

In-state tuition for undocumented immigrants debated

Since 2001, when the 77th Legislature enacted HB 1403 by Noriega, Texas has treated certain longstanding resident undocumented immigrants living in Texas as in-state legal residents for admission to public colleges and universities and eligibility for in-state tuition rates.

Nationwide, debate persists over whether to admit undocumented immigrants to public colleges and universities and whether to charge them in-state or out-of-state tuition. While federal law does not prohibit undocumented immigrants from attending public colleges and universities, individual states have varying policies on whether to do so and how much tuition to charge.

In the United States, any child, regardless of immigration status, is entitled to free public primary and secondary education. In 1982, the U.S. Supreme Court, in *Plyler v. Doe*, 457 U.S. 202, held that a Texas statute that prohibited children who were illegal immigrants from receiving a free public education violated the Equal Protection Clause of the 14th amendment.

The Urban Institute estimates that between 50,000 and 65,000 undocumented immigrant students graduate from high schools in the United States each year. The Texas Legislature may revisit in the 2011 regular session of the 82nd Legislature whether or not to permit

these students to remain eligible for in-state tuition.

In-state tuition in Texas

In 2001, Texas became the first state to allow undocumented immigrants to establish state residency and pay in-state tuition at its public colleges and universities. The Texas law does not specifically address immigration status, but it defines eligibility for in-state tuition with requirements that some undocumented students may

satisfy, including living in Texas with a parent or guardian for three years immediately preceding high school graduation or receipt of an equivalency diploma (GED).

State law allows those classified as Texas residents to pay resident, or in-state, tuition. As residents, students also are eligible for state financial aid. Texas law does not stipulate U.S. citizenship as a prerequisite for Texas residency and makes residency requirements

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Concerns raised about methods of natural gas recovery from shale

Advances in drilling techniques have increased natural gas production from shale rock formations in Texas and other states, but also have led to concerns about the effects the extraction methods may have on water and air quality and on public safety.

Natural gas drilling in the Barnett Shale formation in North Texas has increased significantly in the last decade. While this has been a boon to the oil and gas industry and to cities, counties, and landowners in North Texas, as drilling has moved into urban neighborhoods disputes also have arisen over pipeline routes and the distance between wells and surrounding homes.

Concerns have been raised about potential drinking water contamination caused by the hydraulic fracturing used to extract natural gas from shale and about air quality degradation from potentially harmful substances emitted by wells and equipment. Unusual seismic activity, thought to be caused by extensive drilling and well fracturing in the area, also has been reported. Some have called for a moratorium on gas drilling around Fort Worth until these issues can be further studied.

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uniform for all students, regardless of their legal status. As a result, some undocumented students may qualify for in-state tuition and financial aid.

The average undergraduate, out-of-state tuition in Texas can be more than twice that of the average resident tuition. For example, for fiscal year 2010-11, the average tuition and fees for 30 semester credit hours at the University of Texas at El Paso is \$6,504 for in-state tuition and \$15,804 for out-of-state tuition.

Texas law permits citizens, permanent residents, and certain individuals in the United States on eligible visas several ways to establish resident status and eligibility to pay resident tuition rates. They may pay the resident rate if they establish and maintain a domicile in the state for one year before enrolling in college or if they graduate from a Texas high school or acquire the equivalent of a diploma, having maintained a continuous residence in the state for at least three years leading up to graduation or the GED. Students also must reside in the state the year immediately before enrolling in college. Under Texas Higher Education Coordinating Board (THECB) rules, a domicile may be established by buying and maintaining real property in the state for one year before enrolling in college, buying and managing a Texas business for one year before enrolling in college, or being gainfully employed in the state for one year before enrolling.

Someone who is not a citizen or permanent U.S. resident or who does not hold legal immigration status can be classified as a Texas resident and be eligible to pay in-state tuition only by graduating from a Texas high school after living in the state for at least three years immediately preceding graduation. In addition, those who are not citizens or permanent U.S. residents must promise to seek permanent resident status as soon as they are able to apply.

The residency statutes for higher education in Texas have evolved since the Legislature enacted HB 1403 in 2001. HB 1403 allowed students who had lived in Texas

with their parent or legal guardian and who attended high school for at least three years before graduating or receiving a GED, but who lacked legal immigration status, to establish residency for in-state tuition purposes. Students had to sign affidavits promising to apply for permanent resident status as soon as they were able to do so. The affidavit requirement limited this path to residency to students who were not citizens or permanent U.S. residents, including undocumented students.

