

Marcellus Shale Development and Municipal Roads

Preventing damage to roads and local water supplies

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BENEATH ROUGHLY 60 PERCENT OF PENNSYLVANIA lies one of the world's largest known energy reserves. The Keystone State has recently been referred to as the Saudi Arabia of natural gas, and much of the early production data coming from wellhead reports verify that there is indeed "gold in them-there-hills."

The tapping of the Marcellus Shale Play is already proving to be a shot in the arm for some of the state's most economically depressed regions. Jobs are being created that will allow young people to stay and build a future here. Land values and lease royalties are enabling many hard-working Pennsylvanians to be able to retire comfortably or save the family farm. Some within the state think the industry may even help to fund the needs of the public sector. Ultimately, the hope is that Pennsylvania and its citizens will prosper from the opportunity that this new industry presents.

However, as the old adage goes, there is no such thing as a free lunch, and along with the benefits come the costs. Among the more notable costs of deep shale development are environmental concerns and damages to municipal roads, resulting from the large-scale heavy hauling operations required by the industry. While Pennsylvania's Marcellus region has miles of roads to serve the gas industry, many of these roads are graveled or paved routes never designed to handle the number of vehicles they are now subject to, let alone the heavy-weight hauling requirements associated with deep shale gas development.

But, by being proactive and allowing the gas industry to come in and fix these rural roads before they begin hauling, municipalities are taking a preemptive strike in maintaining their roads. And, by insisting that environmentally sensitive road maintenance practices are followed, municipalities will help to avoid degradation of their streams and lakes and potential damage to their water supply.

The Problem: Impassable Roads and Environmental Degradation

Last spring, news reports described how many municipal roads were reduced to mud holes by scores of overweight trucks serving the gas industry. In some cases, the roads were rendered impassible to passenger vehicles. Not wanting to repeat past mistakes, the gas industry and government officials alike have re-evaluated standard operating procedures related to the Marcellus shale drilling operations and decided how to proceed to prevent a repeat of those problems.

With the exponential growth of the gas industry comes another cause for concern—the potential degradation of the environment. Most of us have heard the concerns about hydraulic fracturing, water withdrawals, and potential chemical spills. However, one of the less publicized concerns includes stormwater issues associated with pad construction, access roads, and damaged public roads. The



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Last spring, a number of municipal roads were reduced to mud holes by overweight trucks serving the Marcellus shale drilling operations. To prevent a repeat of this road damage, the Center for Dirt and Gravel Roads recommends that unpaved municipal roads be upgraded before hauling begins. Unpaved roads in particular are prime candidates for preemptive road improvements.

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state Department of Environmental Protection (DEP) has assumed responsibility for monitoring water runoff at the well site and on access roads, but it is up to municipal officials to ensure that their roads do not become a pollution problem should they break under load.

Municipalities located in the gas patch are urged to address potential problems and concerns early and be as proactive as possible. They have a duty to protect both the public infrastructure and the environment and to minimize the costs while doing so.

The Solution: Improve Roads Before Hauling

Since mid-2008, the Center for Dirt and Gravel Road Studies at Penn State has been promoting the idea of upgrading unpaved municipal roads before hauling begins. The focus should be on roads that either are in close proximity to a stream, wetland, or impoundment or are at risk of catastrophic failure because of inadequate drainage or poor base composition. Unpaved roads in particular are prime candidates for preemptive road improvements because they lack a costly bituminous or concrete overlay that would substantially raise the cost of the process and they often experience greater damage during the spring thaw than hard surfaced roads do.

Upgrades to roads should occur before the hauling begins and should center on the following actions: reinforcing the base at known weak spots, addressing existing drainage problems, and improving road drainage in anticipation of additional run-off, especially at new intersections with access roads, pipelines, and drainage swales. The goal is not only to protect the existing infrastructure and surrounding environment, but to lengthen the maintenance cycle and reduce the need for costly grading and re-graveling. In addition to long-term cost savings, such pre-haul road upgrades will have a wide host of other positive consequences, including environmental stewardship/compliance, enhanced community safety, better public relations, and economic growth beyond the gas industry.

By addressing road base stability and problematic drainage issues prior to subjecting roads to hundreds or thousands of very heavy trucks, municipalities can reduce the number of catastrophic road failures, minimize the need for tons of tailgated stone usually required to prolong a passable road, and reduce sediment released to surrounding surface waters. With fewer hazardous road conditions, emergency vehicles will be able to access homes and businesses, and residents will not be inconvenienced by poor road conditions or impassable roads.

Road Practices to Protect the Environment

Another concern associated with the increased traffic and hauling operations of the gas industry is that many unpaved public roads in the Marcellus region share watersheds with the highest quality streams in the state. Communities throughout the region rely on these streams for tourism and outdoor recreation. By restoring and maintaining local roads, municipalities are also helping to protect these valuable resources.

Rather than the traditional maintenance historically performed to recondition roads, road crews have to be willing to employ environmentally sensitive road maintenance practices aimed at reducing erosion. For example, instead of installing very long and deep parallel ditches on both sides of the road with relatively few deep outlets, municipalities should establish wide and shallow ditches with multiple outlets to avoid concentrated drainage, minimize flow volumes, and reduce the effects of concentrated flow.

If gas development continues as expected, and energy companies or their contractors continue to perform maintenance and repair work on local roads, then municipalities must be proactive and encourage the gas companies to adhere to the following practices:

- Improve the road base prior to heavy hauling.
- Replace failing or inadequate crosspipes.
- Install more ditch outlets (crosspipes and turnouts) than may currently exist on the road.
- Locate ditch outlets away from streams.
- Establish wide and shallow ditches instead of narrow and deep ditches.

These practices will help to minimize the cost of future road maintenance, enhance public safety, and maintain the health of local streams. Adherence to these concepts is particularly important when the road is in close proximity to a stream.

As our rural road network evolves to meet the needs of this emerging industry, so too should the way we maintain those roads. Pennsylvania's rural roads are vital to the successful economic development of the state and the communities affected by Marcellus shale development. With collaboration among industry, state and local officials, and community residents, all of Pennsylvania is more likely to benefit from this recent economic opportunity. Adoption of environmentally sensitive road maintenance practices will leave our communities better off for the next generation of Pennsylvanians. ♦