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DEP Policy Office
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Re: 25 Pa. Code Chapter 78. Unconventional and Conventional Oil and Gas Wells: Proposed Revisions to Surface Activities

Delaware Riverkeeper Network (DRN) submits these comments on behalf of our organization's more than 15,000 members, many of whom live and work in Pennsylvania.

General Comments:

Article I, Section 27 ("Section 27") of the Pennsylvania Constitution states:

> The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.

"The decision to affirm the people's environmental rights in a Declaration or Bill of Rights, alongside political rights, is relatively rare in American constitutional law." Robinson Township, Delaware Riverkeeper Network, et al v. Commonwealth, 83 A.3d 901, 962 (Pa. 2013).

> The right delineated in the first clause of Section 27 presumptively is on par with, and enforceable to the same extent as, any other right reserved to the people in Article I. See PA. CONST. art. I, § 25 ("everything" in Article I is excepted from government's general powers and is to remain inviolate); accord 1970 Pa. Legislative Journal-House at 2272 ("If we are to save our natural environment we must therefore give it the same Constitutional protection we give to our political environment."); Kury, app. C (Questions and answers). Id. at 953.

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> The Environmental Rights Amendment speaks of the rights of "the people." The only other constitutional provision similarly formulated is interpreted to guarantee a constitutional right personal to each citizen. Compare PA. CONST. art. I, § 27 with PA. CONST. art. I, § 8 ("The people shall be secure in their persons, houses, papers and possessions from unreasonable searches and seizures . . . ."); see, e.g., Commonwealth v. Russo, 934 A.2d 1199 (Pa. 2007) (criminal defendant's evidentiary challenge premised upon Section 8 of Article I); Edmunds, 586 A.2d at 898 (unlike federal counterpart, Article I, Section 8 analysis premised, inter alia, upon individual right to privacy); accord 1970 Pa. Legislative Journal-House 2269, 2273 (April 14, 1970) (first clause of Section 27 affirms constitutional right "in individual citizens").

Id. at 951, note 39; see also id. at 976 (citing PA. CONST. art. I, § 27) (citizens seek "to vindicate fundamental constitutional rights"); Nat'l Wood Preservers, Inc. v. Commonwealth, 414 A.2d 37, 44 (Pa. 1980) (citing same) ("maintenance of the environment is a fundamental objective of state power").

En banc panels of the Commonwealth Court have held that the location of the Environmental Rights Amendment within the Declaration of Rights signifies a particular constitutional constraint on the Commonwealth's actions. See Pennsylvania Environmental Defense Foundation v. Commonwealth, 108 A.3d 140, 160 (Pa.Commw. Ct. 2015) ("The General Assembly's powers, like the other branches of government, are tempered by the Declaration of Rights in the Pennsylvania Constitution, which includes the Environmental Rights Amendment.") (PEDF I); see also Com. v. Nat'l Gettysburg Battlefield Tower, Inc., 8 Pa. Commw. Ct.. 231, 243, 302 A.2d 886, 892 aff'd sub nom. Com. by Shapp v. Nat'l Gettysburg Battlefield Tower, Inc., 454 Pa. 193, 311 A.2d 588 (1973) (comparing political rights and environmental rights under Article 1 and concluding Environmental Rights Amendment is "more than a declaration of rights not to be denied by government; it establishes rights to be protected by government.").

The Pennsylvania Supreme Court has noted, "[w]here laws infringe upon certain rights considered fundamental, such as the right to privacy, the right to marry, and the right to procreate, courts apply a strict scrutiny test." Nixon v. Com., 576 Pa. 385, 839 A.2d 277, 287 (2003)(citing state and federal cases). Under this test, government action that infringes on a fundamental right is cannot be allowed unless supported by a compelling state interest and unless the least intrusive means is chosen. McCullen v. Coakley, 134 S.Ct. 2518 (2014). In other words, the government's action must be "narrowly drawn to accomplish a compelling governmental interest," Pap's A.M. v. City of Erie, 812 A.2d 591, 605 (2002) citing Pap's A.M. v. City of Erie, 719 A.2d 273, 275 (1998), rev'd on other grounds, 529 U.S. 277 (2000); DePaul v. Commonwealth, 600 Pa. 573, A.2d 536 (Pa. 2009).

Section 27 restrains the EQB from enacting regulations that will: 1) cause unreasonable "actual or likely degradation" of air or water quality, or other protected constitutional features, such as natural and scenic values of the environment; and/or 2) allow the "degradation, diminution, or depletion of public natural resources, whether such degradation, diminution, or depletion would occur through direct state action or indirectly, e.g., because of the state's failure to restrain the actions of private parties." Robinson Twp., Delaware Riverkeeper Network, et al. v. Com., 83 A.3d 901, 951-955, 957 (Pa. 2013)(plurality). Section 27 restrains the EQB from unduly infringing upon individual environmental rights protected by Section 27, and from breaching its duties as a trustee of public natural resources under Section 27.

Government officials, including EQB members, are "vested by law with the duty to protect and preserve our natural resources," and "the people of Pennsylvania are entitled to expect that those officials will 'support, obey and defend' Article I, Section 27 of the Pennsylvania Constitution in the discharge of

their powers and duties ..." Pennsylvania Envtl. Def. Found. ("PEDF") v. Com., 108 A.3d 140, 171 (Pa. Commw. Ct. 2015).

