

The Times Tribune

TROUBLED PROMISE: Little oversight, looming problems for Pa. gas industry

by Laura Legere (staff writer)

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As the nation remains riveted by the deadly explosion and ongoing environmental catastrophe of a deep-water oil rig accident in the Gulf of Mexico, the need for oversight, public information and disaster-response plans in efforts to extract the Earth's fuel resources has come into sharp focus.

In Pennsylvania, the troubled promise is in the Marcellus Shale, a natural gas-rich geological formation below three-fifths of the state that holds enough recoverable gas to satisfy all of America's gas needs for more than a decade.

A six-month investigation by The Times-Tribune, including a review of thousands of pages of Department of Environmental Protection documents made available through a Right-to-Know request and interviews with regulators, citizens and scientists, shows the limits of the current regulatory environment to prevent contamination of the state's land and water during deep gas drilling in the shale.

It reveals costly environmental and safety errors made by a growing industry that has become the state's economic hope, and details the often frustrated efforts of regulators to police it using outdated laws and incomplete information.

The investigation found:

- There have been hundreds of spills at natural gas well sites in the commonwealth over the last five years, the vast majority of which have never been publicized by the DEP.
- The massive effort to exploit the shale has left an indelible mark on the landscape and communities in the state's Northern Tier and southwestern region, bearing both economic benefits and environmental costs. Experiences in those regions offer a preview of gas development in the seven counties of Northeast Pennsylvania, where a dozen Marcellus Shale operators hold leases to drill.
- Despite industry claims that it discloses all of the chemicals it uses in the gas extraction process, DEP documents from a series of spills in Susquehanna County show that the industry's disclosure is incomplete and insufficient for determining contamination in soil and water.

- A growing chorus of scientists is arguing that not enough is known about the effect widespread gas drilling will have on water supplies, air quality and human health to justify the intensive development of the resource already taking place.

“There’s a massive industrialization experiment happening in West Virginia and Pennsylvania right now,” said Anthony Ingraffea, a Cornell University engineering professor who has studied rock fractures in oil and gas wells for two decades.

“It might sound cruel to say this, but people in New York are very happy to see that West Virginia and Pennsylvania jumped in with both feet, eyes closed, as quickly as they could.

“We’re learning from your mistakes. You’re the guinea pigs.”

Two goals

Among the six states underlain with Marcellus Shale, Pennsylvania has the largest portion of the gas-bearing rock and the most current wells. It will be wedded to the industry for the century and the 380,000 to 760,000 wells the industry estimates it may take to drain the shale’s promised reserves.

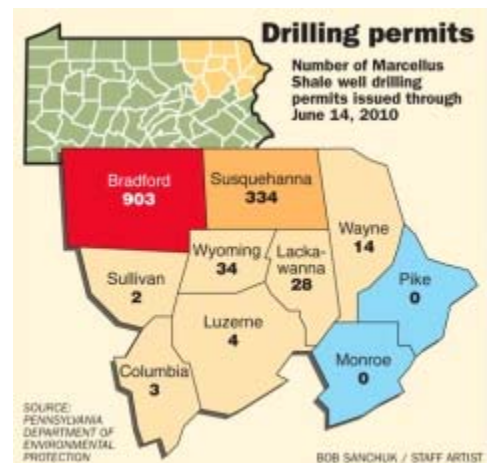
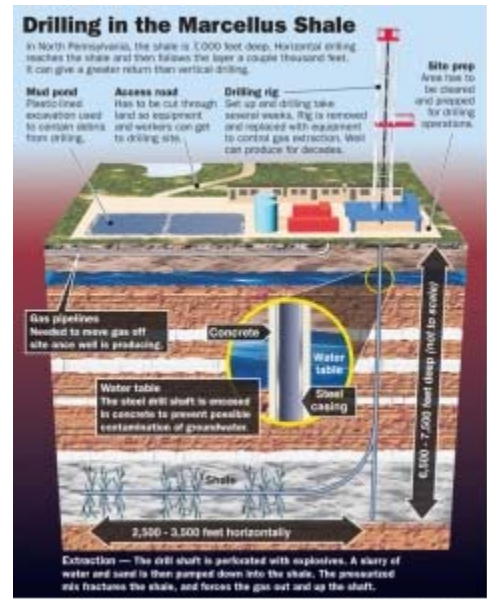
The state has already benefited from a tremendous investment, including \$1.8 billion in up-front lease bonuses paid to property owners in 2009 alone in exchange for the right to prospect below their land.

But Pennsylvania has never performed a comprehensive study of the accumulated impacts of drilling on a community or a watershed.

It has never declared a high-value watershed - like those around the reservoirs that feed Syracuse and New York City - off limits to gas extraction, as New York State has effectively done.

And Pennsylvania has never attempted to stop or slow the deep drilling since the first Marcellus well was sunk six years ago, unlike New York, which has imposed a moratorium on Marcellus Shale drilling as the state crafts an environmental impact statement, and unlike the interstate commission that regulates water quality in the Delaware River Basin.

Calls for caution have increased after a Marcellus Shale well in Clearfield County blew gas and waste fluids uncontrollably for 16 hours on June 3. State Sen. Jim Ferlo, D-38, Allegheny County, introduced legislation last week to pause drilling on both private and public lands in the state for a year.



Industry groups say calls for a moratorium are misguided. They emphasize that the gas companies' economic interests are naturally aligned with environmental interests.

"The only thing that differentiates you as a corporation is your image, your reputation, your costs and workforce, and innovation," Kathryn Klaber, the head of the Marcellus Shale Coalition, said. "Environmental compliance is a much bigger part of who you are."

