Gas Well Study, 2008

Observations from Visiting
Gas Wells Operated by One Company
in Putnam and Kanawha Counties, West Virginia

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Introduction

Between September and the end of December 2008 we examined gas wells in Putnam and Kanawha counties. All but a couple, by chance, were operated by the same company and this report focuses on what we saw at that company's wells. We're not singling out this company because the problems we saw at their wells we also found at other operators'.

The major reclamation problems we observed had to do with vegetation or lack of it, drainage and sedimentation control, and well access roads. Over four-fifths (84%) of the sites had road issues, most often ruts. We used 2 to 4 inch deep ruts as a sign of needed maintenance, though roads often had other problems.

Maintenance issues we found were the wrong or no API number at sites (over a third we examined), trash on the site in the form of cast off industrial debris, leaks or spills, and a visible lack of upkeep (most usually unpainted pipework that, while not regulated, can detract from the company's image or indicate substandard performance).

The lack of proper secondary containment structures for tanks was a major problem. Required by state regulations, the dikes have to be a certain size according to tank capacity and include a rainwater drain with valve. Over four-fifths (84%) of the sites we examined weren't in compliance. Over two-thirds were without a dike and those sites that did have an adequate dike didn't have a rainwater drain.

The study examines and illustrates the problems we found and we've created on our website a special section that is devoted, on a well by well basis, to discussing individual site's problems. The URL is: http://members.citynet.net/sootypaws/Woods/gaswell/comments/otherwells/index.html.

The Study

We've examined a number of well sites in the area near our home, of which most, by chance, are operated by a single company. All of the company wells are distinctive so we've become able to identify one before closer inspection.

Company wells demonstrate problems in the areas shown in the table on the next page and rather than go well by well, we'll discuss and illustrate these problem clusters.

When we look at a well we try to look at it as if we were a manager for the company. Our inspection is visual only, recorded by photographs and notes keyed to the photographs.

Some categories of problems aren't covered by regulations or the *West Virginia Erosion and Sediment Control Field Manual*[1] and that's where our manager persona is useful. Other groups of problems show a clear non-compliance with state regulations or the Manual and at least once with federal regulations.

Two things lead us to believe by first glance we're on a site operated by the company. Generally the roads are poorly maintained and the equipment on the site has a rusty, run-down appearance. The manager in us wonders why metal isn't painted, and, when it is painted, it's always battleship gray. The Bureau of Land Management (BLM) has created a group of PowerPoint and Acrobat documents demonstrating BMPs which include painting equipment so it blends in the environment better. Battleship gray isn't one of the colors.[2]

Wells aren't compliant when they are lacking or have the wrong API number.[3] We've seen an unexpectedly large group with this problem. We can understand that vandalism might cause the plate or label bearing the API number to disappear, but there's nothing keeping the company from painting the number on a storage tank or other equipment.

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[1] West Virginia Division of Environmental Protection, 1992, *West Virginia Erosion and Sediment Control Field Manual*, cited hereafter as Manual.

[2] BLM, 2006, *Visual Resource Management*, part four, Choice of Color, http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/bmps.Par.20196.File.dat/WO1_VRM_BMP_Part_4_Slideshow.pdf.

[3] 35CSR4.5.5.a. We've seen two wells with company tags using the wrong API numbers. Five wells were without numbers.

Company Wells in Kanawha and Putnam Counties

API Number	Road Issues	No or Wrong API Number	Vegetation Issues	Drainage and Sedimentation Control	Maintenance Issues	Trash	Leak or Spill	Tank without Dike	SPCC Violation
Long Road Group									
47-079-01288	X		X	X	X		X	X	
47-079-01215 (storage well, no tank)									
47-079-01178	X			X	X		X	X inadequate	
47-079-01299	X		X					X	
47-079-00702	X		X		X	X		X	
No API 1 (probably 47-079-01314)	X	X	X				X	X	
No API 2 (probably 47-079-00706)	X	X			X			no rainwater drain	
No API 3 (probably 47-079-01364)	X	X	X	X	X	X		X	
47-079-01155	X		X		X			no rainwater drain	
No API 4 (probably 47-079-01363)	X	X	X	X	X	X		X	
No API 5 (probably 47-079-01354)	X	X	X					X	
River Road Group									
47-079-00735	X	X	X		X	X		X	possible
47-079-00601	X					X			
47-079-00570					X		X	X	X
King Cemetery Group									
47-079-01200	X				X		X	no rainwater drain	
47-079-00274 (storage well, tank)	X							X	
47-079-00404 (storage well, no tank)	X								
Kanawha County									
47-039-02026	X	X	X	X		X	(X)	(X)	
47-039-05714			X		X			X	
Percentage of Wells Examined	84%	37%	58%	21%	53%	32%	16%	no dike 68%	