The law was amended in 2005 by SB 1528 by Zaffirini. Before 2005, many U.S. citizens were inadvertently prevented from obtaining Texas residency status for higher education purposes. These included

students too young to establish a domicile on their own who may have lived in the state with a grandparent instead of their parents or legal guardian and students whose parents moved out of state before the student enrolled in college. These students previously were classified as nonresidents,

even though they may have been in the state their entire lives.

Now all students, regardless of their citizenship or immigration status, who graduate from high school in Texas under the required conditions may be classified as residents for higher education purposes, allowing them to enroll and pay in-state tuition rates. Undocumented students still must promise to seek legal status.

According to THECB, the number of non-citizens and non-permanent residents – a majority of whom are thought to be undocumented students – who were permitted to pay in-state tuition in fiscal 2009 was 14,292, or 0.9 percent of total enrollment. THECB estimates that the state allocated about \$23.6 million in direct aid for these students in fiscal 2009, including funding allocated to institutions and financial aid. These students paid about \$27.2 million in tuition and fees during the same time period. When all state, institutional and private financial aid is considered, these students paid a net total of about \$9.5 million out of pocket for their higher education in fiscal 2009.

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States allowing in-state tuition

According to the National Conference of State Legislatures, since 2001, when Texas enacted the first such law, 10 additional states have enacted laws allowing long-term undocumented immigrants who were brought to the United States as children, who graduate from high school in the state, and who meet certain other criteria to pay in-state tuition rates at public colleges and universities. In general, students must live in the state and attend high school for a specified time period, graduate or receive a GED, be accepted to a public college or university, and promise to file for legal immigrant status.

California, Utah, Washington, Oklahoma, New York, Illinois, Kansas, New Mexico, Nebraska, and Wisconsin have enacted similar laws. While most of these states do not allow undocumented immigrants to receive state financial aid, New Mexico, Oklahoma, and Texas do. Undocumented immigrants in Texas who are classified as Texas residents are eligible for state financial aid under the same conditions as other students, except that they specifically cannot qualify for work study programs or the “B-on-Time” loan program. Students without legal immigration status also are not eligible for federal financial aid.

In 2007, Oklahoma lawmakers made undocumented immigrant students ineligible for in-state tuition and student financial aid unless the Oklahoma State Regents for Higher Education adopted a policy allowing it. The state regents subsequently adopted such a policy, which became effective November 1, 2007. The policy allows undocumented students in Oklahoma to pay the lower resident tuition and be eligible for financial aid if certain conditions are met, including graduating from a public or private high school in the state and living with a parent or guardian for two years immediately preceding high school graduation. To pay resident tuition, undocumented students must affirm their intention to legalize their immigration status. To receive financial aid, they must already have applied to legalize their immigration status. Students who had been eligible to pay in-state tuition and receive financial aid before the change to state law were grandfathered and remain eligible under the previous system.

States denying in-state tuition

Georgia allows undocumented immigrants to attend some of the state’s public colleges but charges them the higher out-of-state rate. Georgia higher education officials approved measures in June to ensure that undocumented students did not pay the lower in-state tuition rates at any of the schools of the University System of Georgia. The decision followed a controversy at Kennesaw State University about an undocumented student who was found to be paying in-state tuition instead of the higher out-of-state tuition required by law.

In October 2010, Georgia’s board of regents voted to ban illegal immigrants from attending the state’s most selective public institutions. The policy requires colleges to check the legal residency of any applicant admitted and prohibits illegal immigrants from enrolling at any college with a selective admissions process that has rejected academically qualified applicants for the past two academic years because of space or other issues. Five institutions currently fall into this category. The policy will take effect in fall 2011.

Arizona and Colorado also specifically deny in-state tuition benefits to undocumented immigrants. In 2008, South Carolina became the first state to ban such students from its public colleges and universities.

The North Carolina State Community College Board has been wrangling with this issue for nearly a decade, changing its admissions policy for undocumented students five times. In the fall of 2009, the board voted to admit undocumented immigrants if they have graduated from a U.S. high school, pay out-of-state tuition rates, and do not displace a North Carolina or U.S. resident. Undocumented students are not eligible for state financial aid. This reversed an earlier decision to ban them altogether. The decision came after the U.S. Department of Homeland Security issued a statement in 2008 to the North Carolina attorney general affirming that federal law does not bar the admission of undocumented students and that it is up to each state make its own determination on this issue.

Federal law

Disagreement continues over the meaning of a 1996 federal law that prohibits states from granting undocumented immigrants certain postsecondary education benefits on the basis of state residence unless the same benefits are available to all U.S. citizens. Sec. 505 of the law, known as the IIRIRA (Illegal Immigration Reform and Immigrant Responsibility Act), 8 U.S.C. sec. 1623, says that unauthorized aliens “shall not be eligible on the basis of residence within a state (or a political subdivision) for any postsecondary education benefit unless a citizen or national of the United States is eligible for such a benefit without regard to whether the citizen or national is such a resident.” According to the Congressional Research Service, legal scholars disagree about the precise meaning of the provision, which does not define “postsecondary education benefit” or “residence.”