Matt Pitzarella, a spokesman for Range Resources, one of the largest Marcellus Shale leaseholders in the state, simplified the equation: "We will make more money if we do it the right way," he said.

But last week, at a hearing about the Clearfield County well accident, DEP Secretary John Hanger said he is "not pleased" with the industry's environmental performance and that his own agency is not yet up to his highest standards.

"This industry's got to be better," he said. "There's too many leaks, there's too many spills, there's too many incidents of gas migrating."

He has a goal for the industry and his regulatory agency to be world class, he added. "We're not there."

The commonwealth's environmental regulator must balance simultaneous aims: "to produce the gas and protect the environment as we do that," Mr. Hanger often repeats. In the field, those directives can become more complicated.

In early 2009, after witnessing a string of diesel spills at Cabot Oil and Gas Corp. drilling sites in her small Susquehanna County township, resident Victoria Switzer appealed to one of the state's environmental regulators to impose stiff fines and stop the accidents before they worsened.

At the time, there were two inspectors to police the proliferating wells being drilled in Northeast Pennsylvania counties. Then as now, drillers were expected to report any spills to DEP, as required by law.

But as he stood near her home in Dimock Twp. the regulator told Mrs. Switzer that the agency had to moderate its penalties or risk being sued by the gas companies - taking inspectors out of the field and into courtrooms to defend their decisions.

Worse, he said, the agency feared that if it was too hard on the gas companies, they might stop reporting their spills.

'We could stand to catch our breath'

Difficult decisions about how and when to curb an industry that is acclimating to the state's current and changing laws have become commonplace for the state's environmental oversight agency.

According to Scott Perry, head of DEP's Bureau of Oil and Gas Management, the regulatory agency does not have the legal right to hit the brakes on the whole industry the way New York has done.

Instead, the agency can restrict individual companies that have committed particularly severe violations after the fact - a tool it infrequently uses.

In April 2010, the department selectively halted drilling operations by Cabot in a 9-square-mile area, and stopped issuing permits for it to drill elsewhere, after it found the company failed to correct problems with its wells that caused methane to seep into residents' drinking water in Dimock.

In his testimony last week, Mr. Hanger asked legislators to craft a law with "crystal clear language" giving DEP the authority to withhold permits from operators with unsafe practices, since its current authority could be open to challenge by companies.

Even without a law, "we don't hesitate to take those actions when they are required," he said.

But last fall, legal hurdles apparently contributed to DEP officials' decision to reject the most stringent options for stopping Cabot's operations, even as the company experienced its 19th, 20th and 21st spills at its drilling sites in the rural township in less than two years.

Over two days in September, pipes and hoses carrying a water and chemical mixture across a steep hayfield breached three times, dumping about 8,400 gallons of the fluid around a Cabot well site and allowing up to 1,900 gallons of it to leak into a wetland and creek.

In internal e-mails in the days after the spills, Jennifer Means, the oil and gas program manager in DEP's Williamsport office, wrote that she "wholeheartedly endorsed" either revoking drilling permits the company was already issued or halting pending permits "to slow down their future activity."

It "would go a long way with the public" whose "biggest frustration... is the rate at which they are allowed to continue given all these incidents," she wrote.

"Also - we could certainly stand to catch our breath."

But after the agency's top attorney warned about procedural hurdles to suspending permits under state law, the department decided not to take that step.

It opted instead to issue a narrower order that curtailed - but did not halt - the company's operations, and allowed Cabot to resume full development after three weeks.

'Self regulation doesn't work'

Like the offshore oil rigs that have come under national scrutiny, Marcellus Shale drilling operations are regulated by laws and agencies that rely heavily on the industry's cooperation in policing itself.

In Pennsylvania, Marcellus Shale gas producers are responsible not only for reporting their own spills, but for leading their clean-up operations and, with guidance from state regulators, for assessing the damage done by their mistakes.

At the Marcellus Shale Policy Conference in Pittsburgh last month, Mr. Hanger called for stronger rules to help prevent drilling from polluting the state's streams and air. "Self-regulation doesn't work," he said.

But even proposed rules to improve the requirements of the cement and steel casing that protects an aquifer from a natural gas well will still rely on the companies to perform their own quarterly inspections of the integrity of their wells.

Shortly before those new regulations were prepared for public comment, Mr. Hanger said a mixture of company reporting and department inspection is appropriate.

“We make it very clear to companies that hold permits that filing misinformation or wrong information or deliberately inaccurate information is a very serious matter,” he said. “Any company that is sloppy or, even worse, deliberately false, is almost surely going to get itself into very deep and hot water. They don’t want to go there.”

‘We’re changing lives’

Marcellus Shale gas operators, many of which have national or international operations and are publicly traded companies, frequently surpass the state’s safety and environmental requirements - a fact state regulators often mention to calm public concern about the safety of the process.

At twilight on a May evening, George Stark stood wearing a hard hat and safety glasses at the foot of a state-of-the-art drilling rig ablaze with stadium light in a Dimock field.

Cabot’s newly hired public relations manager pointed out the safety features on the rig, contracted from Patterson-UTI Drilling Company, including a system of tanks and filtration devices, called a “closed-loop” system, that makes it so used fluids and mud can be reused on-site without ever flowing into a lined earthen pit.

The pits are prone to leak, like the one at a Cabot site in the same township that DEP found contaminating groundwater weeks earlier. Pits at 29 of the 364 Marcellus wells drilled in the state this year were improperly constructed or maintained, according to DEP records.