These duties require that the EQB avoids unduly infringing on citizens' rights to "clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment" in which they live every day in their community. Article I, Section 27. The rights stated in this provision are protected against governmental interference to the same degree as those rights protected by Article I, Section 21, which requires government officials to avoid unduly infringing upon citizens' rights to bear arms. ("The right of the citizens to bear arms in defense of themselves and the State shall not be questioned.").

In order to avoid infringing on the people's inherent individual environmental rights, the EQB must make decisions that are science-based. As the Commonwealth Court, sitting *en banc,* recently noted, "The first clause of the Environmental Rights Amendment 'requires each branch of government to consider in advance of proceeding the environmental effect of any proposed action on the constitutionally protected features.'" PEDF, 108 A.3d at 156 (quoting Robinson Twp., Delaware Riverkeeper Network, et al. v. Com., 83 A.3d 901, 952 (Pa. 2013)(plurality)).

The Pennsylvania Constitution, Article I, Section 27 makes every level of government a trustee of public natural resources. PEDF, 108 A.3d at 171 (stating that government officials are "vested by law with the duty to protect and preserve our natural resources," and "the people of Pennsylvania are entitled to expect that those officials will 'support, obey and defend' Article I, Section 27 of the Pennsylvania Constitution in the discharge of their powers and duties ..."); Robinson Twp., Delaware Riverkeeper Network et al v. Com., 83 A.3d 901, 919-21 (Pa. 2013)(majority); id. at 956-57, 977-78 (plurality); Franklin Tp. v. Com., Dept. of Envt'l Res., 452 A.2d 718, 721-22 (1982)(plurality; affirmed by majority in Susquehanna Cnty. by Susquehanna Cnty. Bd. of Comm'rs v. Com., Dep't of Envtl. Res., 458 A.2d 929 (Pa. 1983); 53 P.S. § 65501 (setting forth requirement for Township officials' oath of office)).

Public natural resources include both publicly-owned land, and "resources that implicate the public interest, such as ambient air, surface and ground water, wild flora, and fauna (including fish) that are outside the scope of purely private property." PEDF, 108 A.3d at 167 (quoting Robinson Twp., 83 A.3d at 955).

As part of the Commonwealth's obligations as a trustee of public natural resources, the EQB cannot approve any regulations unless it first makes a science-based determination that the proposed governmental action will not cause or allow unreasonable degradation, diminution, or depletion of public natural resources. PEDF, 108 A.3d at 172 (stating that adequate lease protections are not sufficient and that the state agency must consider whether further gas development impacting state forest land is in the best interests of the Commonwealth *and* consistent with Section 27 obligations); see also Robinson Twp., , 83 A.3d at 957.

As a trustee under Section 27, the Commonwealth has a duty of prudence, and as part of that duty, cannot perform its obligations unreasonably. PEDF, 108 A.3d at 157; Robinson Twp., , 83 A.3d at 957. As the Superior Court has said, "[T]he trustee's action must represent ***an actual and honest exercise of judgment*** predicated on a ***genuine consideration*** of existing conditions." In re Scheidmantel, 868 A.2d 464, 492 (Pa. Super. Ct. 2005); see also PEDF, 108 A.3d at 167 (quoting In re Estate of Warden, 2 A.3d 565, 572 (Pa.Super.2010)) ("The primary duty of a trustee is the preservation of the assets of the trust and the safety of the trust principal."); 20 Pa.C.S. § 7203(a) & (c)(5); 20 Pa.C.S. § 7773.

Further, the Commonwealth has a fiduciary duty to "deal impartially with all beneficiaries and . . . the trustee has an obligation to balance the interests of present and future beneficiaries . . . . The Environmental Rights Amendment offers protection equally against actions with immediate severe impact on public natural resources and against actions with minimal or insignificant present consequences that are actually or likely to have significant or irreversible effects in the short or long term." PEDF, 108 A.3d at 157 (quoting Robinson Twp., 83 A.3d at 958-59 (citations omitted)); see also 20 Pa.C.S. § 7773. If the EQB

fails to consider and address these issues, and enacts the proposed regulations anyway, the EQB would breach the duty of impartiality. This duty mandates that the EQB, as a trustee, treat the beneficiaries of the Section 27 public trust – present and future Pennsylvanians – equitably in light of the trust's purposes. Robinson Twp., 83 A.3d at 957, 959, 980.

"When environmental concerns of development are juxtaposed with economic benefits of development, the Environmental Rights Amendment is a thumb on the scale, giving greater weight to the environmental concerns in the decision-making process." PEDF, 108 A.3d at 170; Robinson, 83 A.3d at 973 n.55. Indeed, as a trustee under Section 27, the EQB is bound by the duty of loyalty to act *solely* in the interest of the beneficiaries of the public trust. Robinson, 83 A.3d at 957 & 959 n.45; 20 Pa.C.S. § 7772(a) (describing trustee's duty of loyalty). Thus, the EQB may not elevate private interests over the interests of present and future Pennsylvanians to an environment of quality, and of the enjoyment of their public natural resources.

Section 27 prevents the EQB from taking a narrow view in its regulations to focus only on technical requirements for segmented parts of the oil and gas process development process. As a trustee, and as a government agency whose actions could unreasonably infringe upon individual environmental rights, the EQB cannot be blind to a holistic view of the public natural resources and people being impacted. It equally cannot rely on the regulation of individual segments of the oil and gas development process to substitute for examining and addressing the impact of the process as a whole. The EQB cannot allow its focus on technical regulations to obscure broader considerations of whether the particular regulated action will damage the environment and human health.

