



Conservation Guidance for Landowners on Natural Gas Development

June 2010

Natural gas exploration and extraction activity have increased significantly across western Pennsylvania in recent years. Extraction of natural gas, much like any extractive activity, can have negative effects including serious environmental impacts. Western Pennsylvania Conservancy believes that conservation of the landscape and landowner management goals should be carefully considered prior to entering into a natural resource extraction lease agreement. Conservation features on the property that may need additional protection measures include but are not limited to the following: any water features such as streams, springs, seeps, and wetlands; steep slopes (generally those having a slope of 20% or greater); intact forests; wildlife habitat; native flora and fauna; natural vegetation and floodplain areas; recreational activities and scenic vistas.

It is important for the landowner to be aware of any potential negative impacts, as well as their rights as a landowner to control and guide any potential extractive use on their land. More specifically, in order to conserve the landscape, landowners should work with the land agent to carefully establish guidelines and develop an addendum to the lease agreement that permits recovery of this resource while at the same time promoting protection of ecologically-sensitive landscapes that include natural communities and species habitat.

Site visit

Upon request for a lease, the landowner should meet with the interested party and conduct a site visit on the property to identify potential impacts to the ecological resources on the land. This evaluation should consider:

- Conservation of natural communities, wildlife habitat, species of special concern
- Impacts to recreational opportunities and scenic vistas
- Degree of landscape fragmentation
- Potential effects upon hydrology, water quality, air and noise pollution
- Ability to significantly improve or restore degraded natural resources

The developer should use available data to locate plant and animal species of special concern (including without limitation searches or surveys the developer otherwise may be required to conduct pursuant to applicable environmental laws, or any searches or surveys conducted by a governmental entity). The site visit should occur prior to the start

of seismic work. A seismic plan should be submitted to the landowner which includes a map showing all proposed seismic lines and test hole locations, as well as conservation values and features as identified in the site visit.

For Marcellus gas development, one well pad can now be used with directional drilling technology to extract natural gas from more than one square mile of shale that is located over a mile underground. Therefore, a landowner may decide to sign a lease but not allow any surface drilling or other infrastructure such as roads and pipelines on the property, but allow the gas to be extracted from another property nearby. This may result in lower payments from the developer, but it may better protect ecological resources on the property. The remainder of these conservation considerations focuses mostly on leases where drilling or other surface activities are permitted on the land owners' property.

If a significant gas source is found and a project moves forward, the developer should coordinate with the landowner as to the location of all proposed development including placement of a well or wells, access roads and pipelines and any other facility or equipment that will support the proposed operation. If the developer proceeds with extraction, the landowner should make sure the following details are addressed:

- Indicate parameters where no drilling is to occur;
- Identify maximum number of wells drilled per site;
- Require lease to include erosion and sediment control plan to be completed by developer and approved by the landowner prior to any earthmoving activity including well site clearing, well pad construction, pipeline construction and access road enhancement; and
- Require submission of a restoration and re-vegetation plan to be completed by developer and approved by landowner which identifies specific steps taken to minimize site disturbance, and addresses any alterations in the land associated with the extraction or transmission activities.

Lease Agreement

All new leases should obtain a comprehensive insurance provision, indemnification and hold harmless clause to protect the landowner against degradation of ecological resources. Leases with an insurance provision should be enforced by the landowner (i.e. both proof of insurance and the landowner listed on the policy as an additional insured). The landowner should also require a performance bond to ensure the developer meets the terms of the agreement. All activities and operations must be in accordance with the laws of the Commonwealth of Pennsylvania. The developer must obtain and follow the appropriate permit application process, and secure a performance bond to ensure parameters for drilling are met.

Specific recommendations for items to include in the addendum to the lease agreement:

Master Site Plan – The developer should submit a master site plan to the landowner which would include the following:

- (a) a map or plat indicating the location of each and every well drilled or proposed for drilling;
- (b) a map or plat indicating the location of each existing potable and non-potable water well;
- (c) a map or plat indicating the location of each potable and non-potable water well drilled or to be drilled;
- (d) a route map indicating the location of each pipeline laid or to be laid;
- (e) a map or plat indicating the location of each existing road proposed for use;
- (f) a map or plat indicating the location of each bridge, drain pipe or culvert pipe to be constructed;
- (g) a plat, diagram and/or schematics indicating the location, design, construction of each slush pit to be constructed together with a corresponding maintenance plan for each such pit;
- (h) a map or plat indicating the location of stream, creek, brook, or wetland together with the location of each proposed drilling site and proposed clearing site near each such stream, creek, brook, or wetland; and
- (i) a map or plat that contains information regarding locations of plant and animal species of special concern, as well as locations of natural communities.

Erosion and Sedimentation Control Plan – This plan should include the following:

- (a) existing topographic features of the site;
- (b) contours, ditches and other excavations;
- (c) water bars or diversion channels for surface runoff to prevent siltation;
- (d) settling basins;
- (e) spreading of gravel or shale on intercepting dips;
- (f) installation of silt fences;
- (g) stabilization of cut slopes;
- (h) stabilization of highwalls; and
- (i) restoration and revegetation of the property as described in a restoration and re-vegetation plan.

