

**Presented:**

41<sup>st</sup> Annual Ernest E. Smith Oil, Gas and Mineral Law Institute

March 26-27, 2015  
Houston, Texas

## **Production and Sales of Brine**

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## I. INTRODUCTION

This paper addresses the use of brine and other non-potable underground waters in the oilfield, principally for fracture stimulation and completion operations. Water of less than potable quality has been used in the oilfield for over a generation, but in the past several years there has been a significant increase in the use of this type of water. The recent drought combined with the increased use of longer lateral horizontal wells and high volume fracturing have stressed freshwater resources in large parts of Texas. Because most surface water supplies are fully utilized, the oil and gas industry must rely almost exclusively on below ground resources, such as fresh groundwater and now brine and brackish water. As competition for freshwater resources has increased, oil companies have turned to brackish water – groundwater of less than potable quality – to supplement or replace fresh groundwater.

Brackish water is generally found at deeper subsurface depths and horizons, almost exclusively below usable quality water. Through various stabilization and chemical techniques the oil and gas industry is able to use brackish water in a variety of operations, most notably hydraulic fracturing. In 2013, for example, only 8.1% of the total water used by Apache Oil Corporation in the Permian Basin was fresh groundwater. Apache reported that over 60% of the water it used hydraulic fracturing in the Permian was non-potable groundwater.<sup>1</sup> Instead of fresh groundwater, Apache opted to use a combination of brackish groundwater and produced wastewater sourced from local hydrocarbon wells.<sup>2</sup> Many other operators are also relying on brackish water in their operations.<sup>3</sup> As competition for fresh groundwater from municipalities, agricultural users and traditional industrial users continues over the coming years, the oil and gas industry will likely increase its reliance on brine and brackish water. Brine and brackish water resources will be of particular importance in the Eagle Ford Shale region as “produced water” volumes are generally low and only a small percentage of hydraulic fracturing water is recaptured and available for reuse.<sup>4</sup>

This paper provides an overview of some of the regulatory, title, contract, and liability issues related to the commercial production of brackish groundwater. This paper does not focus on “produced water” or “oilfield brine” which reach the surface in association with oil and gas production. Although chemically similar, if not identical, to the brackish water discussed in this paper, these substances are considered oilfield waste and are regulated by the Railroad Commission.<sup>5</sup> Instead, this paper will focus on subsurface brackish water that is purposely

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<sup>1</sup> *Apache Global Water Usage*, [http://www.apachecorp.com/Sustainability/Environment/Water/Apache\\_global\\_water\\_usage/index.aspx](http://www.apachecorp.com/Sustainability/Environment/Water/Apache_global_water_usage/index.aspx) (last visited Feb. 4, 2015).

<sup>2</sup> Charles Kennedy, *Apache Oil Corp. Develops Method to Frack Without Water*, OILPRICE.COM (Nov. 21, 2013, 10:43PM) <http://oilprice.com/Latest-Energy-News/World-News/Apache-Oil-Corp.-Develop-Method-to-Frack-without-Freshwater.html>.

<sup>3</sup> See, e.g., *Water Management*, [http://www.eogresources.com/responsibility/water\\_management.html#whatsources](http://www.eogresources.com/responsibility/water_management.html#whatsources).

<sup>4</sup> Table 2 in Pam Boschee, *Produced and Flowback Water Recycling and Reuse: Economics, Limitations, and Technology*, OIL AND GAS FACILITIES, (Feb. 2014) available at [http://www.halliburton.com/public/multichem/contents/Papers\\_and\\_Articles/web/Feb-2014-Oil-Gas-Facilities-Article.pdf](http://www.halliburton.com/public/multichem/contents/Papers_and_Articles/web/Feb-2014-Oil-Gas-Facilities-Article.pdf).

<sup>5</sup> 16 TEX. ADMIN. CODE §§ 3.30(b)(2) and (b)(2)(d)(1)(LEXIS 2015); *Who Regulates Oil and Gas Activities in Texas?* (Sept. 11, 2014), available at [https://www.tceq.texas.gov/assets/public/assistance/sblga/oilgas/statewide\\_oilgas\\_prog\\_info.pdf](https://www.tceq.texas.gov/assets/public/assistance/sblga/oilgas/statewide_oilgas_prog_info.pdf).

produced on its own. Those associated with the oil and gas industry and with the freshwater production industry may find this paper useful, but it is particularly focused on “water wildcatters” – those who drill water wells and produce water for sale to the oil and gas industry.

## II. DEFINING BRINE AND BRACKISH WATER

There are two major types of water suitable for commercial use – groundwater and surface water. In Texas, groundwater is defined as “water percolating below the surface of the earth.”<sup>6</sup> Water found below the surface of the earth is presumed to be percolating water.<sup>7</sup> But, not all subsurface water is considered groundwater. For example, Texas classifies underground streams and the underflow of surface streams or rivers as surface water.<sup>8</sup> Surface waters or “state water[s]” are defined as:

The water of the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state is the property of the state....<sup>9</sup>

As will be discussed in greater detail in Sections III and IV, each type of water is governed by its own body of law. Groundwater is privately owned as part of the surface estate of land. The production of groundwater is governed by a combination of the rule of capture and decentralized administrative regulation through local groundwater conservation districts or other agencies. Conversely, Chapter 11.021 of the Texas Water Code reserves all surface waters to the State of Texas. The appropriation, impoundment, use, sale and lease of surface water is highly regulated and governed by specific case law, statutes and other rules. A rather complicated permit system for surface water exists under the Texas Water Code, which is administered by the Texas Commission on Environmental Quality.<sup>10</sup> The laws and administrative rules relating to the use of surface water do not apply to groundwater.<sup>11</sup>

Groundwater itself is further classified into a number of subcategories. The terms “brine” and “brackish water” are often used in the media, in the oil and gas and commercial water industries, and in Texas law, to describe a type of groundwater, but these terms are rarely defined with precision. On the most basic level, these terms refer to underground water which contains a higher salt and/or mineral content than what is normally considered freshwater. The mineral content of the water is measured in milligrams per liter (mg/L) of total dissolved solids (TDS).

