. XTO operates horizontal wells in the Eagleville (Eagle Ford-1) Field (“Eagle Ford Field”) and vertical wells in the Fashing Edwards Fields. XTO owns mineral interest in both common and adjacent leases, operating horizontal wells and has a continuing horizontal drilling program in the shallower Eagle Ford Field.
4. Capital Star’s complaint asserts that nearby completion and FST by XTO for horizontal oil completions in the Eagle Ford Field, has resulted in the comingling of fluids between the two Fields in violation of Commission rules.
5. Capital Star filed a complaint with the Railroad Commission of Texas (“Commission”) against XTO, alleged nearby completion and fracture stimulation treatment operations by XTO for horizontal well completions in the Eagle Ford Field resulted in the comingling of fluids between two or more Commission designated fields in violation of Statewide Rules 7, 10, 13 and 36. Capital Star included two additional violations not included in the Notice for the hearing, nor discussed at the prehearing conference. Those are violations of Chapter 85 of the Texas Natural Resources Code, one against XTO, the other against the Commission.
6. Capital Star is seeking a designation of the Fashing Edwards Fields, with a halo of a quarter-mile radius surrounding it, as a “potential flow zone” and restricting XTO against further fracture stimulation of Eagle Ford wells across the top of the Fashing Edwards Fields until which time all wells in that field are plugged and abandoned.
7. The Fashing Edwards Fields were discovered around 1956 by Lone Star Producing and are composed of two separate reservoirs in the Edwards Limestone Group referred to as the Edwards Lime -A- Field (Field No. 30379500) and the Edwards Lime -B- Field (Field No. 30379750). The Fashing Edwards Fields produce both oil and gas, but gas is the majority of production. The top of the Edwards Lime -A- Field is approximately 11,100 feet deep with the top of the Edwards Lime -B- Field at approximately 11,320 feet deep. Sour gas (aka H₂S impacted) concentrations typically range from 20,000 parts per million to about 40,000 parts per million in the Fashing Edwards Fields. The Edwards Lime -A- Field reservoir, is depleted to a pressure of about 560 pounds because of significant recovery of hydrocarbons through the years.
8. The Eagle Ford Field (Field No. 27135700), is composed of the Eagle Ford shale formation and is stratigraphically higher in the geologic sequence than the Fashing Edwards Fields. The Eagle Ford Field is an oil and gas field with a correlative interval from 10,294 feet to 10,580 feet in Atascosa County, but also found in Dimmit, Frio,

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 61 of 64

Gonzales, La Salle, McMullen, Wilson and Zavala Counties, Texas. The Eagle Ford Field typically is not impacted with H₂S. The reservoir has a much higher reservoir pressure, closer to 6,000 pounds per square inch since it is a newer Field compared to the deeper Fashing Edwards Fields with pressures at about 560 pounds.

9. The Eagle Ford Field overlies the Fashing Edwards Fields at a vertical separation of approximately 250 feet. Stratigraphically beneath the Eagle Ford shale is the Buda Limestone, Del Rio Clay and Georgetown Limestone, which are intervening formations between the bottom of the Eagle Ford shale and the top of the Edwards Limestone Group which makes up the Fashing Edwards Fields.
10. The Fashing Edwards Fields have a history which include 219 active and inactive wells, with Capital Star operating about 100 wells in the Fashing Edwards Fields. The majority of the active wells in the Fashing Edwards Fields are operated by two companies, Capital Star and XTO.
11. The Eagle Ford Field is being developed using horizontal wells with FST technology to maximize recovery of oil and gas. XTO's is currently targeting this reservoir.
12. Capital Star ultimately asserted that a total of seven wells in the Fashing Edwards Fields ("complaint wells") were impacted by XTO FST operations in the Eagle Ford Field:
 - a. Schumann A-7 Well: 11,000 feet total vertical depth ("TVD"), Completed 1994, Edwards Lime -A-;
 - b. Tom "A" GU3-1L Well: 10,990 feet TVD, Completed 1957, Edwards Lime -A-&-B-;
 - c. Tom "A" GU4-3L Well: 10,900 feet TVD, Completed 1985, Edwards Lime -A-&-B-;
 - d. Urbanczyk GU-1 2L Well: 10,900 feet TVD, Completed 1978; Edwards Lime -A-&-B-;
 - e. Urbanczyk GU-1 3L Well: 10,900 feet TVD, Completed 1982, Edwards Lime -A- & -B-;
 - f. Urbanczyk GU-2 3U Well: 10,900 feet TVD, Completed 1980, Edwards Lime -A-; and
 - g. Urbanczyk GU-2 5 Well: 7,973 feet TVD, Completed 1994, Edwards Lime -A-.
13. XTO completed 38 horizontal wells in the Eagle Ford Field between 2010 and 2018. Some of these wells were completed in close proximity to existing vertical wells owned and operated by Capital Star.
14. In 2015, and 2016, XTO completed 12 Eagle Ford Field wells near Capital Star's Urbanczyk GU-2 5 Well and Schumann A-7 Well. Capital Star noted problems with the Urbanczyk and Schumann wells in 2016 and communicated that to XTO.
15. In 2017, XTO completed six wells between two areas previously developed near the Urbanczyk GU-1 2L Well, Urbanczyk GU-1 3L Well, and the Urbanczyk GU-2 3U Well, with between-well spacing about 300 feet apart. In 2018, XTO completed eight wells in the Eagle Ford Field surrounding the Schumann A-7 Well, with between-well spacing approximately 300 to 400 feet from the Capital Star Schumann A-7 Well.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 62 of 64