Notes:
(X) -- Fixed after complaint

Wells aren't compliant when storage tanks don't have secondary containment.[4] The state's regulations are based on federal Spill Prevention, Control and Countermeasure (SPCC) regulations but are broader in that they don't state a tank size above which containment is required, nor do the state's regulations have location requirements in terms of being close to a body of water (federal SPCC regulations are 40CFR112). In one case assuredly, and possibly another, because of the site's location on or near a tributary of a body of water used for interstate commerce, and because of the size of the tank (50-barrel, well above the 1320 gallon minimum SPCC requirement), the company is violating federal regulations.

Below, we'll discuss and illustrate in more detail what we've seen.

Access Road Issues

Just about every well site we visited had problems with all or parts of the access road. The majority of well access roads were earth with a few that had graveled sections. Access roads for two sites that had no problems were just off state roads and were fully graveled or paved.

It's possible to have an earth road in West Virginia and not have ruts after years of use. The requirement is that such roads be used only by ATV-like vehicles from November through April or after heavy rainfall.

It should be noted that company roads, even where "daylighted", showed deep ruts. Ruts are an issue because they hold water and increasingly degrade the road surface. In addition, during the spring, ruts that hold water are breeding areas for frogs and other wildlife. By creating ruts in a road, letting wildlife lay eggs in the ponds created, and then driving through those areas destroying the eggs or young, the company is being callous.

In one area where main and feeder roads provided access to a large number of sites, the main road had such serious problems in spots that detours had been created. Neither the overall design of that road system or its construction and use showed planning or consideration of the property owners. (This same area was crosshatched with pipelines which usually didn't use the road system right-of-ways but had their own, independent right-of-ways, another indication of little concern for surface owner rights.) We can't remember seeing a single broad-based dip even though one was the logical structure required in a number of instances.

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[4] 35CSR1.7 and Manual, III.D, Table III-1 and Figure III-5.

Besides the roads themselves, the associated drainage and sedimentation control showed little understanding of either the Manual's or the sites' requirements. We've considered drainage and sedimentation control problems as a separate category.

The photographs show the typical range of problems we came across that are road issues.

47-079-01178

This road had serious rutting caused by inadequate drainage. The road itself was a challenge for the company to create, going down steep grades into a hollow.

The problem here was caused by a slip narrowing the road width so that vehicles had to use the side ditch as roadbed.

47-079-01228

A newer well with a deeply rutted access road from a main access road that serves a number of wells. This road had been "daylighted" but still had severe problems.

Just north of 47-079-00702

This access road serves a number of well sites and is in serious need of repair and maintenance. Drainage control in some spots is nonexistent.

Just north of 47-079-00702

Another photo of the same road. This road is several miles in length and like this in long stretches.

On main access road before 47-079-01299 access road, a 6-inch pipeline is exposed in two widely separated areas. This is the spot closer to 47-079-01299.[5]

A close-up of the exposed 6-inch pipeline.

Wrong API

Two sites had the wrong API number (improper county) and five sites had no API number at all.[6] In those later cases we could not be sure if the problem was due to the company or vandalism. As a preventive measure, the company should paint the API number on the tank or some other structure. Or, as we saw at several storage wells, the company could permanently affix a placard to a piece of equipment.

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[5] Current rules (35CSR4.16.7.c.2) require pipeline be under at least 18 inch cover, 6 inch if solid rock doesn't permit deeper burial, but existing pipelines were grandfathered in 1983 and perhaps this one dates before then. Even so, it looks dangerous and probably is dangerous.

[6] The API number is required by 35CSR4.5.5.a.

Vegetation

A number of sites we visited had been drilled in the past 10 years. On these and some older sites we saw problems with vegetation -- ranging from lack of any seeding at all to much older sites with no or sparse vegetation on the pad.

Guidance Document: Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites suggests 70% cover as the aim. We saw this only at a couple of sites.[7]

The reasons for poor vegetation were varied. In a number of cases what was needed was mowing, required by the Manual for tall fescue.[8] If the company doesn't want to go to the expense of mowing it should use a different species than tall fescue. In some cases additional seeding was required to fill bare spots but was not being done.

A group of sites had vegetation problems on the pad in areas compacted by maintenance vehicle use (and regrading in the past in a few cases). Gravel in these areas would help encourage vegetation (which seems counterintuitive but is true). Some of these sites affected negatively by company use also showed off-the-road vehicle use by others. Gates and fences would be the obvious solution in these sites (47-079-00702 is an extreme example of damage done by unintentional vandalism by recreational off-the-road traffic).