Without federal regulations or congressional language for guidance, the provision is commonly understood to mean that states may not grant in-state residency status to undocumented immigrants for tuition purposes. Some have argued that Congress exceeded its authority by legislating how states may dispense state benefits, while others believe the federal government has settled the issue with the enactment of the IIRIRA. Since the 1996 enactment of sec. 505, debate has continued on whether states and localities may offer in-state tuition to undocumented immigrant students on some basis other than residency, such as in-state high school attendance and graduation, in order to avoid violating the law.

Debate on offering in-state tuition

Supporters of making undocumented students eligible for in-state tuition say such laws, including the Texas law, are based on high school attendance and graduation, not legal residency or immigration status, so they do not conflict with IIRIRA. They say it is unjust to

deny undocumented students the opportunity to pay in-state tuition rates because these students have qualified for admission and most would not be able to afford the more expensive out-of-state rate. They say many of these students have grown up in the United States and can make economic and social contributions if provided with less costly access to higher education.

If these students are unable to attend college because they cannot afford the out-of-state tuition, supporters say, it would mean the state was failing to capitalize on its investment in these students’ K-12 education. Because in-state tuition laws require students to seek lawful permanent residency, they promote responsible behavior and provide an incentive for high school graduation. It takes out-of-state citizens only one year to establish residency without having to graduate from a Texas high school. Supporters say in-state tuition is not a handout, but an opportunity for qualified, but not documented, Texas resident high school graduates, regardless of their citizenship or immigration status, to attend a college or university in the state.

Opponents of making undocumented students eligible for in-state tuition say it is a violation of federal law and that the high school attendance and graduation requirements inappropriately function as a proxy for residency requirements. They say offering in-state tuition to undocumented students is unfair to out-of-state U.S. citizens and others who are in the state legally but are not eligible for the lower tuition rates.

Opponents say state education dollars should be spent on making college more affordable only for U.S. citizens and legal residents, not illegal immigrants. They point out that granting resident tuition rates to illegal immigrants takes opportunities away from U.S. citizens by putting them in direct competition for admission to public universities. It also provides incentives for people to immigrate illegally to the United States or to remain after their visas have expired. Some opponents also question the purpose of educating undocumented students whose immigration status will prevent them from legally working after college.

Disagreement continues over the meaning of a 1996 federal law.

Legal challenges

In 2004, opponents of the Kansas law allowing undocumented students to pay in-state tuition rates sued the state, saying the law violated sec. 505 of the IIRIRA. They said the federal law was designed to ensure that any state offering discounted, in-state tuition rates to undocumented immigrants must offer those same discounted tuition rates to all U.S. citizens and nationals, including those in other states.

In 2005, the U.S. Court of Appeals for the Tenth Circuit upheld a federal district court determination in *Day v. Sibelius*, 376 F.Supp. 2d (D.Kan. 2005), that the plaintiffs lacked standing to sue because they could not show they were harmed, given that their own non-resident status would not change, regardless of whether illegal immigrants were allowed to pay resident tuition. The district court determined that as private individuals, the plaintiffs had no authority to seek to enforce federal immigration law, which is under the exclusive jurisdiction of the U.S. Department of Homeland Security (DHS). The U.S. Supreme Court declined to hear the case.

In 2006, a similar lawsuit was filed in California – *Martinez v. Regents of the University of California*, 83 Cal. Rptr.18 (Cal.App.3 Dist. 2008) – claiming the California law granting in-state tuition to undocumented immigrant students violated sec. 505 of the IIRIRA by giving educational benefits based on residency to illegal immigrants but not to all U.S. citizens. In November 2010, the California Supreme Court unanimously decided that the California law does not conflict with federal law. The court concluded that the law that provides the exemption from nonresident tuition for certain students, including those not lawfully in this country, is not based on residence in California. Rather, it is based on other criteria, specifically that those exempted from nonresident tuition must possess a California high school degree or equivalent; that if they are unlawful aliens they must seek to legalize their immigration status; and that they must have attended high school in California for three or more years. The case is expected to be appealed to the U.S. Supreme Court.