A **cumulative analysis** of the impacts of oil and natural gas development and operations in Pennsylvania is essential to show how to address the cumulative, chronic and large impacts of changes to land, forest integrity, water resources, and all living communities, including human and nonhuman. Without assessing cumulative and long-term impacts -- prior to allowing the regulatory program to continue and prior to adopting any of the standards proposed – the EQB fails to satisfy its obligations under Article I, Section 27 of the Pennsylvania Constitution. Likewise, without requiring DEP to assess cumulative and long-term impacts prior to issuance of any permit, the proposed regulations fail to conform to constitutional obligations.

Conventional Drilling should be equally regulated as unconventional. The legislation did not say that the conventional regulations had to be less strict or less protective than the unconventional regulations. They should be at least as protective even though they are separate. These comments apply to Chapter 78 as well as Chapter 78a.

There is no definition for **freshwater** in the regulations and the manner in which it is used ("freshwater impoundments") is opportunistic and does not reflect a factual definition of freshwater; the fluids in "freshwater impoundments" are waste fluids that contain contaminants; freshwater impoundments should only contain uncontaminated fresh water.

Pits and Centralized Impoundments, both waste and "freshwater" impoundments, should be prohibited unless the container is equipped with a sealed lid for all fluids used on sites and at centralized locations. All containers should be equipped with filtering systems to prevent the emission of air pollutants and secondary containment systems that do not allow the discharge of materials they are meant to contain unless permitted under the National Pollution Discharge Elimination System. Areas where oil and gas development is occurring, storage at impoundments are located, and oil and gas operations are occurring should be equipped with air monitoring of the region's air that could potentially be affected by emissions from the storage areas to assess the cumulative impacts of oil and gas development. Clean air standards

must be enforced at local and regional levels to protect the public and the environment from air pollution related to these activities.

The State Review of Oil and Natural Gas Environmental Regulations Inc. (STRONGER) recommended in its most recent state review of DEP oil and gas regulations (September 2013): "The review team recommends that the DEP consider adopting regulations or incentives for alternatives to pits used for unconventional wells in order to prevent the threat of pollution to the waters of the Commonwealth".[i]

The definition of **"freshwater" impoundments** allows fluids that are not fresh uncontaminated water such as "mine influenced water" (including Acid Mine Drainage) and reused frack water. Chapter 105 Dam safety regulations should apply to all centralized impoundments to protect public health and safety and the environment.

Stormwater management planning and systems and **erosion and sediment** controls at gas and oil well sites must include all earth disturbances such as roads, pipelines, borrow pits, staging areas, and other disturbed areas. Post construction stormwater management, as per Chapter 102, must be an integral part of restoration of all disturbed areas for all aspects of oil and gas development and operations. The use of DEP's ESCGP-2 is not adequate for erosion and sediment control and stormwater management at gas and oil operations. The protection of land, vegetation, forests, streams and their riparian buffers, and other water dependent features requires comprehensive stormwater management (both during and post disturbance) that addresses the land use changes that produce stormwater runoff and that address the water quality and water quantity aspects of stormwater and erosion and sedimentation. To accomplish this it is critically important that the PA Stormwater Best Management Practices Manual and the PA Erosion and Sedimentation Manual must take precedence over the Oil and Gas Operators Manual for design standards.

Seismic analysis of fracking needs to be done by DEP to understand and forecast potential for unforeseen damages and changes from fracking of gas wells and injection of waste into wells for storage. There is no provision for investigating and studying this issue but the increase in earthquakes in some states emphasizes this is an important area of study for the Commonwealth. The United State Geologic Survey acknowledges that earthquakes are being induced by the injection of waste into disposal wells and by hydraulic fracturing.[ii]

The **onsite processing, burial and land application of waste** from oil and gas development and operations will continue to be a source of pollution, resource degradation and long-lasting, generational contamination in areas where drilling is occurring. No drill cuttings, frack waste or materials that are generated by oil and gas well development, including oil and gas well drilling and fracking, can be justified for burial or land application on well sites. The only responsible practice is for all waste and produced materials to be disposed of in facilities designed and permitted for this purpose.

The **spreading of brine or fluids** produced by extraction on roadways as de-icer or dust suppressant will continue to result in pollutants being released with adverse environmental impacts. Ground water, surface water, vegetation, habitats and drinking water supplies are all being harmed by this practice, which has inadequate regulation, oversight and tracking.

It is essential that brine spreading be codified as recommended by the State Review of Oil and Natural Gas Environmental Regulations Inc. (STRONGER) recommended in its most recent state review of

DEP oil and gas regulations (September 2013): "There are currently over 200,000 barrels of brine from conventional wells that are spread annually from 84 facilities in Pennsylvania. The DEP's regulations do not contain specific roadspreading criteria, but the department has developed guidelines that address the spreading of brine on unpaved roads. The guidelines specify the need for a permit, the testing criteria for wastes proposed for roadspreading, the application rates and any buffer zones required. Flowback and fluids from unconventional wells are not allowed to be roadspread".[iii] STRONGER makes this recommendation: "The review team recommends that the DEP consider codifying the current roadspreading guidelines in the department's E&P regulations".[iv]

Even if tightly regulated this practice is a likely pollution pathway due to the largely unpredictable variability of these fluids from well to well and geologic formation. All fluids that result from drilling or fracking - conventional or unconventional, above or below surface casing seat - should be disposed of in a facility designed and permitted for this purpose.