47-079-01299

Sparsely vegetated pad of a newer well. Older wells had, generally, just as much a problem if not more.

[7] Horizon Environmental Services, Inc., 2004, pp. 19-20 and A-1. This is 70% of original cover, but since forest is so effective at preventing sedimentation (many more times than agricultural land), we figured woodland at 100% and stabilization would require 70% of that.

[8] Manual, IV.B.2b states for tall fescue, mowing should be "at least once every two years."

47-079-01288

Another sparsely vegetated pad.

No API 3

This site hadn't been seeded even though it was early November.

No API 1

An almost bare well pad with rutting. It had rained several weeks previously.

No API 4

Dirtbike tracks on cut slope above pad which had recently been seeded. The site had no gate or fence.

Drainage and Sedimentation Control

We have yet to see a newer site with the required sedimentation controls (temporary as bales of straw or silt fencing or permanent as vegetation) where drains or culverts occur. Drainage problems are hard for us to quantify and only the most egregiously demonstrable examples were counted. Some sites, such as 47-039-02026, have pads with inadequate drainage so that they become lakes in the winter. The long road group of sites suffered from well access roads with poor or no drainage.

No API 3

This is the inlet end. No sedimentation control at the outlet end.

No API 4

Partially wrecked culvert inlet.

No API 4

Outlet of culvert in previous photo. No sedimentation control until vegetation is established.

Maintenance

Most of the metal at sites, even those that were only a year or two old, showed a need for a coat of paint (except for storage wells which

are the exception to the rule). Rust and severe scaling of metal detracts from the company's image. Some sites showed even greater needs for maintenance. These included inadequate structures at the wellhead and no lock on the tank trapdoor. One tank was missing its trapdoor entirely.

47-079-00735

This well had steel plates over a void at the wellhead. The void should be filled with rock to the ground surface for two reasons. First, the plates are unstable and have a gap. Second, the void creates a breeding place for mosquitoes.

47-079-00702

Low spot at wellhead should be brought level to the surface to prevent ponding and old timbers should be removed.

47-079-00570

Open lock at trapdoor to tank.

47-079-1155

Tank in background has a dike without rainwater drain. Additionally, the tank has no trapdoor.

47-079-01200

Metal at this well is in serious need of paint. Would the company want to use a photograph of a well looking like this on its website or in its annual report?

The tank has an impressive dike but no rainwater drain that we could see.

Trash

Several sites had trash in the form of scrap equipment and pipe. One seemed to be used as a dump by others since it was close to but not visible from the road. A gate, in this instance, is required.

47-079-0735

Old steps from former tank and pipe.

47-079-0735

The trash at this site was a mixed lot and it was impossible to tell what was the company's and what had been left by others.

No API 3

The scrap pipe should be hauled away.

The tank in the background is without a dike.

47-079-00702

Old, unused 100-barrel tank should be hauled away.

No API 4

Scrap plastic culvert tossed over hillside.

No API 3

Tipped over portolet which looks like it's been left as trash.

No API 4

Scrap plastic pipe thread protector (?) lying on recently seeded well pad.

No API 4

We've seen pieces of black plastic on a number of recently reclaimed well sites, though usually they aren't as exposed as this.

Leaks or Spills

In spite of poor maintenance we saw only a few relatively minor leaks (we say relatively minor because it takes only time for a minor leak to become a serious problem).

A complaint was called to the Office of Oil and Gas on 8 September 2008 by George for 47-039-02026. The company built a dike around the tank a week after the complaint.

47-079-00570

A leaking valve in the Christmas tree at the wellhead. It had rained the night before and the leaking gas was bubbling the water.

47-079-01200

Unknown substance leaking at well head.

No API 1

This joint at the Christmas tree seems to be leaking unknown matter.

47-039-02026

Tank that had overflowed the previous winter. This and the next photo were taken in early September 2008.

47-039-02026

The oil had gone down a ditch over the hillside.

The tank now has a dike.

Tanks Without Dikes and SPCC Violations

Secondary containment for storage tanks is required by 35CSR1.7 and in certain instances by federal SPCC regulations. In addition, the dikes have to be a certain size to hold the tank's contents plus freeboard (110% by both Manual and federal regulations). The containment also needs to have a rainwater drain.[9]

Just about every site we visited had a problem meeting all these requirements. Older sites had adequate dikes but no rainwater drains. The majority of sites had no secondary containment at all.

Two sites without secondary containment were close to the Pocatalico River -- 47-079-00570 and 47-079-00735. The former, actually on the bank of the river, is covered by federal SPCC regulations. [10] The latter site needs to be closely examined by an inspector to see if it doesn't also fall within federal requirements.