Rep. Leo Berman had requested an opinion from the Texas attorney general on whether Texas could continue to grant in-state tuition to undocumented students. Atty. Gen. Greg Abbott said in his opinion (GA-0732) issued in July 2009, before the decision by the California Supreme Court, that there was not enough legal precedent to answer the question with certainty. The opinion stated that the Texas statutes that permit illegal immigrants to pay resident tuition at state colleges and universities could conflict with federal law but given the scarcity of judicial precedent, “we cannot predict with certainty that a court would so find.” It stated that a federal or state court in Texas likely would conclude that the statutes do not facially violate the equal protection clause because the statutory prerequisites for in-state tuition are reasonable requirements that serve the state’s legitimate interest in assuring that only bona fide residents that graduate from state high schools or receive a GED from a state high school are eligible for in-state tuition.

In 2009, opponents of Texas’ in-state tuition law filed a state court lawsuit, *Immigration Reform Coalition of Texas v. Texas, et al.*, No. 2009-79110, claiming that the Texas law that allows undocumented immigrants to pay discounted in-state tuition and receive state student financial aid conflicts with federal law that makes illegal immigrants ineligible for post-secondary education benefits at public higher education institutions. The lawsuit currently is pending in the 281st district court in Harris County. The challengers say the state should not give benefits to undocumented students that U.S. citizens from other states do not receive. Especially in the current budget climate, it makes sense, they say, to restrict limited state dollars to legal Texas residents.

University of Houston law professor Michael A. Olivas says that the legal claims of those challenging the Texas law are based on a flawed reading of the 1996 federal immigration law, which he says explicitly allows states to enact their own laws regarding this issue if they choose. Olivas says the immigration law in question “does not prohibit states from allowing in-state tuition for undocumented students but rather says states cannot make it easier for undocumented students to attain residency status than someone who is from another state.” He says a state law extending in-state

tuition to undocumented students by requiring in-state high school attendance as well as a longer duration of residency for the undocumented than for U.S. citizens who are residents of other states is in compliance with the federal law.

Path to citizenship

Lawmakers in Congress have proposed repealing the 1996 federal provision to specifically allow states to offer illegal immigrants in-state tuition rates. Proposed legislation also would provide a path to U.S. citizenship for those who came to the United States as dependent children.

The proposed DREAM Act (Development, Relief and Education for Alien Minors Act), S. 729 by Durbin, would require undocumented students to have been in the country at least five years, have graduated from a U.S. high school or obtained a GED, and be of good moral character. Students would not qualify if they had committed crimes or were inadmissible or removable from the United States on certain other grounds. The bill would allow for a six-year conditional residency during which undocumented immigrants would have to earn at least a two-year degree or serve two years in the U.S. military. They would not be eligible for federal college grants but could apply for student loans and work study. A similar bill in the House of Representatives, H.R. 1751 by Berman, is called the American Dream Act. On December 8, 2010, the House of Representatives approved H.R. 1751, but the Senate has not taken up the issue.

Similar bills have been introduced in Congress since 2001. According to the Immigration Policy Institute, California has the largest number of potential beneficiaries of the DREAM Act, with 553,000, while Texas has roughly 258,000 possible beneficiaries.

Supporters of allowing undocumented students to pay in-state tuition and have a path to citizenship say that those who came to the United States as minors under the care of their parents are not guilty of any crime. For many, the United States is the only home they know. If allowed to pursue their potential through academics, these students could contribute fully to society, but large numbers will be unable to do so unless they are eligible for the lower in-state tuition rates at their state colleges. These students should have legal status so they can legally work after getting a college degree. By increasing the numbers of educated workers, more taxes will be paid, more jobs created, and more goods purchased. It would be a solid investment in the country's collective future. Others support the goal of a pathway to U.S. citizenship for illegal immigrant high school graduates but say requirements should be more stringent than those proposed in the DREAM Act. Requiring public service in addition to completing at least two years of higher education or military service would be more appropriate, they say.

Opponents of allowing undocumented students to pay in-state tuition and have a path to citizenship say it would be tantamount to granting amnesty to millions of illegal immigrants and providing special privileges to undocumented students at the expense of American students. They say undocumented immigrant students and their families are in the country illegally, and taxpayer money should not be used to subsidize the education of individuals who are in the United States in violation of the law. More broadly, opponents say, granting benefits to illegal immigrant students undermines the U.S. immigration system and would encourage more illegal immigration into the country.

— by *Rita Barr*

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Natural gas production also is being developed in the Eagle Ford Shale in South Texas and the Haynesville Shale, which is mostly in Louisiana but extends into several counties in east Texas (see *Shale gas fields, page 9*). As drilling in shale rock formations expands to other areas of the state, the resolution of issues raised in the Barnett Shale area may influence how such issues are handled elsewhere.