Cabot has been operating in Dimock since 2006, but the series of wells being drilled with the Patterson rig are the first the company developed using a closed-loop system - a best practice that is not required by Pennsylvania law.

Beneath the rig, workers placed a giant mat of black, heavy plastic on the acres of flat earth - a guarantee that most anything spilled on site would not hit the ground. The company had been using that best practice for about eight months.

Earlier in the evening, on a tour of a reclaimed well site where deer nibbled on clover near tanks and a metering station hooked up to a completed well, Mr. Stark listed highlights of the investment Cabot has made in Susquehanna County: The company has leased more than a third of the county’s total acreage. It paid property owners \$75 million in 2009 alone to acquire the right to drill on their land. Between 2006 and 2009, the company spent \$500 million on its operations in the county. In 2010, it expects to spend \$400 million more.

“We’re changing lives,” he said, “in a positive way.”

Tough love and tough rules

Not everyone agrees with Mr. Stark.

After speaking with Dimock residents who have experienced water contamination from Cabot's drilling, Robert F. Kennedy Jr. drove through the township's winding roads to a barbecue stand in a trailer parked on the side of Route 29 - one of the businesses in the township that has been born or altered to cater to the industry workers.

Mr. Kennedy, president of Waterkeeper Alliance and a professor at Pace University School of Law's Environmental Litigation Clinic in New York state, drew a comparison between the confused and apparently insufficient regulation of offshore oil drilling, with the regulation of onshore energy extraction, like Marcellus Shale production.

Unfortunately, he said, "I think that's a template for what's happening all across the country."

The best technologies and enforcement practices necessary to minimize mistakes by natural gas drillers are well known, he said, but they are rarely adopted by governments and imposed on the industry.

"What they need is tough love from the regulators and from themselves," he said as he drove.

"They need restraint. They need tough rules that allow them to make money, and big money, but force them to do it in a way that's not going to penalize the public."

Mr. Kennedy said the gas industry's record of mistakes is contributing to a growing public reaction against gas extraction in Pennsylvania and drilling regions across the country. That is unfortunate, he said, because natural gas is a cleaner-burning alternative to traditional fossil fuels and will play a critical role in leading the country away from oil and coal and toward green energy solutions.

"Nobody's going to believe that about them when they're doing these kind of shenanigans," he said.

"Nobody's going to believe that they're good guys when they're blowing up people's houses and poisoning their wells."

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State lacks consistent record keeping for natural gas drilling contamination, leak incidents

by [laura legere](#) (Staff writer)

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A Times-Tribune review of records detailing gas drilling spills, leaks and contamination incidents revealed hundreds of problems at well sites since the beginning of 2005.

It also found outdated and inconsistent record keeping by the environmental agency charged with regulating Marcellus Shale gas drilling in Pennsylvania.

Unlike Texas, Colorado, New Mexico, New York, West Virginia and other gas drilling states, Pennsylvania does not keep a public database detailing spills or contamination incidents at oil and gas wells.

The Department of Environmental Protection's online "eFacts" database, which enables public searches of any permitted facilities in the state, lists coded descriptions of violations, but the information included there is often vague and provides no detail on what spilled, how much or where.

In some cases, eFacts masks the severity of an incident: DEP forced Cabot Oil and Gas Corp. to shut down a well that contributed to methane contamination in 14 residences in Dimock Twp., but the violation detail on eFacts notes only a "failure to report" a defective well casing and two "general" violations of the state law governing oil and gas drilling. The notation is to be used only when specific violation codes do not apply, even though a violation code exists for "failure to case and cement to prevent migrations into fresh groundwater."

Of the 421 violations DEP inspectors found at Marcellus Shale well sites between January and June this year, 109 of them were categorized as such "general" violations of state laws.

Alan Eichler, the oil and gas program manager for the Southwest regional office in Pittsburgh, explained that inspectors have to choose from among the computer system's list of codes when imputing a violation even when they are not "perfectly appropriate."

"Sometimes those violations codes are not as specific as maybe we would like," he said. "A code is chosen that might imply there was a discharge when there really wasn't a discharge."

In order to measure the frequency of well site spills, The Times-Tribune submitted a Right-to-Know request for the environmental agency's well inspection reports and violation notices that detail spills, leaks and seeps. But inconsistent responses and record keeping from the four regional offices that oversee drilling made finding an exact count of spills impossible.

Some offices gathered only industrial waste violations; some included erosion and runoff violations. Few of the offices included waste pit violations, even those when plastic liners meant to protect the soil fell in or were breached, leaving the waste in contact with the ground.

The files contained reports of spills that were not included on lists of incidents provided by the DEP, and revealed inconsistent characterizations of violations by inspectors.

In one case, a fluid and oil mixture meant to be pumped into a lined pit ran behind the liner or missed the pit entirely, but the violation noted only that the pit was not "structurally sound." In another case, wastewater overflowed a pit, ran down an access road and into the woods, but the company was cited for not keeping an open space between the top of the pit and the fluid.

Other files were incomplete.

At the Southwest regional office, more than a dozen files for wells where there have been spills of diesel, wastewater and other fluids were missing any documentation of those spills.

Some of those files noted ongoing violations or described the progress of clean-up from a spill, but records of the original spill were not there.

Mr. Eichler said the lack of precision in the violations coding process may explain the missing files.

However, he could not explain why the eFacts database contains records of spills when inspection reports for the same spills are not in the files.

“That shouldn’t be,” he said. “If there’s a record in eFacts there should be a hard copy report in the file.”

“If you’re telling me that there were inspections that were listed in eFacts that you couldn’t find in the file,” he said, “that would cause me some concern.”