There is no statewide statutory definition of “brine” or “brackish water.” However, the Texas Water Development Board (hereafter TWDB) does provide relatively clear definitions of the different types of groundwater. The Texas Water Board’s definitions draw the line between fresh and brackish water at 1,000 mg/L TDS:

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<sup>6</sup> TEX. WATER CODE §§ 35.002(5) and 36.001(5) (LEXIS through 2013 3rd Called Session).

<sup>7</sup> Texas Company v. Burkett, 296 S.W. 273 (1927).

<sup>8</sup> 30 TEX. ADMIN. CODE § 297.1(21) (LEXIS 2015)

<sup>9</sup> TEX. WATER CODE § 11.021(a) (LEXIS through 2013 3rd Called Session).

<sup>10</sup> See generally TEX. WATER CODE § 11.001 *et seq.*

<sup>11</sup> TEX. WATER CODE § 35.003 (LEXIS through 2013 3rd Called Session).

Brackish water typically contains TDS in concentrations ranging from 1,000 milligrams per liter (mg/l) to 10,000 mg/l. Saline water or salt water has more than 10,000 mg/l TDS. And, brine is very salty water (TDS greater than 35,000 mg/l). Seawater typically is very salty (TDS >35,000 mg/l).<sup>12</sup>

Unfortunately, even the TWDB is not consistent in the way it uses the terms. On a different frequently asked question webpage related to brackish water, the TWDB adds additional categories of saline water and does not use the term “brine”:

Brackish groundwater contains dissolved minerals in the range of 1,000 to 9,999 milligrams per liter (mg/L). Water is classified as fresh (0–999 mg/L), slightly saline (1,000–2,999 mg/L), moderately saline (3,000–9,999), and saline (greater than 10,000 mg/L).<sup>13</sup>

These definitions are not found in Texas case law and are not found in Chapter 36 of the Texas Water Code which governs the regulation of groundwater. Instead, the TWDB categories appear to be based on (1) the definition of “underground source of drinking water” found in Federal regulations (using 10,000 mg/L TDS as an upper bound for contamination)<sup>14</sup> and (2) on current desalination practice which considers water with more than 3,000 mg/L TDS unusable without treatment and considers water with up to 10,000 mg/L TDS a potential source of future usable water.<sup>15</sup>

The Railroad Commission’s water quality definitions follow a similar pattern. The Railroad Commission identifies “freshwater zones, base of usable-quality water” as “generally less than 3,000 mg/L total dissolved solids, but may include higher levels of total dissolved solids if identified as currently being used or identified by the TWDB as a source of water for desalination...”<sup>16</sup> The Groundwater Advisory Unit (hereinafter Unit) of the Railroad Commission uses a three-tiered evaluation of water quality when issuing groundwater protection determinations to well drillers. The Unit identifies freshwater (< 1,000 mg/L TDS), usable-quality groundwater (3,000 mg/L TDS and other waters known to be used or identified as sources of desalination water), and, for saltwater disposal wells, underground sources of drinking water (< 10,000 mg/L TDS).<sup>17</sup>

Local groundwater authorities also use their own definitions, which generally follow the definitions provided by the TWDB. For example, the Edwards Aquifer Authority draws the line

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<sup>12</sup> *Brackish FAQs*, <http://www.twdb.state.tx.us/innovativewater/desal/faqbrackish.asp#title-01> (last accessed Feb. 4, 2015); TEXAS WATER DEVELOPMENT BOARD, WATER FOR TEXAS 2012 STATE WATER PLAN 247 (2012) available at [http://www.twdb.texas.gov/publications/state\\_water\\_plan/2012/2012\\_SWP.pdf](http://www.twdb.texas.gov/publications/state_water_plan/2012/2012_SWP.pdf).

<sup>13</sup> *Frequently Asked Questions*, <http://www.twdb.texas.gov/innovativewater/bracs/faq.asp#title-02> (last accessed Feb. 4, 2015).

<sup>14</sup> See 40 CFR § 146.3 (2014).

<sup>15</sup> TEXAS WATER DEVELOPMENT BOARD, GUIDANCE MANUAL FOR BRACKISH WATER DESALINIZATION IN TEXAS 7 (2008) available at [http://www.twdb.texas.gov/publications/reports/contracted\\_reports/doc/0604830581\\_BrackishDesal.pdf](http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0604830581_BrackishDesal.pdf).

<sup>16</sup> 16 TEX. ADMIN. CODE § 3.30(e)(7)(B)(i) (LEXIS 2015).

<sup>17</sup> *Groundwater Advisory Unit*, <http://www.rrc.state.tx.us/oil-gas/applications-and-permits/groundwater-advisory-unit/> (last updated Nov. 4, 2014, 4:18 PM).

between fresh and “saline water” at 1,000 mg/L TDS.<sup>18</sup> Of the seven groundwater districts identified by Texas Alliance of Groundwater Districts website as having separate rules for brackish water,<sup>19</sup> only five define brackish water in their district rules. Two districts define brackish water as water containing more than 1,000 mg/L TDS, two define it as between 1,000 – 10,000 mg/L TDS, and one defines “Brackish, Salt, or Brine water” as water with a chloride concentration greater than 300 parts per million.<sup>20</sup> According to the same website, many other groundwater conservation districts do not have separate rules for brackish water, but assert that brackish water is “encompassed within current regulations of all groundwater.”<sup>21</sup>

The key takeaway here is that governmental authorities draw the line between fresh and brackish water in different places. These discrepancies require those interested in commercially producing brackish water to carefully define the type of water they wish to produce and to thoroughly familiarize themselves with the local and state regulations which apply to their proposed project area.