Water Management Plans are not required for conventional wells but should be since the water used for drilling and extraction is depleted. Even if less water is used for conventional drilling than unconventional drilling, there can be substantial impacts and diminishment of water resources on subwatersheds or cumulatively on large watersheds by the water withdrawals and the consumptive use. It is unclear how drought and low rainfall periods (such as is being experienced currently in Pennsylvania) will apply to drilling, including conventional drilling. A real-time "water ledger" and map of all water in the state being withdrawn, used, discharged or injected for disposal should be kept by DEP and made public through easily available web platform.

The acute and long term depletion of Pennsylvania's water resources is an issue that is not well understood and is poorly tracked for the benefit of the public and water users. This lack of transparency and understanding has led to a poor regulatory system that lacks state-based planning and essential protections. This proposed rulemaking takes a step forward in requiring nominal water management plans - particularly because two of Pennsylvania's watersheds are not regulated by a commission or compact - but does not begin to address comprehensively these critical issues.

The State Review of Oil and Natural Gas Environmental Regulations Inc. (STRONGER) recommended in its most recent state review of DEP oil and gas regulations (September 2013): "The review recommends that the State clearly indicate what is required in a water management plan and make those plans available to the public".[v]

The lack of needed **restoration** requirements for oil and gas sites and related infrastructure continues to allow for the steady degradation of resources. There is no baseline pre-survey, minimal restoration to pre-conditions, lack of specificity in terms of quality standards, and maintenance and monitoring is absent from the proposed requirements. Oil and gas operations will chip away at the remaining resources of the Commonwealth, causing un-mitigatable loss for present and future generations.

The scope of protections for **Public Resources** must be expanded. As stated above, the lack of cumulative analysis, comprehensive protection of public health and the environment as environmental rights, the allowance of harm rather than avoidance of harm is leading to the steady loss of quality and quantity of public resources. The nominal setbacks and standards that are included will not provide needed protection for public resources.

More **transparency and public accessibility** to information and decision making by the DEP is required. We support the requirements that submission by operators be made electronically but these documents must also be posted by DEP on a public web platform for access by the public and interested parties. We state this with the backdrop of a news article reporting that natural gas production reports filed by operators with DEP had incorrect data which had to be corrected by the agency 94 times since 2010.[vi] The news report contains a link to a DEP-generated document that shows several companies, operating in both unconventional and conventional formations, submitted incorrect information that DEP had to retract and resubmit to the database. Many of the errors were by the largest of companies such as Range Resources, Chevron, Chesapeake and Exxon's subsidiary XTO, companies that certainly should be able to use an electronic filing system with accuracy.

The provision of electronic filings and open access to operator information will also help DEP to satisfy the recommendation of the State Review of Oil and Natural Gas Environmental Regulations Inc. (STRONGER) that "DEP maintain consistent standardized data for tracking violations and enforcement actions to facilitate accurate internal DEP performance evaluation and to provide accurate information to the public". STRONGER recommends that this improvement be made by DEP in their program recommendations and that the public have access to the data and analysis of data.[vii]

The posting of these reports on a publicly available web platform is crucial as a means of supplying information about operators and gas development activities to the public - activities that directly affect many people who live, work and recreate in Pennsylvania. Much of this information is only available to the public through file reviews, which are time consuming, have costs associated with them, and is beyond the reach of most of the general working public.

Sections:
Definitions.

Floodplain:

Comment - Intermittent streams are headwaters and should be treated equally as a floodplain area with a 100' buffer, not reduced to 50'.

***Fresh groundwater*: (the proposed regulation only includes a definition of fresh groundwater, not freshwater).**

Comment – Typical definition of freshwater, brackish water, salt water and brines are based on specific total dissolved solid concentration and not generic as presented above. Hydrogeological systems that have brackish water are part of the hydrologic cycle and occupy the pore spaces and fractures of saturated subsurface materials. Please define freshwater based on less than 0.05 % salinity. (see below)

Water salinity based on dissolved salts

Fresh water	Brackish water	Saline water	Brine
< 0.05%	0.05–3%	3–5%	> 5%

The State Review of Oil and Natural Gas Environmental Regulations Inc. (STRONGER) recommended in their most recent review of DEP's regulations that DEP should establish numerical criteria for fresh groundwater. Because the definition is not precise in terms of numerical criteria, it is interpreted differently by different operators, making the determination subjective. This is a problem for many reasons, including determining surface casing seat depth, according to STRONGER.[viii]

This is also a problem because DEP allows freshwater impoundments to contain fluids that are contaminated, increasing the opportunity for pollution to the environment because freshwater impoundments are not required to meet the stricter requirements of Chapter 289 (relating to residual waste disposal impoundments) or Chapter 105.3. There is no defined process and no prescribed standards for how the Department approves "other sources".

Freshwater Impoundment:

Comment - Freshwater is not defined in the regulations but should be. Freshwater impoundments should only allow uncontaminated surface or groundwater. Freshwater should also be defined based on numerical criteria, as per STRONGER; see comment above on ***freshwater***.

Allowing freshwater impoundments to contain fluids that are contaminated increases the opportunity for pollution to the environment because freshwater impoundments are not required to meet the stricter requirements of Chapter 289 (relating to residual waste disposal impoundments) or Chapter 105.3. Additionally, there is no defined process and no prescribed standards for how the Department approves "other sources" which allows for other contaminated materials to be held in freshwater impoundments.

(i) "Not regulated fewer than 105.3" should be deleted
(iii) The inclusion of "other Department-approved sources" should be deleted

Nonporous material:
Comment – Typically drill cuttings are not considered to be a "nonporous material." Drill cuttings can be very permeable depending on the materials encountered during drilling, specifically sandstones and conglomerates. Drill Cuttings should be removed from the definition of "nonporous material."