The Barnett Shale

Texas is the nation's leading natural gas producer, accounting for about three-tenths of total U.S. natural gas production, according to the U.S. Energy Information Administration. The Barnett Shale, a giant natural gas formation that lies beneath Fort Worth and 23 surrounding counties, accounts for 25 percent of the natural gas produced in Texas.

The Barnett Shale rock formation lies more than 7,000 feet below the surface, with shale about 400 to 500 feet thick. When the Barnett Shale was discovered in 1981, only a few of the thicker sections near Fort Worth were expected to be profitable to drill, but advances in horizontal drilling and hydraulic well fracturing technology increased the area of the Barnett Shale considered potentially profitable. Significant drilling activity did not begin until gas prices increased in the late 1990s. Since 2002, gas production in the area has grown significantly, and the amount of drilling that is occurring in urban areas is unprecedented.

Most Barnett Shale wells are in six counties around Fort Worth — Tarrant, Denton, Wise, Parker, Hood, and Johnson. The Barnett Shale formation had more than 14,401 producing gas wells as of September 22, 2010, with more than 1,000 in Fort Worth. In addition, 3,175 locations have permits pending.

Horizontal drilling, hydraulic fracturing

Unlike shallow natural gas projects, the producible portions of deep shale gas formations are many thousands of feet below the surface in shale rock with

low permeability and low porosity. Producers have long known that deep shale formations contained natural gas deposits, but they were thought to be unrecoverable. Through the use of hydraulic fracturing, combined with horizontal drilling, extraordinary amounts of natural gas now are being produced from deep shale formations across the United States (see *page 9*).

With hydraulic fracturing, commonly called “fracking,” a well is drilled vertically more than a mile deep, then extended horizontally into the targeted rock formation. Fracturing fluids, consisting of water, sand, and chemical additives, are pumped at extremely high pressure down the wellbore. The fracturing fluids flow through perforated sections of the wellbore and into the surrounding formation, fracturing the rock and injecting sand into the cracks to hold them open. This process is repeated multiple times to reach maximum areas of the wellbore. The water pressure then is reduced and fluids are returned up the wellbore for disposal or for treatment and re-use, leaving the sand in place to prop open the cracks and allow the gas to flow and be collected at the surface.

Water quality and consumption

With the increased use of hydraulic fracturing in shale gas production, concerns have increased about potential groundwater contamination for those living near shale gas fields across the country, as well as about the large amount of water required to frack a well.

Water quality. Concerns about groundwater contamination from hydraulic fracturing have resulted in intense debate. It has become the subject of multiple studies, at least four documentary films, and town hall meetings from New York to Texas.

The federal Clean Water Act regulates the discharge into surface water of oil and gas wastewater from hydraulic fracturing operations. The Safe Drinking Water Act (SDWA) generally regulates the underground injection of fluids. However, the federal Energy Policy Act of 2005 amended the Safe Drinking Water Act to exclude from federal regulation the underground injection of fluids or certain propping agents in hydraulic fracturing for oil, gas, or geothermal

production. This amendment, referred to by some as the “Halliburton loophole” because the extraction techniques were developed by Halliburton, effectively exempted hydraulic fracturing from federal water quality regulation and gave jurisdiction and authority over these operations to the states. The use of diesel fuel during hydraulic fracturing is still regulated under the SDWA. Bills were introduced in Congress in 2009 to repeal the exemption and return regulatory jurisdiction to the federal government. No action has been taken on these bills.

In a 2004 study, the federal Environmental Protection Agency (EPA) did not find any incidence of contamination of drinking water by hydraulic fracturing and concluded that it poses little or no threat to underground sources of drinking water. The Interstate Oil and Gas Compact Commission member states, including Texas, have said no cases have been identified in which hydraulic fracturing can be verified to have contaminated drinking water.

Since the 2004 EPA study, complaints from landowners of well contamination immediately after gas wells on their properties were fracked have cropped up across the nation in places with substantial deep shale gas drilling. The EPA is again investigating the possible relationships between hydraulic fracturing and drinking water, and study results are expected by late 2012.

The water that flows back from fracturing projects is another concern. It may be treated and reused, but in many cases is disposed of in saltwater disposal injection wells, which typically are abandoned oil and gas wells. Use of these wells is causing concern about whether they still are properly cased and adequately cemented to prevent leakage and potential groundwater contamination and if they are below aquifer levels.