The file review process was also work- and time-intensive for the regional offices. Because the agency does not keep a list of spill incidents, it took four regional DEP offices up to three months to identify and gather the files containing the documents.

Ed Stokan, an assistant counsel at the Southwest regional office, explained that the delay was due in part to state budget cuts that reduced the staff as well as the fact that such a search would entail “our going through hard paper files.”

“The department staff has been so stripped that we don’t have the staff to go through the files,” he said.

Staffing limitations also hampered other regional offices. In the Northcentral office in Williamsport, which is responsible for inspecting the bulk of the state’s Marcellus Shale wells, one person has run the file room since December because of budget cuts.

Oil and gas field inspectors are now responsible for filing, and finding, their own reports there.

The DEP is currently in the process of hiring a second person to work in the file room, a spokesman said.

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Hazards posed by natural gas drilling not always underground

BY LAURA LEGERE (STAFF WRITER)
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Fear about environmental damage from Marcellus Shale natural gas drilling is often trained on what could happen deep underground, but some of the gravest hazards posed by the process are driven in trucks, stored in tanks, carried through hoses and left in pits on the surface of natural gas well sites.



Concentrated chemicals, as well as wastewater containing toxic levels of salts and metals, are stored, produced or transported in large quantities at each well site, creating the potential for tainting drinking water or seeping into local ponds and streams.

While recent incidents at Marcellus Shale wells involving explosions, blowouts and methane-contaminated drinking water have drawn attention to the dangerous potential of the activity, information about the industrywide frequency and impact of spills and leaks has not been reported publicly.

Department of Environmental Protection files made available to The Times-Tribune through a Right-to-Know request reveal hundreds of examples of spills at natural gas drilling sites in the state during the last five years, recorded by at least 92 different drilling companies.

The documents show that many of the largest operators in the Marcellus Shale have been issued violations for spills that reached waterways, leaking pits that harmed drinking water, or failed pipes that drained into farmers' fields, killing shrubs and trees.

The frequency of violations has kept the state's gas inspectors on the run.

After a Marcellus Shale hearing last week, DEP produced a list for state legislators of 421 violations found by inspectors at Marcellus Shale wells this year through June 4.

At least 50 of the violations - recorded by 15 different Marcellus operators - involved a spill to soil or water. Generic descriptions used by the department to characterize the violations make it impossible to determine the exact number of spills.

"It goes from an accident to negligence," DEP Secretary John Hanger said at the hearing, and attributed the problems to "poor management" and "not proper oversight" by the companies.

"This industry's got to look in the mirror," he said.

Kathryn Klaber, the director of the Marcellus Shale Coalition, a Pennsylvania industry group, said shale drilling is an industrial activity, like many others.

“Any spill is a problem,” she said. “For PR (public relations) reasons, for fines, for reputation, stock price - there’s no good reason to have one.”

But, she added, “I think if we were looking across multiple industries ... the question I’d like to pose is, is it worse or better than others?”

The following list highlights examples of spills, seeps and accidents as described in DEP documents that have been committed by an array of Marcellus Shale operators.

It illustrates that none of the companies currently pulling gas from the shale has been able to avoid potentially harmful accidents and errors.

Spills and leaks near a state forest

An accident at a Marcellus Shale well in early June caused a geyser of gas and wastewater to erupt for 16 hours on property owned by a private hunting club in the middle of a state forest frequented by campers and anglers.

The well is one of 44 permitted or pending Marcellus Shale wells operated by Houston-based EOG Resources on the hunting club land in Clearfield County, and the nearly catastrophic rupture was a dramatic demonstration of the hazards of natural gas drilling.

But months before that incident, a seemingly invisible plume of contamination affected water sources around the same EOG lease, prompting months of investigation by DEP.

Beginning in late August 2009, inspectors found evidence that Marcellus Shale waste fluids had impacted Alex Branch, a wild trout stream and high-quality fishery, and damaged the drinking water at a nearby hunting camp, where water tests found barium that was four times above the state and federal drinking water limits - an amount that can cause vomiting, diarrhea and muscle weakness after drinking it for even a short period of time.

DEP inspectors had not noticed any evidence of a spill from the nearest EOG well site and could see nothing wrong with the earthen pit where the company stored the well’s waste, but it was determined that undetected seeps from one pit, and maybe several, most likely caused the wastewater to contaminate the stream.

An accident in early August may also have contributed to the damage when a small hole in a hose carrying wastewater from the well sprayed a fine mist for several days that landed on nearby plants and a small wetland. A heavy rain swamped the pad, likely washing the fluids downhill to the hunting camp and stream.

In response to the leaks, EOG excavated the suspected faulty pit and another nearby pit, backfilled other unused pits on the lease and transitioned to a system in which drilling fluids and waste drawn from a well are piped to closed tanks rather than pits, which helps to minimize the risk of seeps and overflows. In an e-mail to DEP, the EOG environmental safety administrator said the company

would transition to the safer systems, which are not required by Pennsylvania law, because “we don’t want to risk anything.”

In a separate incident, on Oct. 12, 2009, a leak in a tank used to store a fluid mixture of water and hydraulic fracturing chemicals spilled about 7,980 gallons, most of which was absorbed into the ground.

It caused a nearby tributary to Alex Branch to turn cloudy and suds when agitated. An EOG spokeswoman said the company “regrets these incidents occurred and took immediate steps to address the issues,” including adopting new operating procedures and hiring outside contractors to perform water sampling after both events.

Acid leaks and unlabeled tanks

Twice in two months, hydrochloric acid spilled at two wells sites operated by Chesapeake Appalachia in Bradford County - including once when the company used a tank that was not meant to store the acid.