Other critical communities:

Comment - typo in (2). Word threatened misspelled

Permanently cemented:

Comment – permanently cemented should include not only the surface casing or coal protective casing, but also the intermediate casing and the production casing. Grouting of the well is discussed in detail below.

Pit:

Comment - The definition of a pit is less defined by the elimination language related to drilling mud, drill cuttings, etc. and only referencing "fluids, semifluids, or solids". The definition should be changed back to be more specific in the list of materials that are found in a pit to provide clarity about their regulation, particularly considering their continued use at conventional well sites.

We oppose the use of pits on both unconventional and conventional well sites.
The definition should make clear that open pits are PROHIBITED for all natural gas and oil wells.

Regional Groundwater Table:

Comment – 1.) The textbook definition of "unconfined" is where the upper ground water surface is equal to ambient atmospheric pressure. A "confined" aquifer is an aquifer where the water is under pressurized conditions such that the water level rises above the top of the confining unit. Confined aquifers are not subject to ambient atmospheric pressures and should be removed from the definition of regional groundwater table.

2.) By definition, the seasonal high groundwater level is part of the regional groundwater table during the wet portion of the year. Seasonal high groundwater levels are critical in the downward migration of ground water into the deeper portions of the aquifer during the spring season due to the additional head pressure that occurs during this time period. To equate seasonal high groundwater levels to perched ground water is technically incorrect based on mainstream hydrogeological textbooks. Delete "the seasonal high water table".

As discussed below, draining of seasonal high ground water is damaging to the overall rates of recharge to the deeper rock aquifers and should not be allowed.

Seasonal High Groundwater Table:

Comment – The definition of seasonal high groundwater table should not include any reference to slowly permeable layers within the soil profile. Seasonal high groundwater table is the increased water level and saturation zone in the upper part of the regional groundwater table and is not dependent on slowly permeable layers. Defining the seasonal high groundwater table in this manor is inappropriate as this definition can allow for draining of this zone for impoundments. Low permeable zones belong only in the definition of perched groundwater. The seasonal high groundwater is critical in increasing ground water recharge into deeper portions of the regional water table aquifer by increasing, in a significant amount, the vertical head pressure in the primary recharge period of the year. Draining seasonal high recharge has detrimental impacts on the annual recharge to the water table aquifer and must be discouraged.

Water Management Plan:

Comment - A Water management Plan should apply to both conventional and unconventional formations due to the use of substantial amounts of water and production of waste by both classes of wells.

Water protection depth:

Comment – The definition of water protection depth is unclear. How can the protection depth be greater that the surface casing seat? The water protection depth should be less than or equal to the surface casing seat.

Water source:

Comment – Water sources for drilling should be limited to potable water that is certified to be bacteria free and uncontaminated by pollutants to prevent contamination of the water table and shallow freshwater aquifers during drilling of conductor casings, surface casings, and intermediate casings.

(C)"Mine pools and discharges" and (D) "Any other waters that are used for drilling or completing a well in an unconventional formation" should be removed from the definition. The definition of water source should assure that only freshwater is included and that additives used in drilling and mine pools and discharges not fall into definition of "water source" to ensure the application of the correct water quality standards, withdrawal and management requirements.

Watercourse:

Comment – It is appropriate that the definition of watercourse is consistent with Chapter 105.1 to provide consistent and effective regulation of waterways. This definition supports the inclusion of intermittent streams and headwaters, as advised by Luna Leopold, to ensure that all streamflow occurrences are protected.[ix]

Wetland:

Comment - We support that the definition of wetland is consistent with Chapter 105.1 to provide consistent and effective regulation of wetlands.

Well Development Pipelines:

Comment - One definition for pipelines that will carry drilling fluids, hydraulic fracturing fluids, and residual waste generated as a result of the activities will cause confusion and lack of specificity when using the term. These activities vary in the materials, method of use, and construction practices employed and should each have their own definition with specific regulatory requirements.

78a15. Application requirements

78a.15(b.1) If the proposed limit of disturbance of a well site (such as well pad) is within 100' of a watercourse or water body (except wetlands smaller than 1 acre that are not EV) the applicant must demonstrate that they will be protected. This proof of protection should be required for a much larger area because of potential adverse impacts beyond 100 feet.

Additionally, small wetlands that are not Exceptional Value (EV) should be included. Surface impacts that DEP expects to be controlled by the regulations they list include erosion and sedimentation, waterway encroachment, land and soil, and pollution prevention and emergency response.

Areas beyond 100 feet show myriad impacts from land cover changes that accompany gas well construction, varying depending on the type of land cover. New York Department of Environmental Conservation found that a forested area that is fragmented by a well site can be impacted at least 100-300 meters in from the developed edge.[x]

The Nature Conservancy concluded that an average of 9 acres of habitat was removed for each well pad in Pennsylvania and that the total for direct and indirect impacts is 30 acres on average per well pad, showing a much greater area of impact than the few acres cleared for the well pad and related construction areas that we assume DEP calls the "limit of disturbance" (there is no definition provide for limit of disturbance).[xi]

78a.15(d). The assessment for species should include Species of Special Concern and Rare and Significant Ecological features in Pennsylvania in addition to Threatened And Endangered Species, all of which are found in Pennsylvania Natural Heritage Program (PNHP) inventories and can be searched using the Natural Diversity Inventory (PNDI) database and tool. These are all valued and protected animal and plant species that applicants should have to search for in order to provide protection required under this program.