An additional practical point is that, as they are currently written, groundwater regulations may not provide adequate guidance for regulators or for industry. As noted in one amicus in the recently decided *Environmental Processing Systems v. FPL Farming Ltd.*, it is difficult to reconcile the position that groundwater includes saltwater and brine (taken by the Supreme Court in *Robinson v. Robbins Petroleum Corp., Inc.* 501 S.W.2d 865, 867 (Tex. 1973) and by the Beaumont Court of Appeals) with the various portions of the Water Code which distinguish between groundwater and saltwater – “[F]or example, the [Water Code] provision defining ‘waste’ as ‘harmful alteration of groundwater in a groundwater reservoir by saltwater or by other deleterious matter admitted from another stratum....”<sup>22</sup> This inconsistency was not a central issue in the case, but, at some point, the Texas Supreme Court may not be able to avoid this issue.

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<sup>18</sup> TEX. WATER CODE 27.0516 §§ (3) and (4) (LEXIS through 2013 3rd Called Session).

<sup>19</sup> *Groundwater Conservation District Index*, <http://www.texasgroundwater.org/gcdi-map.html>; then under Parameter Search; select category Brackish Water; select Yes; click Submit Query (last visited Feb. 4, 2015).

<sup>20</sup> Rules of the Evergreen Groundwater Conservation District, Rule 1.1(al) available at <http://www.evergreenwcd.org/files/Evergreen%20rules%20Adopted%201-23-09.pdf>; Gonzales County Underground Water Conservation District, Rules of the District 2 (revised March 6, 2010) available at <http://www.gcuwcd.org/images/GCUWCD%20FINAL%20RULES%202010.pdf>; Plum Creek Conservation District, Groundwater Management and Protection Rules 1.9 (also defining Brine as >35,000 mg/L TDS) available at <http://www.pccd.org/PCCD%20GW%20Management%20&%20Protection%20Rules.pdf>; Rules of Pecan Valley Groundwater Conservation District 8 (revised October 15, 2013) available at <http://www.pvgcd.org/docs/pvgcdrule.pdf>; Piney Woods Groundwater Conservation District Rules, Rule 1.1(aa) (revised Jan. 13, 2011) available at [http://www.pgcd.org/uploads/media/PGCD\\_rules\\_1-13-11.pdf](http://www.pgcd.org/uploads/media/PGCD_rules_1-13-11.pdf).

<sup>21</sup> E.g., *Groundwater Conservation District Index*, <http://www.texasgroundwater.org/gcdi-map.html>; then under Parameter Search; select category Brackish Water; select No; click Submit Query; select Culberson County (last visited Feb. 4, 2015).

<sup>22</sup> Brief of Amicus Curiae Texas Oil & Gas Assoc. in Support of Petition for Review, (No. 12-0905), 2013 WL 145861, at\*8 n.1 (Tex. Jan. 7, 2013) (emphasis in original) (citing TEX. WATER CODE §36.001(8)(D)). See also Charles Nixon, *The Continuing Saga of FPL Farming V. Environmental Processing Systems: Will the Texas Supreme Court Set New Rules of Liability for Underground Trespass?* 8 TEX. J. OIL GAS AND ENERGY L. 428 (2012-2013).

As the above discussion demonstrates, the legal definitions of brine and brackish water are less than clear. As the demand for brackish water increases, local groundwater districts, if not the Texas Legislature, may find it necessary to distinguish between the two types of water. These changes may not be far away. Brackish water legislation was introduced during the 2013 legislative session<sup>23</sup> and it has already surfaced during the 2015 session. For example, Representative Lyle Larson (R-San Antonio) recently introduced HB 30 which would, among other things, amend Chapter 36 of the Texas Water Code to provide for the creation of “brackish groundwater production zones” for desalinization operations.<sup>24</sup>

### III. LAND TITLE REVIEW

As a threshold issue, developers of brackish water resources must determine who owns the brackish water in their target tract(s). Then, developers must negotiate an agreement with the owner(s) of the target water. Generally, a traditional, commercial water lease with the physical land (surface) owners is sufficient. However, complicated title situations can and do arise regarding the different and possibly separate estates in the surface, freshwater, brackish water, and minerals.

Groundwater is not a “mineral.”<sup>25</sup> Instead, Texas has recognized water as a part of the surface estate of land, except in those cases where the groundwater rights have been specifically reserved or conveyed.<sup>26</sup> Accordingly, groundwater rights are one of the “sticks” held by an owner of real property and may be leased or conveyed. Recently, the Texas Legislature codified this principle in Tex. Water Code § 36.002 (a), which states, “The legislature recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property.”<sup>27</sup> The Texas Supreme Court has also made it clear that the owner of the groundwater beneath a tract of land owns the groundwater in place.<sup>28</sup> Ownership of groundwater is not limited to fresh or usable water. Groundwater also includes saltwater and brine.<sup>29</sup>

The bottom line is that a person or entity intending to acquire groundwater rights to brackish water or brine in a particular tract of land must carefully examine the entire chain of title from Sovereignty of the Soil through the present to identify if groundwater rights have been

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<sup>23</sup> Neena Satija, *Brackish Water Abounds, but Using It Isn't Simple*, THE TEXAS TRIBUNE (Jan. 8, 2014) available at <http://www.texastribune.org/2014/01/08/plenty-brackish-water-underground-still-elusive/>.

<sup>24</sup> House Bill 30, <http://www.capitol.state.tx.us/BillLookup/History.aspx?LegSess=84R&Bill=HB30> (last visited Feb. 4, 2015).

<sup>25</sup> *Moser v. United Steel Corp.*, 676 S.W.2d 99, 102 (Tex. 1984); *Sun Oil v. Whitaker*, 483 S.W. 2d 808, 811 (Tex. 1972); *Fleming Foundation v. Texaco*, 337 S.W.2d 846 (Tex. Civ. App.—Amarillo 1960, writ ref'd n.r.e.); TEX. NAT. RES. CODE § 53.1631 (LEXIS through 2013 3rd Called Session) (“[G]roundwater shall not be considered a mineral in any past or future reservation of title or rights to minerals by the State of Texas.”).