Alarmed notes from an inspector’s telephone conversation with the tank’s manufacturer at the time of the first spill, at the Chancellor well site in Asylum Twp. in February 2009, showed the tank was not designed or lined to hold 36 percent hydrochloric acid, and that even less concentrated acid should only have been held for a day and a half.

“Somebody messed up big time to put 14,000 gall. 36% HCL in a frac tank for 30 days!!” the note stated.

DEP records also show the same inspector pursuing concerns about the proper labeling of the tank, which was one among between 25 and 50 identical 500-barrel, corrugated wall storage tanks on site without placards to differentiate it.

“It’s bad enough dealing with unlabeled 55 gallon drums in our line of work,” he wrote in an internal e-mail, “but having to contend with unlabeled 21,000 gallon acid ‘frac’ tanks in the boondocks, on properties that have unrestricted access, is a bit much.”

The second acid spill, at the Vannoy well site in Granville Twp., may have contributed to the contamination of a private pond and a 30-foot swath of dead or stressed vegetation, including several evergreen trees.

The 420-gallon acid spill was one of several accidents at the site DEP thought might have caused the damage, including a spill of several thousand gallons of water on March 3, 2009, that was never tested for metals and salts, the hallmark constituents of Marcellus Shale wastewater.

The acid spill, on March 20, also flowed into the pond. Chesapeake neutralized the acid and removed the contaminated soil, but a cleanup plan commissioned by the company in December said some of the acid likely percolated through the pad and may have remained perched on the shallow bedrock causing additional contamination.

In July, DEP inspectors found stained areas at the base of a waste pit where the company left rock cuttings and drilling fluids in direct contact with the ground, and said the stain was a sign that drilling fluid “either has or is seeping from the pit.”

DEP fined Chesapeake \$27,271.93 and its hydraulic fracturing contractor BJ Services \$8,598.46 for the second hydrochloric acid spill in February 2010, a fine the agency never announced publicly.

Brian Grove, Chesapeake’s director of corporate development, said the company “responded proactively to both situations” and “learned very valuable lessons from the incidents.” It turned those lessons into new operating practices, including requiring secondary containment for all materials brought to a pad, he said.

Hydrochloric acid on public roads

A worker for Fortuna Energy (now called Talisman Energy USA) drove a tanker leaking hydrochloric acid about 2½ miles over public roads between two of the company’s well sites in Troy Twp., Bradford County, on June 30, 2009.

At the second site, the driver, wearing an acid-resistant suit and a respirator, tried to put a catch pan under the leak, passed out from inhaling the fumes and was taken by helicopter to Robert Packer Hospital in Sayre. The tanker lost between 100 and 200 gallons of acid and contaminated soil was later removed from both sites.

Talisman did not report the spill to DEP until late the next day, a delay DEP officials called “unacceptable.”

A February 2010 press release from DEP announced a \$3,500 fine for some incidents at one of the pads involved with the acid spill, but it did not address that spill. It also did not address three drilling wastewater spills in July and August 2009 on the same two well pads.

Efforts to reach a Talisman spokesman were unsuccessful. In the company’s written response to DEP after the acid spill, the operations manager said it “takes the issue very seriously” and he visited each well site to emphasize to workers “the importance of our zero spill approach.”

Mud eruption in a wetland

Crews for Chief Gathering - the pipeline subsidiary of driller Chief Oil and Gas - were boring a path for a pipeline 13 feet under a stream, wetland and road in Penn Twp., Lycoming County, on December 12, 2009, when the muds used to drill the hole erupted to the surface, spilling between 3,000 and 6,000 gallons into the wetland.

Initial reports from the company estimated the spill to be only about 100 gallons and to have stopped at least 10 feet away from the stream, but the DEP inspector who was called two days later found sandbags and a silt sock right at the water’s edge and the barrier did not prevent some of the mud from reaching the stream.

Efforts to clean up the spill were slowed, first because the muds clogged the suction hoses the company used to try to remove it from the wetland, and later because the fluids froze solid.

While he was on site, the inspector also saw evidence of muds in a roadside ditch and was told that there had been another, unreported spill on December 10 of about 110 gallons.

The inspector noted that chemical safety sheets provided by the company for the mud, “Hydraul-EZ,” listed the ingredients bentonite, a kind of clay, and a “bentonite extender,” but the manufacturer “claims that any further details about these substances is proprietary” making it “difficult” to determine the potential of the mud to cause pollution.

Kristi Gittins, a Chief spokeswoman, said that the spilled mud is “not hazardous. It’s dirt.”

“There were no chemicals, and the DEP knows that,” she said.

The remedy for such a spill is to “let it settle,” she said, which is what the company was told to do.

Overflowing waste pit 1

More than 30,000 gallons of diluted wastewater overflowed a waste pit, rushed over a barrier and soaked a pasture on June 3, 2009, when workers transferring the fluid to the site owned by East Resources in Tioga County accidentally dumped too much into the pit.

The spill was first noticed by DEP inspectors, who happened to stop by the well pad. The fluid was diluted enough, and cleaned up quickly enough, not to kill or stress vegetation, and the fluid did not appear to reach a stream.

The pit was among four at East Resources well sites in Tioga and Potter counties that discharged the wastewater they were holding. The three other pits all leaked and at least one was concentrated enough to kill or stress nearby vegetation.

East is finalizing a consent order with DEP that covers those and about 30 other violations at its sites, according to a violation notice posted on a DEP database that indicates the company will pay a \$29,000 fine.