A PNDI search may not yield current or comprehensive results if it out of date and incomplete; a field survey with a comprehensive investigation and assessment by a professional for the applicant should be required. Areas assessed should include gas and oil gathering and distribution lines along with well site and access roads. Any area disturbed – such as borrow pits for stone or storage or construction staging areas – should also be included.

Additionally a PNDI search should include the areas around the limits of disturbance of a well site where species could potentially be adversely impacted. For instance, threatened or endangered species that are dependent on a forest habitat could be affected directly or indirectly within a 30 acre area around a well site.[xii] The impacts include lights, noise, and odors "which could travel considerable distances and disrupt an animal's reproductive or foraging behaviors".[xiii]

78a.15(e). The allowance for an exemption to comply with PNDI requirements if the applicant has obtained a permit under Chapter 102 should be removed. The ESCGP-2 is not adequate for erosion and sediment control and stormwater management and should not be relied upon as sufficient for PNHP consultation. ESCGP-2 permits have not received adequate technical review at either the DEP or County Conservation District so in the field many sites are not in compliance with their permits. This lack of effective stormwater and erosion and sediment controls will be prolonged by this two year grandfathering.

78a.15(e) should be deleted.

78a.15(f) (Public Resources). The distance between a well site to a public resource that will require notification and assessment should be much larger than the proposed areas in this subsection. Additionally, it should be stated that DEP can deny a permit based on the findings. The protection of public resources require more than notification, they require the avoidance of diminishment, depletion, degradation or harm. None of these distances are large enough to encompass the area that is routinely impacted by oil and gas well sites. Impacts from oil and gas development have far-reaching effects and need greater distances to avoid harm.

The Maryland Department of Public Health concluded that there is a "high likelihood" that unconventional natural gas development will cause air pollution at levels that will impact public health.[xiv] The Maryland Department of the Environment and the Maryland Department of Health and Mental Hygiene concluded from scientific literature that the closer a gas well is to drinking water wells, the more likely it is to be impaired[xv]. An EPA report concludes that fluids produced by hydraulic fracturing contain the original fracturing fluids and natural pollutants from the target oil and gas formation such as radionuclides and heavy metals.[xvi] Another study found that chemicals from hydraulic fracturing fluids and methane can spread into the aquifer from various natural and drilling and fracturing-related forces.[xvii]

78a.15(f.1.i.) DEP should change how it determines a setback that is protective of publicly owned park, forest, game land or wildlife area; the setback should be much greater and based on a site specific analysis. It is reported in a report examining potential state park impacts from gas well development that when hydraulic fracturing occurs in and around a state park, water quality and water quantity changes occur in groundwater and surface water in the area. If land within a park is hydrologically connected to land outside the park where a gas well is being developed, such as being part of a subwatershed, adverse impacts can travel substantial distances, far greater than 200'.[xviii] Groundwater and surface water are connected as one system; groundwater moves through the subsurface, emerging to the surface over time. A groundwater contaminant plume will spread laterally and downgradient. The contaminated water will flow over time (days, years, or centuries) to the surface and can emerge within park boundaries if this hydrologic connection exists.[xix]

The high level of toxicity of the chemicals used in hydraulic fracturing and the relatively high concentration of these chemicals in fluids injected in hydraulic fracturing, poses a danger to human health and other living resources, affecting park resources and recreationists.[xx]

Wildlife and recreational impacts also can carry great distances, such as noise, lights, scenic view obstruction or degradation and other quality diminishment. DEP should not allow a well pad to be located upstream in a watershed or subwatershed of a park and a ten mile buffer between a ell pad and the boundary of a park should be mandatory to minimize the impact on wildlife and recreationists.[xxi]

DEP should establish setbacks based on environmental factors such as watersheds and hydrologic connectivity, not an arbitrary 200' to prevent park resource degradation.

78a.15(f.1.ii.) Should be changed to: In, within, or within view of the corridor of a State or National Wild and Scenic River under the National Wild and Scenic Rivers Act or scenic or protected river under other special protection designations including Exceptional and High Quality Waters.

78a.15(f.1.iv.) Critical communities should be revised to include: National Recreation Areas, National Wildlife Refuges, and other nationally protected areas.

78a.15(f.1.vi.) Water supplies are being affected at much greater distances than 1000' feet. To accurately assess an area around a public resource that could be affected by an oil or gas well site, DEP should require a much greater area to be subject to notification and assessment, requiring mapping and analysis of the geologic properties and hydrologic connectivity of ground and surface water systems of the area. Distances from a well to water supplies should be based on this site specific information. Drinking water wells closer

to drill sites (less than 1 km) are likely to be adversely affected by hydraulic fracturing [xxii] An EPA report concludes that fluids produced by hydraulic fracturing contain the original fracturing fluids and natural pollutants from the target oil and gas formation such as radionuclides and heavy metals. The report also found that because the fluids are generally stored on site in pits or tanks the accidental release of fracturing fluids can occur, resulting in groundwater contamination and soil contamination.[xxiii]

Contaminants can migrate very far if fractures or fissures are intersected and the distances are very specific to the geologic make up[xxiv], making a "one size fits all" review area of 1000' ineffective and not supportable by available scientific evidence. Groundwater and surface water are connected as one system; groundwater moves through the subsurface, emerging to the surface over time, allowing for pollutants to migrate with the groundwater to water supplies. See comments above at 78a.15(f.1.i.). An assessment should be done of the potential for impacts to an area defined by a mapping of underground fractures and fissures that can make migration of methane more likely, and of the natural subwatershed groundwater flows to assess where a pollution plume may move and where it may surface, rather than an arbitrary 1000' review area.