<sup>26</sup> *Texas Co. v. Burkett*, 296 S.W. 273 (1927); *Whitaker*, 483 S.W.2d at 811.

<sup>27</sup> (LEXIS through 2013 3rd Called Session).

<sup>28</sup> *Edwards Aquifer Authority v. Day*, 369 S.W.3d 814, 823 (Tex. 2012) (“[W]e held long ago that oil and gas are owned in place, and we find no reason to treat groundwater differently.”).

<sup>29</sup> *Robinson v. Robbins Petroleum Corp., Inc.*, 501 S.W.2d 865, 867 (Tex. 1973) (“We are not attracted to a rule that would classify water according to a mineral contained in solution. Water is never absolutely pure unless it is treated in a laboratory.... And in our case the saline content has no consequence upon ownership.”); *FPL Farming Ltd. v. Env'tl. Processing Syst., L.C.*, 383 S.W. 3d 274, 279 (Tex. App.—Beaumont 2012) *reversed on other grounds by Env'tl. Processing Syst., L.C. v. FPL Farming, Ltd.*, 58 Tex. Sup. J. 293 (Tex. 2015).

separately conveyed or if the groundwater rights were specifically included as part of a reserved or conveyed mineral estate. The mineral estate or leasehold includes the exclusive right to groundwater if, and only if, the creating instrument specifically devised ownership of or the right to use groundwater. Buyers or lessees of groundwater rights should also carefully examine record title for deed restrictions, prior groundwater leases, etc. Texas courts have enforced restrictive covenants which prohibit drilling water wells.<sup>30</sup> More importantly, many tracts of land, especially those near urban areas, are already covered by groundwater leases. These leases often define groundwater broadly and include all water at all depths. But, specific language may limit the lease to certain depths or certain qualities of water and, therefore, leave the rights to saltwater or brine available for leasing.

#### IV. PERMITTING

Production of groundwater is governed by the rule of capture.<sup>31</sup> The rule of capture provides that “absent malice or willful waste, landowners have the right to take all the water they can capture under their land and do with it what they please, and they will not be liable to neighbors even if in so doing they deprive their neighbors of the water’s use.”<sup>32</sup> Other than restrictive covenants found in the chain of title, the only private limitation on the landowner’s right to withdraw water is the slight risk of liability for the subsidence of an adjoining owner’s land caused by the negligent, willful, wasteful or malicious withdrawal of water.<sup>33</sup>

Private limitations on the production of groundwater are relatively rare. The main limitation on the rule of capture is the State’s police power. “[T]he State has the right to regulate use of underground water.”<sup>34</sup> In Texas, the production of groundwater is regulated by local groundwater conservation districts (hereafter GCD or GCDs), like the Wintergarden GCD, or local agencies, like the Edwards Aquifer Authority or the Harris-Galveston Subsidence District. In the case of brackish water and water produced with oil and gas, the Railroad Commission also plays a role.

GCDs are Texas’ preferred method of regulating groundwater.<sup>35</sup> There are currently 98 confirmed GCDs which cover all or part of 179 of Texas’ 254 counties.<sup>36</sup> Among other powers, GCDs have the authority to require the registration of wells, to require drilling and production permits, to define well spacing, to manage the transportation of water out of the district, and to

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<sup>30</sup> Griffith v. Pecan Plantation Owners Ass’n, 667 S.W.2d 626 (Tex. App.—Fort Worth, 1984, no pet.); Susan M. Maxwell & Denise V. Cheney, *Groundwater Transactions*, in *ESSENTIALS OF TEXAS WATER RESOURCES*, 18-32 (Mary K. Sahs ed., 2nd ed. 2012).

<sup>31</sup> *E.g.*, Day, 369 S.W.3d at 823-25; Houston & T.C. Ry. Co. v. East, 81 S.W. 279 (1904).

<sup>32</sup> Day, 369 S.W.3d at p. 827 (quoting Sipriano v. Great Spring Waters of America, Inc., 1 S.W.3d, 75, 76 (Tex. 1999)).

<sup>33</sup> Friendswood Dev. Co. v. Smith S.W. Indus., 576 S.W.2d 21, 30 (Tex. 1978).

<sup>34</sup> Barshop v. Medina Underground Water Conservation Dist., 925 S.W.2d 618 (Tex. 1996).

<sup>35</sup> TEX. WATER CODE § 26.0015 (LEXIS through 2013 3rd Called Session).

<sup>36</sup> *Texas Groundwater Conservation Districts* (Jan. 2015),

<http://www.tceq.state.tx.us/assets/public/permitting/watersupply/groundwater/maps/gcdmap.pdf> (last visited January 25, 2015); *What is a Groundwater Conservation District (GCD)?*,

[https://www.tceq.texas.gov/assets/public/permitting/watersupply/groundwater/maps/gcd\\_text.pdf](https://www.tceq.texas.gov/assets/public/permitting/watersupply/groundwater/maps/gcd_text.pdf) (last visited January 25, 2015).

limit water production.<sup>37</sup> This decentralized regulatory structure allows for local adaptation but also creates a regulatory landscape that is difficult to navigate. To make matters more complicated, as the Supreme Court noted in *Day*, “Districts may have different rules; indeed, a district may adopt different rules for different areas of the district. Special legislation, unique to each district, may also grant powers beyond those provided by [Texas Water Code] chapter 36.”<sup>38</sup>

Chapter 36 of the Texas Water Code “applies to water wells, including water wells used to supply water for activities related to the exploration or production of hydrocarbons or minerals” but does not apply “to production or injection wells drilled for oil, gas, sulphur, uranium, or brine or for core tests, or for injection of gas, saltwater, or other fluids, under permits issued by the Railroad Commission of Texas.”<sup>39</sup> At first glance, it may appear as though brackish water and brine production wells are exempt from the Water Code. Although there is no case law on this issue, it is likely that the term “brine” included in the exemption above refers to solution mining or brine injection wells, not the type of brackish water or brine well considered in this paper.<sup>40</sup>