Wells – To reduce fragmentation and invasive plant pathways, the developer should locate wells closer to previously disturbed or developed footprint (such as landings, roads, barrow pits, pipelines and wells). Such wells should be camouflaged or screened with native plants to reduce aesthetic impacts.

Water – *Water quality and quantity should be carefully considered and monitored prior to and following the extraction activity.* The developer should not contaminate or pollute springs, brooks, streams, wetlands, vernal pools or other waters on the property. Any water well usage should be restricted to drilling processes only. Water well usage should not be used for frac, stimulation or completion processes. The developer or its contractors and subcontractors should not construct earthen dams across

any stream to obtain a water supply for its operations. Developer should remove all water used in drilling and fracing processes from the property including water developed from the well. In addition, the developer must supply the landowner with a plan to address water source pollution in the event of a leak.

Well Plugging – At its own expense, developer should properly and effectively plug all wells on the leased premises before abandoning, in accordance with the regulations of the Department of Environmental Protection's Bureau of Oil and Gas Management and all applicable laws of the Commonwealth. A copy of the Certificate of Well Plugging showing the plugging procedure used and submitted to the Bureau of Oil and Gas Management should be supplied to the landowner for each well plugged and abandoned. Parameters should be established to determine acceptable production rates. If production falls below the rate and is determined to be uneconomic (i.e., not in paying quantities) to maintain and operate, then developer should (a) plug and abandon the well and (b) restore the well site and access road to the satisfaction of landowner within a specified timeframe.

At the end of production, whether or not oil or gas is produced, the developer is required to cover all costs to plug the wells (according to Section 601.210 of the Oil and Gas Act) and restore all disturbed acres. All wells no longer in use should be plugged by the operator(s).

Pipelines – Where possible, pipelines should be laid within the boundaries of existing roads or rights of way, such as existing pipelines and transmission lines. Developer should submit a route map for each pipeline to the landowner for review and approval as to location prior to the laying of any line. Developer should keep the pipeline and right-of-way in good repair and appearance.

Drilling – It is best to limit the number of wells and number of disturbed acres. It is recommended that a buffer area (e.g. 300 feet) be included for all water sources (rivers, creeks, streams, wetlands, etc.) to prohibit drilling in certain areas. Clearing on steep slopes (those greater than 20%) should also be restricted.

Pits – Developer should prevent access of wildlife to pits or excavations dug for Developer's operations by erecting and maintaining fences. Developer should have thirty (30) days from date of completion of a well to reclaim the pit. Pits must be lined with an impervious liner, not merely clay. When drilling is complete, pit liner and its contents should be properly disposed offsite. Developer should ensure that each slush pit will consist of two (2) compartments; one to contain fluids materials from the drilling operations and the second to contain surface runoff from the drilling site. Appropriate buffers should be established for pits as well.

Roads – All road locations and grades must be identified in the Master Site Plan. The landowner should limit the size of all new roads (e.g., determine an appropriate road width to be 20 feet). The location of drilling operations should be close to existing roads to prevent further fragmentation of the property. Developer should construct access roads to drilling sites along existing pipeline rights-of-way, provided that a ten percent

(10%) grade can be maintained, as described in the Erosion and Sedimentation Control Plan. Road drainage structures should conform to the Environmental Sensitive Maintenance Principles of Penn State's Center for Dirt and Gravel Roads program.

Erosion Sedimentation and Grading – Topsoil disturbed during construction shall be stored on uphill side of disturbed area, saved and put back during reclamation. Developer should regrade and refill to contour any areas of land cleared for construction and infrastructure placement within ten (10) working days following disturbance and should reseed according to the restoration and revegetation plan. Temporary seedling should be required, in addition to permanent revegetation. Gravel or shale should be spread on intercepting dips that become subject to erosion. Further, the developer should, at its own expense, secure, plant and maintain native species (consisting of grasses and/or trees or shrub seedlings) on all well sites, retired access roads, pipeline rights-of-way and other cleared areas.

Use of Department of Conservation and Natural Resources Gas Lease – The landowner may need to enter into a lease agreement that has more stringent terms than the standard lease agreement provided by the developer. WPC recommends using DCNR's 2007 gas lease as a guiding document.

Nothing in this document constitutes legal advice. Western Pennsylvania Conservancy recommends that any landowner considering entering into a natural gas lease agreement should obtain the advice of an attorney and a consultant specializing in natural gas leasing. In addition, many resources are available online that can provide basic information and education.

Penn State College of Agricultural Sciences Cooperative Extension:
<http://extension.psu.edu/naturalgas/publications>

DEP, Bureau of Oil and Gas Management, Marcellus Shale
http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/marcellus/marcellus.htm

DEP, fact sheet *Landowners and Oil and Gas Leases in Pennsylvania*
<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-44185/5500-FS-DEP2834.pdf>

DCNR, Marcellus Shale research in Pennsylvania
<http://www.dcnr.state.pa.us/topogeo/oilandgas/marcellus.aspx>