Areas that are prone to methane degassing naturally may be areas that are more likely impacted by the disturbances that accompany gas well drilling, fracking, and extraction. Aquifer tests have found effects of drilling on aquifers for 4,300 feet from the gas well.[xxv] The connectivity of ground and surface waters allows contamination from gas and oil operations to travel great distances over time (days, years, or centuries), even miles from the source of the pollution. Contaminants will move with groundwater flows laterally and down-gradient. The highly toxic properties of the fracturing chemicals used and the natural contaminants that are distributed by drilling and fracturing in the geologic formations pose long-lived health and environmental dangers.[xxvi] If it is found that the public resource will be inevitably impacted and the damage cannot be avoided or restored, the permit must be denied by DEP.

Contaminants, including methane, can migrate from gas and oil wells to shallow groundwater and then to surface water. Methane concentrations were 17 times higher on average in shallow wells that were within one kilometer of one or more gas wells than in wells without gas wells.[xxvii]

Higher methane concentrations in shallow groundwater occur as a result of oil and gas well drilling and fracking and from legacy wells that have not been plugged.[xxviii] Methane in water wells and degassing to the surface endangers people due to the explosive properties and water quality effects; movement of methane into springs and streams can cause dead zones that are depleted of oxygen, resulting in severe aquatic life damages such as fish kills and extirpation of species.

Chemicals used in hydraulic fracturing and methane were found in water wells 1-3 km from Pennsylvania shale gas well sites. Researchers report that DEP concluded that methane had contaminated the aquifer that supplies water to at least three households located in a Susquehanna River watershed and cited the company for violating the law and regulations. Additional analysis by the researchers revealed 2-n-Butoxyethanol and glycols in one of the wells at nanogram per liter concentrations leading to the conclusion that the pollution was caused by drilling or fracking fluids from the nearby gas wells.[xxix]

78a.15(f.1.vii.) There is no scientific basis presented for the 200 feet review area for school property. Review area distances should be more encompassing than "common areas" and playgrounds; the area should be measured from the school's property, a playground, a sports field or community recreation area.

For the reasons cited above under 78a.15 (f), 78a.15(f.1.i.) and 78a.15(f.1.vi.), pollution can migrate far off site through water, risking adverse health effects for schools and children. Pollutants in groundwater from hydraulic fracturing or drilling were found as far as 3km (1.86411 miles) from shale gas wells in Pennsylvania.

Air contaminants are also released from gas and oil well sites and expose people nearby to several risks.[xxx] Toxic pollutants with known severe health effects have been found at much greater distances than 200 feet. Benzene has been found at levels that exceed health standards as far as 885' from wellheads and formaldehyde has been found up to 2,591' from wellheads; the same study found eight volatile compounds at concentrations that exceeded ATSDR minimal risk levels at greater distances than 200 feet from gas wells.[xxxi]

Another study found highly toxic air pollutants at 1.1 km from a wellhead.[xxxii] In Ohio, researchers found polycyclic aromatic hydrocarbons above the U.S. EPA's acceptable risk level near gas well sites, posing a significant health risk from air pollutants emitted at gas wells.[xxxiii] More air sampling studies are being conducted at even greater distances. Oil and gas wells should not be allowed for at least 1.86 miles from schools, a school's property, playground, sports field or community recreation area.

78a.15(f.2). Typo in (#2) – remove "and". Local government units should be added to the notification requirement of all applications that will effect public resources. The increase from 15 to 30 days is an improvement but due to local government meeting schedules in practice, 45 days will provide the time needed for local government to perform its review and comment through a mandated public process.

78a.15(f.3.iii). DEP does not have authority under the constitution to allow detrimental impacts unless there has been a demonstration of compelling state interest and that the least impactful means has been utilized. It is insufficient to simply "mitigate impacts." Any detrimental impacts need to be remediated and there needs to be full restoration. The proposed regulations do not accomplish this in regards to public resources.

78a.15(f.4). DEP information required in paragraph (3) above should not be limited to the discreet area of the public resources that may be affected by the well, well site, and access road. All disturbances related to oil and gas development and operations must be assessed for impacts to public resources such as borrow pits, staging areas, and all infrastructure, including all pipelines, regardless of the materials they transport, pits, basins, utility lines and other related aspects of oil and gas operations.

78a.15(f.4.g). DEP does not have to – and cannot merely -- allow damages with mitigation; they can and must deny a permit if the damages cannot be mitigated and the detrimental impacts fully remediated and the resource fully restored. DEP should not be allocated the burden of proving that any conditions are necessary; the burden should be on the applicant to prove that any conditions are inappropriate.

78a.41 Noise Mitigation. Operators will likely try to claim that a DEP role in noise mitigation would preempt local efforts to address noise impacts. The regulations should be amended to note that nothing contained in the regulations are intended to expand the scope of any state preemption of local ordinances.

78a.51 Protection of Water Supplies

78a.51(c) The presumption established by Section 3218(c) of the act should apply to pollution resulting from well site construction. There is no authority under the Oil & Gas Act to limit the scope of the statutory presumption. This provision is wholly unauthorized and would be inconsistent with the clear statutory language. This provision should be deleted from the proposed regulations.