The brackish water production contemplated by this paper is subject to Chapter 36 of the Water Code. Brackish water produced specifically for the purpose of supplying activities related to hydrocarbon exploration or production would, by definition, come from a water well. However, there is an important exception related to “rig supply wells.” Despite the fact that Chapter 36 applies, a groundwater conservation district may not require a permit for a “rig supply well”:

[T]he drilling of a water well used solely to supply water for a rig that is actively engaged in drilling or exploration operations for an oil or gas well permitted by the Railroad Commission of Texas provided that the person holding the permit is responsible for drilling and operating the water well and the well is located on the same lease or field associated with the drilling rig....<sup>41</sup>

Therefore, if an operator (1) has a Railroad Commission permit to drill an oil and gas well, (2) that operator drills and operates the water well, and (3) the well is located on the same lease or field associated with the permitted rig, the GCD may not require a permit. Although commercial brackish water production might appear to fit the exception for rig supply wells, the reality is that if a brackish water producer who is not the permitted oil and gas operator drills a water well and supplies water for drilling or completion, the water producer will not normally fall within the exception because the brackish water well is drilled and operated by an entity that does not hold the drilling permit for the related oil or gas well. The chance of a brackish water producer being able to use this exception decreases further if the water producer is selling brackish water to offsite oil and gas operators.

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<sup>37</sup> TEX. WATER CODE § 36.116(a) (LEXIS through 2013 3rd Called Session).

<sup>38</sup> *Day*, 369 S.W.3d at 835.

<sup>39</sup> TEX WATER CODE § 36.117(1) (LEXIS through 2013 3rd Called Session).

<sup>40</sup> See 16 TEX. ADMIN. CODE §§ 3.8(31), 3.81 (LEXIS 2015); TEX. WATER CODE §26.132 (LEXIS through 2013 3rd Called Session).

<sup>41</sup> TEX. WATER CODE § 36.117 (b)(2) (LEXIS through 2013 3rd Called Session) (emphasis added).

Moreover, once a water well “no longer supplies water solely to a rig that is actively engaged in drilling or explorations operations,” the local GCD may require a permit and compliance with all GCD rules.<sup>42</sup> The Railroad Commission interprets “exploration operations” to include well completion and fracturing.<sup>43</sup> But, as fracking operations have demanded larger amounts of groundwater, some GCDs have read this exception narrowly. By their reading, fracturing is not “drilling or exploration operations” and, therefore, operators are required to obtain a permit for fracking supply wells.<sup>44</sup> For example, as of March 2014, the Wintergarden GCD (covering Dimmit, La Salle, and Zavala Counties) viewed fracturing supply wells as exempt from the district permitting processes, but the neighboring Evergreen GCD (Frio, Atascosa, Wilson, and Karnes Counties) read the exemption narrowly.<sup>45</sup> Much like the definitions of brackish water and brine discussed above, it is probably only a matter of time before the Legislature steps in to resolve this ongoing controversy between the Railroad Commission and local groundwater districts.

As a practical matter, depending on the GCD, production of brackish water may require both registration and a permit (or permits). Even if a well is exempt under Water Code § 36.117(b)(2), GCDs may require the well to be registered and equipped in accordance with district rules.<sup>46</sup> Registration and reporting requirements are common and permit requirements vary. Therefore, it is important for oil and gas operators and those considering producing brackish water commercially to determine (1) if the proposed water well site is within a GCD, (2) how the local GCD regulates drilling, well design, and production, and (3) if there is a need for a “pass through” permit from the local GCD or conservation agency that ensures an appropriate drilling and casing program to protect freshwater from the brackish water that will be brought up through production tubing.<sup>47</sup>

It is also worth noting that “[a] district may not deny an application for a permit to drill and produce water for hydrocarbon production activities if the application meets all applicable rules as promulgated by the district.”<sup>48</sup> That being said, brackish groundwater will almost always be located deeper than any known or currently used freshwater supply formation or sands. Therefore, the Railroad Commission will also play a role in permitting. The brackish water operator will receive sufficient statutory and government agency clearance by securing two sources of documentation. First, the operator should secure a useable quality groundwater letter from the Groundwater Advisory Unit of the Railroad Commission of Texas (specifically one

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<sup>42</sup> *Water Use in Association with Oil and Gas Activities*, <http://www.rrc.state.tx.us/about-us/resource-center/faqs/oil-gas-faqs/faq-water-use-in-association-with-oil-and-gas-activities/> (last visited Feb. 4, 2015).

<sup>43</sup> *Id.*

<sup>44</sup> Deborah Gordon & Katherine Garner, *Texas's Oil and Water Tightrope*, (Mar. 11, 2014) available at <http://carnegieendowment.org/2014/03/11/texas-s-oil-and-water-tightrope/>.

<sup>45</sup> *Id.*

<sup>46</sup> TEX. WATER CODE § 36.117(h) (LEXIS through 2013 3rd Called Session).

<sup>47</sup> *Well Construction*, <http://edwardsaquifer.org/well-owners/well-construction> (last updated 2013); *Application for “Drill Through Edwards Aquifer” Well Construction Permit*, available at <http://www.edwardsaquifer.org/files/download/0d9cf791229754a> (last visited Feb. 2, 2015).