Stephen Rhoads, East’s director of external affairs, said the spill was an “unfortunate accident” with no long-term impact.

“Working with DEP, we took care of it immediately,” he said.

Overflowing waste pit 2

A 750,000-gallon pit holding a mixture of fresh water and wastewater overflowed off a well pad run by Atlas Resources in Washington County, through a drain and into a small tributary in a high quality watershed on December 5 and 6, 2009.

The spill was reported to DEP by the property owner, who noticed the spill before Atlas saw or reported it. It apparently was caused by a pump that turned on automatically but had no mechanism for turning off automatically when the pit was full.

The spill, for which the company has not been fined, is one of several violations the company has recorded in southwestern Pennsylvania. In January, DEP fined Atlas \$85,000 for violations at 13

well sites between December 2008 and July 2009, including improper erosion controls and site remediation, and spills of diesel fuel and wastewater.

In late March, on the same Hopewell Twp. farm as the pit overflow, liquid hydrocarbons called condensate on the surface of a 400,000-gallon wastewater pit caught fire, engulfing the pit and burning its plastic liner, causing a plume of black smoke that was visible for miles.

Atlas, a Pennsylvania company, also drills non-Marcellus Shale natural gas wells, including one near Kushequa, McKean County which DEP found to have caused explosive levels of methane and ethane to seep into residential water supplies and triggered a small explosion in the village's public well in late 2007.

Efforts to reach an Atlas spokesman were unsuccessful.

Hydraulic oil leak

An oil leak from a hydraulic line in March 2008 spilled onto a field and into natural springs surrounding a Range Resources - Appalachia well in Washington County. The oil mixed with water and flowed 100 yards downhill, contaminating soil and killing vegetation.

Range excavated the contaminated soil and paid a \$21,200 fine in June 2009 for the spills at that site and for 16 other violations, an enforcement action that was never publicized by DEP.

DEP also investigated whether a Marcellus Shale well drilled by Range on the same property affected an old abandoned well, causing gas to contaminate private water supplies and bubble up through the soil.

Matt Pitzarella, a Range spokesman, said the gas migration was a preexisting issue that was only discovered once Range's activities started on the site. The company capped and remediated the old well, he said.

The oil leak he called a mechanical error, and said the other violations included many that were administrative.

"Fortunately it was an incident that had minimal if any environmental impact, but you have to take care of every little detail," he said.

"Since that time we've increased efforts to keep spills on location."

Two months, two diesel spills

Cabot Oil and Gas Corp. had two 800-gallon diesel spills in five weeks in 2008 at some of its earliest Marcellus Shale sites in Dimock Twp.

On June 3, off-road diesel spilled from a break in a fuel line to a drilling rig, ran down a hill and into a roadside swale and pooled in a flooded wetland near Meshoppen Creek.

On July 11, a dump truck driver working to build an access road to a well backed into a 1,000-gallon tank of off-road diesel, panicked and dragged the tank about 30 feet before it tipped over and

spilled onto the ground. Crews dug pits and vacuumed up about 170 gallons of the visible diesel, then removed contaminated soil and stone from the site.

When two of nine soil tests showed continued contamination, contractors dug a foot deeper and excavated more soil. A total of 272 tons of contaminated soil was taken from the site.

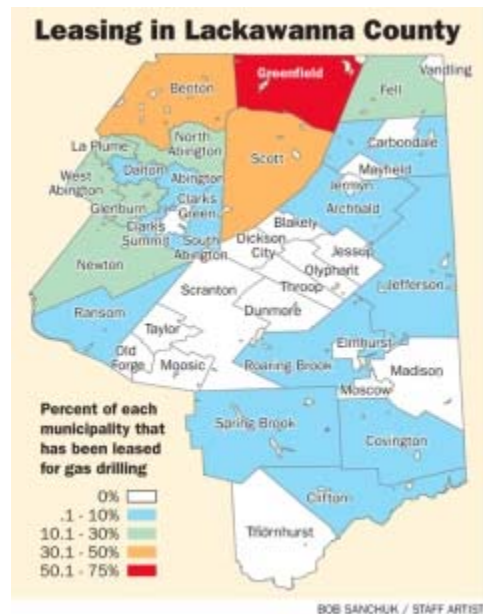
The company was fined \$4,915.30 for the first spill after the site was cleaned up. According to DEP records, Cabot was never fined for the second spill.

Cabot spokesman George Stark said the company “works hard to ensure that we have a plan in place to control and maintain any accidental release.”

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More than an eighth of Lackawanna County land leased to drilling companies, more wells likely

by Laura Legere (staff writer)
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One natural gas well has been drilled into the Marcellus Shale in Lackawanna County, but much more development is on the county’s doorstep.

Already more than an eighth of the county’s land has been leased to companies planning to drill in the Marcellus Shale, according to deeds recorded with the county.

The total land leased - about 38,000 acres - amounts to an area roughly twice the size of Scranton.

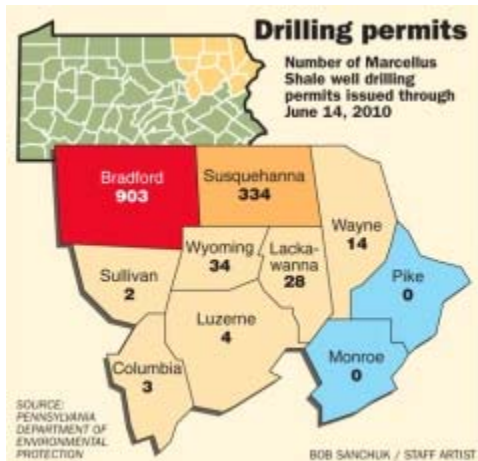
Those leases carry a soft deadline for drilling: Many of them have a primary term of five or seven years, which means the companies have to make some progress to develop the gas within that time or renegotiate to extend the agreement and risk losing the lease to a competitor.