The Texas Railroad Commission (RRC), which regulates oil and gas exploration in Texas, requires wells to include multiple layers of protective steel casing surrounded by cement in order to protect freshwater aquifers. Gauges monitor the wellbore casings at the surface. Before drilling can begin, oil and gas companies must register with the Texas Commission on Environmental Quality (TCEQ) their plans for installing the surface casing of the well in order to ensure that

the casings are adequate to prevent seepage into the water table. The surface casing is a steel pipe encased in cement that extends from the surface to below the groundwater. Cement is set between the casing and the sides of the wellbore to seal it from the aquifer. TCEQ identifies the depth at which groundwater must be protected from contamination by cement and steel at each drill site for wells where hydraulic fracturing will be used. This dictates the required depth of each well’s surface casing.

RRC inspectors try to witness the plugging of all abandoned and dry wells, which can pose a threat to groundwater if not plugged correctly. Unplugged, inactive wells are required to be pressure tested annually to identify any integrity problems in the casing.

Water consumption. In addition to concerns about groundwater contamination, concerns about water availability have been raised because of the large amount of water required in hydraulic fracturing a well. Fracking a horizontal deep shale gas well requires an average of 4.5 million gallons of water per well, according to Chesapeake Energy, one of the top producers in the Barnett Shale formation. Concerns are that as gas production in the Barnett Shale continues to grow, the water resources in the area will be overstretched and the water needs of others in the region will be affected.

Potential legislation. The 82nd Legislature may see proposed legislation aimed at protecting water quality and reducing its consumption in fracking operations. Bills may propose increased oversight of well design, including cementing and casing, and of the waste handling of fracturing fluids. Requiring full disclosure of chemicals used in fracking may be discussed, as well as requiring use of non-polluting substitutes for toxic fracturing chemicals. Other bills may require or seek to incentivize the recycling of water used in the fracking process. One proposal may be to transfer regulatory authority for groundwater protection during oil and gas activities from TCEQ to the RRC.

Supporters of hydraulic fracturing have said it is unlocking vast domestic natural gas reserves once thought unattainable, strengthening America’s energy independence, and reducing carbon emissions.

Hydraulic fracturing has been a key technology in making shale gas affordable and has proven to be an effective technique. Use of hydraulic fracturing also requires less surface area and fewer wells. An average well that has been fracked can access up to 60 times more below-ground area. Also, operators can drill as few as six to eight wells on a single site to access the same natural gas that once required 16 or more wells drilled in separate locations.

Supporters say that hydraulic fracturing has been done safely for more than 60 years with no incidence of groundwater contamination directly attributable to this process. Also, the chemicals used in fracking a well make up less than 1 percent of the fracturing fluid. The risk of groundwater contamination from fracking is extremely remote, especially in areas like the Barnett Shale, where more than a mile of dense rock separates shallow freshwater aquifers from petroleum deposits. The geology in Texas, combined with safeguards required by the Railroad Commission (RRC), which regulates oil and gas exploration and production in Texas, would prevent water used in hydraulic fracturing from migrating to a water table.

Fracking advocates say there is little evidence that hydraulic fracturing has been a direct cause of groundwater contamination. Pollution of freshwater aquifers is more likely to be caused by poor cementing

and casing of wells. A new EPA study likely will identify risks to public health not from fracking itself, but from sloppy drilling practices.

Supporters say that while water management and availability are a challenge because of the amount of water required for hydraulic fracturing, innovative regional solutions are emerging that allow shale gas development to continue while ensuring that the water needs of other users are not affected and that surface and groundwater quality is protected. While the 2007 State Water Plan did not factor in water use from hydraulic fracturing, the current round of regional water planning for the 2012 State Water Plan does factor in water use from hydraulic fracturing in North Texas. Also, while the amount of water required for hydraulic fracturing may seem large, it is small in comparison to some other uses of water, such as agriculture, electric power generation, and municipal use. Also, the water use is temporary, occurring only during the drilling and completion phases of each well. Some companies have instituted water recycling programs that capture a significant volume of water required for the hydraulic fracturing process for reuse in future operations.

Opponents of hydraulic fracturing have said private citizens in areas of shale gas production have reported many cases across the country of drinking water that took on a foul taste and odor and began to

Shale gas fields being developed around the United States

Besides the Barnett Shale in North Texas, three other areas in the United States have significant shale gas fields currently in production. The largest is the Marcellus Shale, which covers 95,000 square miles and includes central and western Pennsylvania, southern New York, and northern West Virginia. The natural gas resources of the Marcellus Shale were thought to be exhausted, but the area is now estimated to hold 168 to 516 trillion cubic feet of recoverable natural gas with the use of horizontal drilling and hydraulic fracturing. The second largest area is the Haynesville Shale, encompassing about 9,000 square miles in northern Louisiana and eastern Texas and thought to contain 251 trillion cubic feet of recoverable natural gas. The Fayetteville Shale in northern Arkansas is estimated to hold 20 trillion cubic feet of natural gas.