<sup>48</sup> Tex. Water Code § 36.117(g) (LEXIS through 2013 3rd Called Session).

sufficient for a saltwater disposal well by filing a Form W-14 and a Form GW-1).<sup>49</sup> All formations lying deeper than those identified in the letter are identified as sources of brackish water or other formations into which saltwater may be disposed or which may be eligible for an underground injection control permit. By corollary, the pumping of water from a zone that would be eligible to receive disposed exempt oilfield waste is, by definition, not usable quality water. Thus, the letter indirectly qualifies the brackish water formation as a legitimate common source of supply. Second, in addition to the recommendations above, the well developer (through its driller) should review the regulations of any applicable groundwater conservation district to identify those formations which are regulated potential sources of industrial, municipal or irrigation water and then only permit wells lying below the deepest formation identified by the agency.

## V. RURAL PRACTICES WITH FRESHWATER OF LESS THAN POTABLE STANDARDS.

In rural communities, particularly in the western part of Texas, groundwater of less than pristine quality has been utilized for many years for the purposes of watering cattle and, to a lesser extent, for irrigation. Livestock can tolerate water of lower quality than would be suitable for human consumption.<sup>50</sup> For livestock purposes, water with high sulfur content may be pumped to the surface and run to tanks or ponds where natural aeration occurs. Once the water is brought to the surface, sulfur and other high gas products vapor off, leaving a substantial amount of water that is of sufficient quality for animals. Consequently, unregulated use of non-potable water has occurred for many years, principally through deep water wells which produce water with high sulfur or other mineral content.

Additionally, the Railroad Commission, through an individual, case-by-case permitting system has allowed the treatment of produced water – water that is naturally entrained in oil and gas reservoirs (principally in the Georgetown Formation in Southwest Texas) – to be reused for livestock and other uses.<sup>51</sup> Under this system, oil and lightly impacted groundwater from the same oil and gas bearing formation are run through an oil water separator and then allowed to aerate. If distilled water is produced by the recycling process, no permit is required to use the water in any manner other than discharging it into the waters of the state. The Commission analyzes other treated fluids and, depending on their source, constituents, the volume of fluids involved, and other factors may authorize the fluids to be used for livestock purposes.<sup>52</sup>

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<sup>49</sup> See *Groundwater Advisory Determination for Saltwater Disposal Wells* (last updated Apr. 2, 2014 2:26 PM) available at [http://www.rrc.state.tx.us/oil-gas/applications-and-permits/groundwater-advisory-unit/gau\\_saltwater\\_disposal/](http://www.rrc.state.tx.us/oil-gas/applications-and-permits/groundwater-advisory-unit/gau_saltwater_disposal/); Instructions for Completing Form GW-1 Groundwater Determination Request Form (last updated April 2, 2014 2:25 PM) available at [http://www.rrc.state.tx.us/oil-gas/applications-and-permits/groundwater-advisory-unit/gau\\_form\\_instructions/](http://www.rrc.state.tx.us/oil-gas/applications-and-permits/groundwater-advisory-unit/gau_form_instructions/).

<sup>50</sup> FLORON C. FAIRES, JR. ET. AL, WATER QUALITY: ITS RELATIONSHIP TO LIVESTOCK 3 (1998) available at [http://publications.tamu.edu/WATER/PUB\\_water\\_Water%20Quality%20Relative%20to%20Livestock.pdf](http://publications.tamu.edu/WATER/PUB_water_Water%20Quality%20Relative%20to%20Livestock.pdf); ROBERT C. REEDY, ET. AL, NATURALLY OCCURRING GROUNDWATER CONTAMINATION IN TEXAS 8 (2011) available at [http://www.twdb.texas.gov/publications/reports/contracted\\_reports/doc/1004831125.pdf](http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/1004831125.pdf).

<sup>51</sup> 16 TEX. ADMIN. CODE § 3.8(d)(7) (LEXIS 2015).

<sup>52</sup> *Id.*

These rural handling practices have been in place for years without any reported contamination to freshwater zones or problems related to regulatory coverage by groundwater districts, the Texas Commission on Environmental Quality or the Texas Water Development Board. "Produced water," water that comes to the surface as a byproduct of oil and gas production, is beyond the scope of this paper. To the extent brackish water is encountered through oil and gas production wells and comes to the surface as "produced water," it is regulated as oil and gas waste and subject to the jurisdiction of the Railroad Commission.<sup>53</sup>

## **VI. CONTINGENCY PROVISIONS FOR DRAWING OF FRESHWATER INSTEAD OF SALTWATER.**

Some brackish water resides in a common formation and exists in "contact" with freshwater. For example, in the Edwards Aquifer the boundary between fresh and saline or brackish water is often referred to as the "bad water line."<sup>54</sup> Normally, groundwater (both fresh and brackish) is owned by the owner of the surface estate. Under most circumstances, the landowner and water producer should be able to come to an agreement regarding the production of freshwater along with brackish water in the reservoir areas with brackish/fresh water contact. However, in those cases where the freshwater has either been severed or in which freshwater supply operations are underway by a third party water lessee, then there will be occasions for disputes between brackish water producers and freshwater producers. These disputes can be caused by (1) the potential for the boundary between fresh and brackish water to move due to water production and (2) the fact that there is no bright line boundary between fresh and brackish water other than the amount of chlorides or other dissolved minerals found in the water. Consequently, any comprehensive agreement allowing for the production of brackish water should provide for a release of liability for producing from the freshwater zone or causing the freshwater zone to be drawn down into the brackish water zone by heavy pumping.

There are a number of contract mechanisms that could handle this problem. But, the simplest fixes would involve a contractual release or provide for an increased or additional payment(s) to the Lessor as produced groundwater approaches potable quality standards or freshwater approaches brackish standards. This is not just a law school hypothetical scenario. The potential intrusion of brackish water into freshwater zones emerged as a delicate issue during the planning of the San Antonio Water System's (SAWS) brackish water desalinization program. According to the Texas Tribune, the Evergreen Water Conservation District's concerns regarding brackish water intrusion caused SAWS to relocate the project.<sup>55</sup>

If fresh and brackish groundwater are in contact, brackish water producers should (1) carefully monitor water quality levels and (2) consider targeting deeper, captive formations to avoid possible complications with local GCDs. If brackish water intrusion into freshwater zones is a potential issue, the brackish water producer should install metering and testing equipment to provide for monthly (if not weekly) testing of the brackish water constituent parts (primarily

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<sup>53</sup> 16 TEX. ADMIN. CODE §§ 3.30(2)(A)(i) and (B)(i) (LEXIS 2015).