Because the vast majority of the leases in the county - 816 of them - were recorded in 2008, the incentive for developing the gas is approaching.

The land rush has touched a vast area of the county. Land in 20 of Lackawanna’s 40 municipalities has been leased, with the largest concentration of leases in northern municipalities, including Scott, Benton and Greenfield townships, as well as areas of the Abingtons.

Many of the county's most prominent farmers, including the Manning, Eckel, Roba and Pallman families, have signed leases.

Although much of the land has been leased outside of the population centers along the Lackawanna Valley, leased parcels are not strictly on farms or in rural areas.



Baptist Bible College leased 114 acres on its South Abington Twp. campus.

The Abington Hill Cemetery Association leased 120 acres in South Abington along the Morgan Highway.

Leases have also been agreed to on land near residential areas. For example, 38 acres have been leased along the 900 and 1000 blocks of Fairview Road in South Abington.



Property owners with leases include private individuals, but also churches, golf courses, businesses and community associations. The Greenfield Township Sewer Authority leased 7.3 acres; the Fleetville Volunteer Fire Company leased 65 acres in Benton.

The Newton Lake Association and the Associates at Chapman Lake, two community associations that own their namesake lakes and the area around them, both signed leases.

Religious organizations have also signed leases, including the Harmony Heart church camp in Scott, a 59-acre parcel in Scott owned by Parker Hill Community Church, the Evangelical Free Bible Church in North Abington Twp., and Community Bible Church in Greenfield.

Three national energy companies, Oklahoma-based Chesapeake Appalachia, Texas-based Exco Resources, and Texas-based Southwestern Energy, hold nearly all of the leases.

The amount of Lackawanna County land leased for gas development surprised even people who have followed the subject closely for years.

Lee Jamison, a leader of the multi-municipal Abington Council of Governments, which has hosted educational events and speakers regarding Marcellus Shale drilling since 2008, did not know the extent of the leasing or its reach to areas outside of the rural northwest of the county.

He said despite educational events and active gas drilling in nearby communities, Lackawanna County municipalities have to do more to follow changing legislation and precedent-setting court cases to prepare for the coming development.

“I still think there’s quite a lack of preparedness on the part of the local municipal officials,” he said. “Often times you get conflicting reports and confusing stories.”

Mr. Jamison, who recently lost in the Republican primary race for state representative in the 114th House District, made Marcellus Shale a central part of his platform.

“Over 90 percent of the people I’ve spoken to are in favor of developing the Marcellus resource,” he said, “but they want it done correctly. With that caveat.”

Mary Felley, the open space coordinator for the Countryside Conservancy and a representative of Dalton in the Scranton-Abingtons Planning Association, said residents and municipal officials are “aware that it’s coming but not quite here.”

“I come to my local borough meetings, and people ask what can we do as a borough to regulate this, and we don’t know,” she said.

Because of unsettled case law regarding what role municipalities can take in regulated drilling, “we’re not getting a whole lot of clear guidance on what we can and cannot do here,” she said. “That’s kind of scary.”

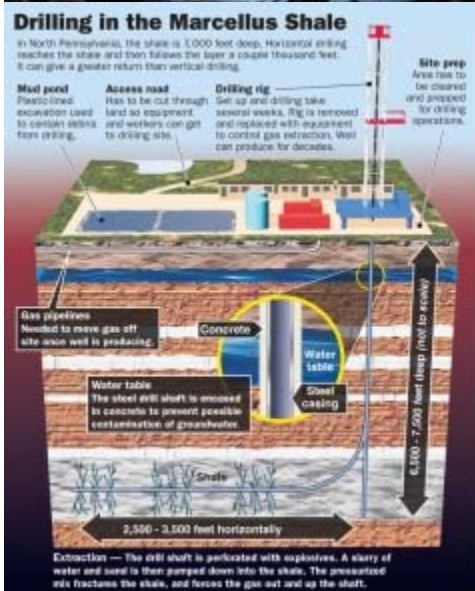
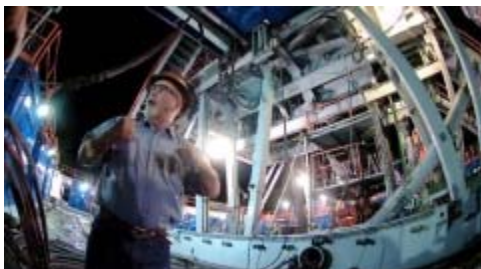
There has also been a dearth of local training specifically targeting municipal officials on preparing for gas development. Even if there were such meetings, “my concern is people may not attend those until there’s a lot more activity in the county,” she said.

“This is the way we’ve evolved apparently: you respond to urgent threats you can see. You don’t respond to slow, impending threats that are over the hill somewhere.”

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Impact of natural gas drilling environmental woes could linger

by Laura Legere (staff writer)
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Michel Boufadel began a recent presentation about Marcellus Shale drilling with a photo of the ruptured Exxon Valdez oil tanker spilling into Alaskan waters, a disaster whose remnants the Temple University engineering professor has been studying for years.

He flipped to a photo of himself and some graduate students standing around a pool of oil in a hole in the sand of an Alaskan beach.

“Everyone assumed in 1992” that the oil from the spill had been properly remediated and was “going to disappear,” he said. “Yet it is still there. That is the problem with groundwater pollution. It doesn’t go away that fast.”