Although still in the early stages of development, the Eagle Ford Shale in South Texas, which begins near the Mexico border and sweeps east below San Antonio, is being called the biggest oil and gas discovery in 40 years by some in the industry. Natural gas has been found in almost 20 counties in South Texas, with more to be added as companies extend their acreage and do more well testing. Recently announced infrastructure investments, including pipelines, indicate that the Eagle Ford Shale could become a leading player for both natural gas and crude production over the next few years.

fizz and bubble immediately after gas wells on or near their properties were fracked. They give examples of groundwater users near fracking operations having flammable water running from their tap, an indication that natural gas had seeped into the water source. The EPA recently ordered a Fort Worth natural gas company to supply homeowners near a Parker County drilling site with gas monitors and drinking water after high levels of methane were found in residents' tap water. The company also must identify and remediate any potential gas flow pathways to the Trinity Aquifer.

Current oversight is inadequate to protect water sources from effects of hydraulic fracturing, critics say. For example, the chemical additives used in fracturing fluids are not fully disclosed to the public, but instead remain proprietary trade secrets. Some of the additives are toxic. Even a small amount of a toxic substance would be unacceptable if leaked into a drinking water supply. While the industry says hydraulic fracturing has been done safely for more than 60 years, it has not been done at such high pressure and not with recent advances in drilling methods, such as horizontal drilling. Complaints of recurrent health problems have come from previously healthy people and are thought to stem not only from drinking contaminated water, but also from breathing contaminated air. Such health complaints include headaches, upset stomachs, asthma, dizziness, disorientation, ringing in the ears, loss of sense of taste and smell, and in some instances neurological problems.

Opponents say it is not surprising that evidence that hydraulic fracturing has been a direct cause of groundwater contamination is mostly anecdotal thus far because it is difficult to pinpoint the source of natural gas pollution. Also, neither industry nor government has conducted adequate scientific testing to determine whether fracking has contaminated groundwater. Too many landowners all over the country are describing the same scenarios, so something is wrong.

Also, water consumption in gas drilling operations, even while short in duration, is significant and poses a risk to water availability in North Texas. While the current round of regional water planning for the 2012 State Water Plan does factor in water use from hydraulic fracturing, the water use projections for gas drillings are highly uncertain and dependent on the price of gas, requiring multiple planning scenarios, opponents say.

Air quality

Once gas wells have been drilled and are operating, activities surrounding active wells can result in emissions of a variety of air pollutants, including greenhouse gases, ozone and fine particle smog-forming compounds, and air toxic chemicals. The greenhouse gases of greatest concern are carbon dioxide, methane, and nitrous oxide, which are emitted from oil and gas sources in the Barnett Shale area.

The federal Clean Air Act limits air emissions from engines, gas-processing equipment, and other sources associated with drilling and production. The federal law grants primacy to the states, allowing state agencies to implement air quality programs with federal oversight.

Once drilling is complete and a well is being tested or has started producing, TCEQ will issue an air permit for any stationary sources, such as a valve on a well head, that may emit an air contaminant.

Due to air quality concerns, TCEQ conducted air quality tests in 2009 at 94 sites across the Barnett Shale area. The tests revealed two sites with high levels of benzene, a known human carcinogen, and 19 more with elevated levels. Most sites had either no harmful emissions or small amounts. The readings at the two worst sites were caused by mechanical problems that were fixed by the companies. TCEQ reported no immediate health concern based on samples taken in Fort Worth. However, an internal TCEQ audit later showed that four of the eight samples taken in Fort Worth had concentrations of benzene higher than what TCEQ initially reported, but were not at levels indicating an immediate health concern, according to TCEQ. Fort Worth officials have commissioned their own air quality study, which began in late summer and includes point-source testing for leaks at drilling and production sites and 24-hour ambient air testing. The final report is due to the city in March.

Air quality tests commissioned last summer by the city of Dish in Denton County and a private citizen from Fort Worth reported high levels of benzene and other toxic compounds in the air near gas wells, compressor stations, and other facilities.

Nine counties surrounding Fort Worth and Dallas do not meet the federal ozone standards and have been designated by the EPA as the D-FW ozone nonattainment area: Tarrant, Denton, Parker, Johnson, Ellis, Collin, Dallas, Rockwall, and Kaufman. Four of these counties (Tarrant, Denton, Parker, and Johnson) have substantial oil and gas production that can emit pollutants to the atmosphere that contribute to ozone and fine particulate matter smog.