<sup>54</sup> See e.g., REFINING THE FRESHWATER/SALINE-WATER INTERFACE, EDWARDS AQUIFER, HAYS AND TRAVIS COUNTIES, TEXAS, BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICT 5 (Oct. 2014) available at [http://www.bseacd.org/uploads/AquiferScience/Reports/Refining\\_the\\_Saline\\_FINAL.pdf](http://www.bseacd.org/uploads/AquiferScience/Reports/Refining_the_Saline_FINAL.pdf).

<sup>55</sup> Satija, *supra* note 23.

TDS). If brackish water production causes drainage and/or impacts freshwater production from an off tract location, the rule of capture is implicated and there is no private liability.<sup>56</sup> But, there will likely be consequences from local regulators (if any). A negatively affected freshwater producer will almost surely seek relief from the local GCD and, if brackish water is in fact intruding into the freshwater reservoir, the GCD will most likely shut in or limit production from the brackish well. For example, the Evergreen GCD rules require 1) a Carrizo-Wilcox monitor well to be located within 100 feet of all brackish water wells and 2) provide that the GCD may temporarily or permanently suspend the permit(s) for brackish groundwater production or impose additional permit conditions if brackish water production affects the Carrizo-Wilcox Aquifer.<sup>57</sup> From a practical standpoint, brackish water producers should accumulate brackish water production data and monitor well data in order to be prepared for any potential claims of brackish water intrusion. These scenarios underscore the importance of being familiar with local GCD rules and avoiding negative impacts on freshwater resources.

## VII. TEXAS OILFIELD ANTI-INDEMNITY ACT

Potential producers of brackish water should shield themselves from liability for accidents which may occur during drilling or production operations. Such protection often comes in the form of an indemnity provision written into service contracts, investment agreements or site leases. Indemnity provisions must be carefully drafted in order to be enforceable. A full discussion of indemnity provisions is beyond the scope of this paper, but a brief discussion of the Texas Oilfield Anti-Indemnity Act (the Act) is necessary because it may create a trap for the unwary. With few exceptions, the Act applies to agreements “pertaining to a well for oil, gas, or water,” including those related to well services.<sup>58</sup> The Act is broad in scope and includes agreements related to well drilling, well testing, and water transportation (fresh, brine, and/or produced).<sup>59</sup> The Act specifically refers to water wells and to brine; there is no room for interpretation here.

The Act provides that an indemnity provision is void as against public policy if the provision indemnifies a party against loss or liability for damage that:

- (1) is caused by or results from the sole or concurrent negligence of the indemnitee, his agent or employee, or an individual contractor directly responsible to the indemnitee; and
- (2) arises from:
  - (A) personal injury or death;
  - (B) property injury; or
  - (C) any other loss, damage, or expense that arises from personal injury, death, or property injury.<sup>60</sup>

Such a provision is void unless it meets the requirements of the express negligence doctrine, the fair notice rule, and meets a specific exception found in the Act.<sup>61</sup> The express negligence

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<sup>56</sup> See *Sipriano v. Great Spring Waters of America, Inc.*, 1 S.W.3d 75 (Tex. 1999).

<sup>57</sup> Rules of the Evergreen Groundwater Conservation District, Rules 6.10(d) and (d)(1), available at <http://www.evergreenuwcd.org/files/Evergreen%20rules%20Adopted%201-23-09.pdf>.

<sup>58</sup> TEX. CIV. PRAC. & REM. CODE § 127.001(1) (LEXIS through 2013 3rd Called Session).

<sup>59</sup> TEX. CIV. PRAC. & REM. CODE § 127.001(4)(A)(i) (LEXIS through 2013 3rd Called Session).

<sup>60</sup> TEX. CIV. PRAC. & REM. CODE § 127.003 (LEXIS through 2013 3rd Called Session).

<sup>61</sup> Gerald F. Slattery, Jr., *Indemnity and Insurance in the Texas Oil Patch*, 10 TEX. J. OIL GAS & ENERGY L. 99, 128 (2015).

doctrine states that a party seeking indemnity from the consequences of that party's own negligence must express that intent in specific terms within the four corners of the contract. The "fair notice rule" provides that indemnity provision must be conspicuous – "something must appear on the face of the [contract] to attract the attention of a reasonable person when he looks at it."<sup>62</sup> Finally, the Act carves out a few exceptions to its general prohibition of indemnity clauses that operate to protect the indemnitee (the party protected by the indemnity provision). Specifically, the Act does not apply to agreements where the parties agree in writing that the indemnity provision will be supported by liability insurance coverage to be furnished by the indemnitor (the party providing the indemnity) if (1) in the case that both parties choose to indemnify each other, the obligation is limited to the extent of the coverage provided by both parties or (2) if the indemnity obligation is unilateral, the amount of insurance may not exceed \$500,000.<sup>63</sup>

There are two additional exemptions that are worth noting. First, the Act targets agreements between operators and contractors, not operators and landowners. It does not "deprive an owner of the surface estate of the right to secure indemnity from a lessee, an operator, a contractor, or other person conducting operations for exploration or production."<sup>64</sup> Second, the Act does not apply to loss or liability arising from personal injury due to radioactivity, property damage due to pollution (including cleanup and control of pollutants), property loss that results from reservoir or underground damage, and losses related to wild wells.<sup>65</sup> Therefore, producers of brackish water should consider specifically addressing property damage due to pollution in indemnity provisions.

As this discussion makes clear, indemnity provisions should not be viewed as mere boilerplate. Potential producers of brackish water should carefully draft indemnity provisions to ensure that these provisions will be enforceable.