Dr. Boufadel is one of the scientists who study the rocks, water and people directly affected by Marcellus Shale drilling who cautions that everything from the way the rock breaks underground to the way contaminated water travels through an aquifer has not been - or cannot be - thoroughly considered.

Much of the attention about the environmental risks of natural gas drilling in the Marcellus Shale has focused on the potential for hydraulic fracturing to contaminate drinking water aquifers.

According to the industry and both state and federal regulators, there has never been a confirmed case of contamination being caused by the fracturing - a process of injecting millions of gallons of water, sand and chemical additives underground at high pressure to break apart the rock.

The industry takes a narrow view of what such contamination would mean, limiting it to what they say would be an impossible instance of the toxic mixture migrating through the new cracks caused by the fracturing operation, up a mile of rock, and into a drinking water aquifer.

But legislators and federal regulators are increasingly looking at hydraulic fracturing as more than the isolated act

of breaking apart the gas-bearing rock; they see it as part of an interconnected series of often hazardous steps, from trucking and storing toxic chemicals on a well site to disposing of the fluid laced with salt, metals and radiation that comes back out of the wells.

In March, the Environmental Protection Agency announced plans for a study of hydraulic fracturing that would consider all of those factors - the whole life-cycle of a well.

Kathryn Klaber, the head of the Marcellus Shale Coalition, a Pennsylvania-based gas drilling cooperative, said the industry supports the EPA study, as long as it does not halt or slow the pace of drilling.

“I don’t think you have to stop something in order to study it,” she said.

The industry also points to a previous EPA study of hydraulic fracturing that did not find any instances of the practice causing water contamination, but which was limited to only one type of hydraulic fracturing, in coal-bed methane wells.

“What we’re missing is that definitive, absolutely unquestionable, science-based, non-politically influenced study,” said Dr. Anthony Ingraffea, a Cornell University engineering professor who has two decades of experience working on computer simulation of hydraulic fracturing in oil and gas wells. “And that is what everybody is hoping that the EPA will do.”

‘What can we live with?’

Many scientists, including Dr. Ingraffea, acknowledge that there are limits to the usefulness of the EPA study, no matter how ambitious the final scope, because it must be completed by 2012, a relatively short amount of time.

“There shouldn’t only be one study or awaiting the EPA study,” said Dr. Boufadel, who advocates for risk-assessment studies tailored to individual communities near gas drilling.

“There should be 10 or 20 studies. That would allow the truth to come out.”

He proposes studies that would measure and assign a value to the relative risk of living among a certain number of wells, compressor stations, pipelines, wastewater impoundments and the other infrastructure necessary for drilling and production.

Evaluating risk, he said, is “how insurance companies make decisions. That’s how we, as people, make decisions.

“It is not yes or no. It is what can we live with.”

Asked if he knew of anyone conducting a study like that he said, “No. Not to my knowledge.”

Dr. Boufadel also suggests that several practices that are standard in Pennsylvania for measuring contamination from drilling are questionable.

The weight of any water contaminated with the salty waste produced by Marcellus Shale wells will cause it to sink in an aquifer, he said, below the reach of conventional measuring tools, like groundwater monitoring wells.

“We really need more advanced models than we are talking about now,” he said, or the state will risk misjudging the scope of a contamination incident until a “whole aquifer is polluted.”

‘Nobody knows; no one can know’

Conrad Dan Volz, director of the Center for Healthy Environments and Communities at the University of Pittsburgh, also argues that science has been missing in much of the consideration of long-term or cumulative effects of shale gas exploration.

He lists a number of elements of the drilling process that require further study, and plans to begin researching some of them this summer in southwestern Pennsylvania. His work will include baseline testing of rivers and comparisons of drinking water wells in areas full or free of gas drilling.

“The question is, why didn’t we do the science beforehand on this?” he said.

“What we’re really bad at - and we have the tools to do this - is anticipate problems. And I don’t see where anyone has done much anticipatory work.”

Even the most straightforward assurance about the hydraulic fracturing process - that aquifers are protected from fracturing by thousands of feet of layered, solid rock - is not as certain as the industry insists, Dr. Ingraffea, of Cornell, said.

Although he does agree that the chance of contamination through those layers is minuscule, he also knows from experience that the work to predict and measure where fractures go is necessarily inexact, and the rock “unfortunately” is not solid or impermeable.

To say that hydraulic fracturing contamination through direct communication with an aquifer is impossible is “nonsense,” he said. “To say that it is inevitable is nonsense.

“We’re dealing with a highly probabilistic underground system, where nobody knows, no one can ever know, exactly the geology that’s down there, exactly the geometry of what’s down there.”

Add the very remote risk of fractures causing direct contamination, to the larger risks of well casing failures and human errors on the surface and the total probability of failure during Marcellus Shale gas production “starts looking, to me, high,” he said. “Very risky.”

Gas drilling companies have financial incentives to avoid mistakes, he said, but the experience of Marcellus Shale exploration so far - what he calls “ground truth” - has been a series of mistakes followed belatedly by attempts at improvement.

“They could have done this totally differently if they weren’t in a hurry,” he said.

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DEP gas drilling violations database

DATACENTER

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Search a partial collection of DEP gas drilling violation documents from 2005 - 2009

<http://thetimes-tribune.com/news/gas-drilling/dep-gas-drilling-violations-database-1.856436>

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County	<input type="text"/>
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Natural Gas Leases Database for Lackawanna and Luzerne County

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<http://thetimes-tribune.com/news/gas-drilling/natural-gas-leases-database-for-lackawanna-and-luzerne-county-1.856437>

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