TCEQ is installing seven air-quality monitors in the Barnett Shale region that will operate around the clock and provide emissions data that the public can access. The monitors will test for 45 volatile organic compounds, including benzene. Monitors currently are operating in Dish, the Eagle Mountain Lake Area, Fort Worth, Dallas, and more recently, Decatur and Flower Mound. An air monitor in Southeast Tarrant County, either in Fort Worth or Everman, will be operational by the end of the year. TCEQ recently partnered with the University of Texas at Arlington to install four additional air quality monitors in the Barnett Shale region. The locations for those monitors will be determined with stakeholder input. Also, seven air inspectors have been added in TCEQ's Fort Worth regional office to respond to complaints.

TCEQ proposed rule changes. TCEQ has proposed new rules to replace the current standard permit for construction and/or modification of oil and gas production facilities with a new standard permit. The new rules would require a single site-wide emissions authorization rather than individual emissions authorizations for each piece of equipment.

The proposed rules would create tiered requirements based on the amount of pollutant emitted and would, for the first time, consider the rate of emission and the distance from a receptor, such as a home, school, daycare, church, or hospital. Facilities would have to be at least 50 feet from receptors. Operational monitoring, such as leak detection and air pollutant sampling, would be required, as would more specific record-keeping.

Except for requirements for TCEQ to be notified about certain site details and to authorize maintenance, start-up, and shutdown activities, the new rules would not apply to existing facilities unless there was a

modification at the facility. Adoption of the proposed rules is expected on January 26, 2011. Facilities will be phased in starting in the Barnett Shale area early 2011, followed by the rest of the state starting early 2012.

Supporters of the proposed TCEQ rules have said they are a step in the right direction of protecting health and safety. These rules contain innovative improvements and enhancements, including a tiered approach that would place the most stringent regulations on the highest emitters of air contaminants. A set-back requirement of 50 feet from homes, schools, and other public areas, although still close, would help to ensure the safety of residents in areas of urban drilling. The proposed rules should not put a strain on industry because many of the requirements, such as record-keeping, should have been done all along.

Opponents of the proposed rules have said that they are overreaching and would create an unnecessary burden on industry. These rules, which would be implemented statewide, would force producers to collect data, analyze samples, and compile paperwork for tens of thousands of wells, including wells in rural areas where no serious emissions problems exist. Complying with the requirements could cost gas producers as much as \$100,000 per facility. These rules should be limited to heavily populated areas that have current air quality issues and are in violation of federal ozone standards.

Other opponents have said that while these rule changes are a long-overdue step in the right direction, they do not go far enough to protect residents in areas of urban drilling. They would apply only to new oil and gas facilities, leaving most current wells under the less stringent rules. With production of the Barnett Shale continuing to increase, and production of the Eagle Ford Shale in South Texas, which is near San Antonio and Bexar County, beginning to take shape, urban drilling is likely to become more commonplace in Texas.

Health and safety

Health and safety concerns have been raised about wells in the Barnett Shale area being drilled and operating near homes, schools, and other public areas. Along with complaints about the noise and visual

nuisance of the wells right outside residents' back yards, especially during the drilling process, are fears of breathing toxic air emissions and accidents that could result in explosions.

The RRC does not regulate how near a house, school, or public area an oil or gas well may be drilled, but a city may enact ordinances regulating wells within city limits that govern their proximity to dwellings or other structures. For example, Fort Worth allows drilling no closer than 300 feet to homes, schools, parks and other sensitive uses, but as close as 200 feet if the site was acquired before 2008. Many mineral leases also contain clauses that govern how close to existing structures a well may be drilled.

Potential legislation. Bills may be proposed during the next regular session to provide a standard set-back requirement for all oil and gas drilling and pipelines near homes and places used by the public. Another proposal would increase penalties for violating the damage prevention program, which allows anyone digging near a pipeline to call a central clearinghouse so that crews can mark underground facilities to prevent the unintended piercing of a natural gas line.

Landowner rights

Landowner concerns about oil and gas drilling are not unique to the Barnett Shale area, but they have been amplified by the unprecedented amount of urban drilling in the area. Such issues include leases of surface and mineral rights, eminent domain authority to drill on private property, and placement of wells and pipelines near homes, schools, business, and other public areas.

Potential legislation. Several landowner protection bills may be considered by the 82nd Legislature, including one to protect landowners who did not sign a mineral-rights lease from being forcibly included in a drilling unit, called forced pooling or unitization. Another proposal would create a public protection office to help residents in drilling areas with issues relating to mineral interests, eminent domain authority, spacing of wells and pipelines, and forced pooling. Another proposal would make pipeline routing more similar to routing of electric transmission lines, including submitting alternate routes and allowing public participation in routing decisions affecting landowners.

— by **Blaire D. Parker**

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