## VIII. INSURANCE

Problems with brackish water production wells can cause substantial surface contamination and have the potential to put livestock and humans at risk. Insurance for any industrial operation is a wise investment, but for a brackish water production it is an absolute necessity. Due to potential contamination concerns, most landowners and operators will require a brackish water pumping, storage, and load out facility to carry traditional liability insurance coverage. The most common and necessary forms of insurance are general commercial liability policies which cover normal business risks causing personal injury or property damage to third parties.<sup>66</sup> This type of insurance will normally also support the indemnities under the lease or production agreement, and, possibly, provide additional insured status to the landowner or other investors. This type of policy and endorsement is called contractually assumed liability or an "insured contract."<sup>67</sup> Most commercial general liability policies cover the named insured (here

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<sup>62</sup> *Id.* at 107-08 (quoting *Dresser Indus., Inc. v. Page Petroleum, Inc.*, 853 S.W.2d 505, 511 (Tex. 1993)).

<sup>63</sup> TEX. CIV. PRAC. & REM. CODE § 127.002 (LEXIS through 2013 3rd Called Session).

<sup>64</sup> TEX. CIV. PRAC. & REM. CODE §§ 127.002 and .007 (LEXIS through 2013 3rd Called Session).

<sup>65</sup> TEX. CIV. PRAC. & REM. CODE § 127.004 (LEXIS through 2013 3rd Called Session).

<sup>66</sup> *E.g.*, Commercial General Liability Coverage Form, CG 00 01 12 07.

<sup>67</sup> *E.g.*, Amendment of Insured Contract Definition, CG 24 26 02 04.

the well operator), and the landowner or investors in the facility (as an additional insured under the policy, but sharing the policy limits) for personal injury and property damage claims that are caused by routine accidents. The landowner may also have inclement protection from the insurance because it back-stops the indemnity.

Unfortunately, general commercial liability policies often exclude pollution. For example, this can occur under what is commonly called the “sudden and accidental pollution exclusion.” This exclusion is a result of environmental laws dating from the 1970s and strict liability statutes, where insurance companies sought to avoid coverage for past or on-going environmental issues. Because of this, many commercially available “business” liability policies excluded all pollution claims that resulted in personal injury or property damage unless those claims fell within in a narrow category of “sudden and accidental pollution.” This meant that certain policies did not cover a significant pollution event that resulted from, for example, a slow leak. Contamination that occurred over longer periods would be excluded because such contamination was not a one-time, sudden event. These types of events can occur due to a variety of causes from faulty casing to incomplete completion programs to substandard maintenance. Regardless, most common commercial general liability policies simply exclude pollution totally which means that the operator must purchase a separate type of insurance commonly referred to as a Pollution Legal Liability Policy or PLL Policy.<sup>68</sup>

The practical takeaway here is that brackish water producers should obtain an additional PLL policy that covers their operations from the date of well construction through ultimate shutdown. PLL policies are common and are routinely used for oil and gas facilities. These policies cover operations on the surface and will cover cleanup obligations and contractual or tort liability for damages to others because of pollution. PLL policies are often sold along with and overlay the commercial liability policy maintained by the operator. Brackish water producers should ensure that their facilities are scheduled as listed properties and expressly covered by any relevant policy.

## **IX. HANDLING AND FACILITIES**

By in large, the physical apparatus, wellbores, pumping and storage equipment related to brackish water production are almost identical to a traditional, high volume industrial or agricultural water well. The major exceptions are the enhanced quality of the casing program needed to prevent salt or brackish water from encroaching upon freshwater horizons and the more comprehensive surface containment system required to prevent or mitigate brackish water spills during storage or load-out.

Saltwater disposal facilities are required to follow specific construction and handling guidelines to address the unique natures of saltwater and common produced oilfield water. Because the production of brackish water involves similar, and in some cases identical fluids (at least as to salts and TDS), the following provisions should be included in commercial lease agreements regarding brackish water surface facilities. Potential producers of brackish water

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<sup>68</sup> *E.g.*, Pollution Liability Coverage Form, CG 00 39 12 07.

should expect these types of provisions to be common requests from their lessors and/or to be common permit requirements. These provisions include those:

- Requiring construction of a berm or dike facility around the water production area to contain water if the well or storage tanks leak.
- Requiring a substantial fence and gate system to prevent people and animals from accessing the well or storage facility.
- Requiring a comprehensive signage program identifying the water as not fit for human consumption.
- Requiring the construction of impervious cover for the truck loading and unloading facility (like a concrete pad with a drain connected to a catchment facility).
- Requiring substantial increase in the wall strength on the tank loading racks, tank facilities and the water pumping system.
- Requiring a leak monitoring and alarm system. This type of system is useful in case the volume of the saltwater stored in the tank battery drops unexpectedly (indicating a sudden leak to the tank or piping system). This monitoring system should be tied to the well pumps so that the pumps will shut-off if a leak is detected.
- Requiring that logs or records be kept if waste saltwater and waste handling trucks regulated by the Railroad Commission move the water.
- Requiring the installation of a monitor well and the development of a reasonable monitoring program. For example, a lease may require weekly water sampling to determine whether brackish water is causing a cone of depression to occur bringing freshwater into the brackish zone.
- Requiring a Spill Prevention, Control and Countermeasure Plan (SPCC plans) like the SPCC plans used in connection with oil and gas waste disposal and a detailed storm water pollution prevention and containment plan.

## **X. CONCLUSION**

Several major industries in Texas are starting to view brackish groundwater as more than just “bad water.” On one hand, Texas law clearly establishes title to brackish water and clearly outlines production procedures (well design, water transportation, handling, etc.). But, on the other, Texas lacks a standardized definition of “brackish water” and straightforward permitting requirements for brackish water production wells. As demand for brackish water increases, so will the demand for legal services related to its production and, hopefully, the demand for clearer guidance from regulators.