The tanks we saw without dikes ranged from steel double wall 50-barrel tanks to plastic tanks in several sizes.

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[9] "Many operators confused the requirements of the Federal SPCC Program with spill prevention requirements established by other agencies." EPA, 2003, *Oil and Gas Environmental Assessment Effort 1996-2002: Report of the United States Environmental Protection Agency Region 8*, page 12. The report recommends, as we do, a need to provide explanatory materials.

[10] EPA, 2005, *SPCC Guidance for Regional Inspectors*, page 2-26, presents the requirements for SPCC compliance: 1) Facility must be non-transportation related, 2) Facility must be engaged in drilling or production, 3) Facility could be reasonably expected to discharge oil in quantities in navigable waters or tributaries, 4) Tank has to be 1320 gallons or more. SPCC regulations extend to facilities other than drilling or production; we've presented a description applicable to well sites.

47-079-0735

50-barrel tank without a dike.

This site is close to the Pocatalico River.

47-079-01288

50-barrel tank without a dike.

47-079-00570

This site is on the Pocatalico River (which is visible in the background). The remains of a dike surround the tank but the dike is wholly inadequate. This is a federal SPCC violation.

47-079-00570

View of the tank's dike on the river side, which is the dike's lowest point.

47-079-00702

Large plastic tank without a dike.

47-079-00274

This is a storage well site with a, what looks to be 50-barrel, plastic tank.

No API 1

Large plastic tank without a dike.

47-039-05714

Another 50-barrel steel tank without a dike.

George, when he made his complaint on 8 September, expressed his concern that tanks at other wells might also be without dikes. When he talked with an Office of Oil and Gas inspector at the well site the next day he again expressed his concern, as he did earlier that day

in a meeting with non-managerial company representatives. We've seen no action by the company on this issue in the intervening time period.

Conclusion

The problems we observed could, in some instances, have negative health and safety effects. The state's secondary containment regulation has the intent of protecting water quality. A well in a remote location without the required API number identification makes it impossible to locate if there is an accident or problem. A poorly maintained access road can be dangerous for company workers and contractors or for others who use those roads.

Maintenance of roads is required for the life of the well by the Manual, the state's minimum reclamation requirements for the industry by code. So is proper drainage and sedimentation control and vegetation on the site.

The presence of an API number at the well and secondary containment for tanks are required by state regulations, which are quite explicit.

Recommendations that we offer include revising the regulations and creation of manuals and guides for operators.

The requirements for secondary containment are spread between 35CSR1.7 and the Manual. We suggest that the material in the Manual be included in the regulation making a comprehensive statement.

Manuals or guides for contractors and operators need to be created for: laws of the state, requirements for reclamation and maintenance, and storage tank secondary containment. These can be in the form of web pages or downloadable documents on the DEP website.

We believe that the state's educational outreach should include its citizens. Illustrated standards could be put up on the DEP website, allowing people to know what is right and what is wrong, encouraging knowledgeable complaints.

Comments or Questions? Email gmonk@citynet.net with "Gas Well Study" in the subject line.

Works Cited

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Appendix

The study was done between September and December 2008, visiting sites that we saw as we drove down the road in a car or made special expeditions to by ATV. Examination of a site was entirely visual. After seeing a few sites, we created a checklist that we use to help us have a consistency of approach.

At each site, we noted the API number if one was present at the wellhead. This was written in large numerals with a Sharpie on a notebook page and the notebook was propped up against the wellhead. We photographed the notebook and used this to help us keep photographs sorted according to each particular well.

It really helps to have two people looking at a well together -- each person sees different things.

Items that we include in our bag when examining wells are: pens, notebook and checklist sheets, maps, digital camera and spare batteries, and measuring tape (for measuring size of dikes we used either a 25 or 50 foot tape).

On the next page is a copy of our Well Site Checklist.

Well Site Checklist

Well API Number: 47-____-_____

Well Name: _____

Operator: _____

Date: _____ By: _____

Location (so the well can be easily found): _____

_____

General impression of site (include vegetation, signs of recent maintenance or signs of lack of maintenance, etc.) _____

_____

_____

Visible debris or spills: _____

Leaks/odors: _____

Dike present for storage tank: ☐ Yes ☐ No

Dike large enough for tank's contents plus extra: ☐ Yes ☐ No

Rainwater drain for tank: ☐ Yes ☐ No

Locked trapdoor: ☐ *Yes* ☐ *No*

Comments: _____

Access road to site: ☐ Earth ☐ Graveled ☐ Mixed

Ruts: ☐ *2 to 4 inches deep* ☐ Silt control lacking

Problems with road: _____

_____

Notes: _____

_____

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