16. XTO conceded that the Schumann A-7 Well was adversely impacted by XTO's FST activities. Below is the chronology of major events regarding the FST impact of the Schumann A-7 Well:
- a. On August 16, 2018, XTO was fracking a stage in their KOWR E Well 21 about 250 feet away from Capital Star's Schumann A-7 Well. On August 16, 2018, a pressure spike was observed on the Schumann A-7 Well at 5,054 pressure square inch gauge ("psig"). Generally, observed pressure readings for this well would normally range from approximately 560 psig to 600 psig. Failure of a wellhead valve on the Schumann A-7 Well resulted in a discharge of fluids to the surface. Capital Star notified XTO about a release to the surface associated with the Schumann A-7 Well at about 5:30 pm on August 16, 2018. On August 17, 2018, the wellhead pressure for the well stabilized at 2,578 psig, which was above the expected reservoir pressure of 560 psig. XTO tagged the well for assessment to determine if their FST operations in the area caused the release.
 - b. A release to the surface occurred again from the Schumann A-7 Well on December 4, 2018, most likely caused by a failure of a sand bridge plug in the tubing that was formed during the initial pressure spike on August 16, 2018. The wellhead pressure spiked on December 4, 2018 to 2,650 psig.
17. XTO and Capital Star agree that one of the seven complaint wells, the Schumann A-7 Well, was adversely impacted by XTO's FST operations on August 16, 2018.
18. Capital Star did not provide evidence sufficient to show that any of the remaining six complaint wells were adversely impacted by XTO FST operations in the Eagle Ford Field.
19. Capital Star did not provide evidence sufficient to support its argument that the Schumann A-7 Well was adversely impacted through FST operations that generated fractures that intersected the Edwards Lime -A- Field, located approximately 250 feet below the bottom of the Eagle Ford Field.
- a. Evidence submitted by Capital Star regarding the indirect communication route through the 250-foot vertical separation composed of the Buda Limestone, Del Rio Clay and Georgetown Limestone and the potential commingling of fluids from the two Fields (Eagle Ford and Edwards -A-) is based primarily upon model simulation outputs that show possible, but not probable, fracture lengths and directions.
 - b. The pressure values associated with the fracked KOWR E-21H Well and the adversely impacted Schuman A-7 Well is a strong indicator of direct communication between the two wells. The relatively similar pressure values associated with the measured pressure spike at the Schumann A-7 well and the observed transfer of frac sands suggest a "direct" communication route between the wells is more likely than the indirect communication route suggested by Capital Star.

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 63 of 64

- c. The adverse impact to the Schumann A-7 Well was likely caused by direct communication between the FST activities on the KOWR E-21 H Well and the Schumann A-7's casing.

20. The Commission's Groundwater Advisory Unit established the usable-quality groundwater from the surface to a depth of 450 feet and established the base of useable-quality groundwater (BUQW) at 4,900 feet, which is consistent with correspondence from the Texas Water Commission dated June 9, 1993. It is noted that XTO indicates that their wells are designed to meet the rules, regulations and are protective of the usable fresh waters. In addition, Capital Star indicated in the hearing that their older vertical wells met the regulations at the time they were installed.

CONCLUSIONS OF LAW

1. The Commission has jurisdiction in this case. *See, e.g.*, Tex. Nat. Res. Code § 81.051.
2. All notice requirements have been satisfied. *See, e.g.*, Tex. Gov't Code §§ 2001.051, 052; 16 Tex. Admin. Code §§ 1.42, 1.45.
3. Capital Star failed to provide sufficient evidence to prove XTO has violated Statewide Rule 7 through its fracking operations.
4. Capital Star failed to provide sufficient evidence to prove XTO has violated Statewide Rule 10 through its fracking operations.
5. Capital Star failed to provide sufficient evidence to prove XTO has violated Statewide Rule 13 through its fracking operations.
6. Capital Star failed to provide sufficient evidence to prove XTO has caused other operators to violate Statewide Rule 36 through its fracking operations.
7. Capital Star failed to provide sufficient evidence to prove XTO has violated Tex. Nat. Res. Code § 85.046(a)(2) and (6) through its fracking operations.
8. Capital Star failed to provide sufficient evidence to prove the Commission has been derelict in its duties as cited in Tex. Nat. Res. Code § 85.046(a)(2) and (6) and Tex. Nat. Res. Code § 85.202(a)(4), (5), and (6).

Oil and Gas Docket No. 01-0309061
Proposal for Decision
Page 64 of 64

EXAMINERS' RECOMMENDATION

Based on the record and evidence presented, the Examiners recommend the Commission dismiss the Capital Star's complaint and deny Capital Star's requested relief.

Respectfully,

DocuSigned by:
Robert Musick
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Robert Musick, P.G.
Technical Examiner

DocuSigned by:
Kristi M. Reeve
DAB305E140194B7...
Kristi M. Reeve
Administrative Law Judge