The time allotted for investigation and conclusion of 45 days is inadequate for a proper investigation. The time period of 45 calendar days barely allows time for obtaining and receipt of laboratory analytical results. In addition, water elevation data and pressure transducer data should be collected over a several week period to compare events at the gas well to the impacted well. A proper hydrologic evaluation will take a minimum of 45 days of data collection and then analysis. A 90 day time period is the minimum for an adequate investigation. In the meantime, those whose water is affected must receive a safe source of water at no cost to the water user while determinations are ongoing.

78a.51(d.2). We support that in the incidence of water supply contamination by oil and gas operations, replacement water must meet the standards of the Pennsylvania Safe Drinking Water Act and if, prior to pollution, the water was of higher quality, the restored or replaced water must meet the pre-pollution quality. Anything less would unfairly leave a degraded condition for those dependent on the water.

78a.52. Predrilling or Prealteration Survey.
(d) We support that sample results and other reports be provided electronically to DEP. All results supplied to DEP should be made publicly available on an easily accessible web platform.

78a.52a. Area of Review (related to orphan and abandoned wells)

78a.52a(a). The extent of the Area of Review should be much greater than 1000'. Well bores at greater distance than 1000' can connect with new well bores through natural or human-made connections. As documented, contaminants can migrate very far if fractures or fissures are intersected and the distances are very specific to the geologic make up[xxxiv]; the same is true for connecting well bores through drilling or fracking. (See comments above under section 78a.15(f.1.vi.)).

The federal Bureau of Land Management's new rules for fracking on public and tribal lands released in March require a survey of a half mile; Pennsylvania deserves equal protection.

The area should be at least as large as the zone of presumption established by section 3218(c) of the PA Oil and Gas Act to provide needed information about conditions within the zone of presumption.

78a.52a(b). DEP should require a thorough on-site field inspection to locate and verify all wells within the Area of Review in addition to these other reviews before site and well construction and drilling so that the location of a new well won't trigger a pollution incident or pose dangerous conditions.

DEP should require that all wells that are identified in the Area of Review have been properly classified and all closure and abandonment activities performed. Some inactive wells are inactive for long periods of time even though there is a responsible party. Any inactive well should have the responsible party identified through a file survey by the applicant. DEP should require all known responsible parties to properly plug and abandon inactive wells in accordance with 58 Pa. C.S. § 3220.

All orphan or abandoned wells that are potentially affected by the new well in the Area of Review should be plugged and sealed or otherwise appropriately addressed according to state safety standards prior to new well site construction. The state doesn't commit adequate funding to address the large number of orphan or abandoned wells, estimated at 200,000. DEP has verified the locations of 9,000 wells, according to the STRONGER report.[xxxv] The others are legacy wells not yet located by DEP.

Applicants for new well drilling are investing capitol and should use some of that investment to perform due diligence to prevent water and air pollution, including methane releases, and to avoid unsafe conditions for the local community and to avoid catastrophes such as a well blow out. In the answers to questions submitted by STRONGER to Scott Perry at DEP, it was stated that DEP was proposing to amend section 78.52a to require operators to visually monitor any orphaned or abandoned wells that may be impacted by the new well and to "take action to prevent pollution of the waters of the Commonwealth or discharges to the surface".[xxxvi] It was also stated by DEP "In addition, an operator that alters an orphaned or abandoned well by the hydraulic fracturing would be required to plug the altered well".[xxxvii] DEP should make this change that they testified they would make during the STRONGER review. The STRONGER review may have made a different assessment and recommendation regarding DEP's performance in addressing these legacy wells if this statement had not been affirmatively made by DEP.

78a.53. Erosion and Sediment Control and Stormwater Management

We support that stormwater management has been added to the requirements to control erosion and sediment in this section. However, DEP does not include post construction stormwater management, a critically needed component to ensure that sites are equipped with an effective stormwater system after being built. DEP should change this section to: "shall comply with Chapter 102 (relating to erosion and sediment control) and Post Construction Stormwater Management requirements".

Researchers at the Academy of Natural Sciences have discovered that where high density of natural gas wells occur, adjacent streams in Pennsylvania's Marcellus are experiencing decreased water quality as demonstrated by lower macroinvertebrate density and higher levels of specific conductivity and total dissolved solids.[xxxviii] Degradation to these streams results from increased polluted runoff and other pollution releases.

DEP should remove the exemption for oil and gas activities of riparian buffer requirements at 102.14(d)(vii). The waiver provision is allowed if the pre-construction buffer area is undisturbed. This provision is often abused because there is no guidance for its application and, in practice, buffers are being damaged or destroyed by gas and oil development.

If DEP does not remove this exemption, DEP should require a pre-disturbance inventory of the riparian buffer to ensure an informed assessment of the condition in terms of disturbance after construction.

Text should include:
Prior to site disturbance, identify soil types and locations, soil layer depths, and at least 98% of existing plant species (identify genus and species) including herbaceous plants, shrubs and trees, and a calculation of the prevalence of those species, to inform site restoration. Utilize qualified soil scientists for the soil investigation, and qualified botanists for the plant species identification and quantification. The plant survey should be done in season(s) appropriate for identifying the herbaceous species.

For sites larger than 1 acre, provide mapping of the locations of soils and species groups. Removal of vegetation, compaction of soils, or any other changes in the features surveyed will constitute disturbance.

No stormwater is to be routed directly into or through the riparian buffer and any disturbed area is subject to a stormwater management plan (pre- and post- construction) and will require full compliance with riparian forested buffer restoration requirements according to Chapter 102 and the appropriate Manuals, as discussed below.

We support the inclusion in this section of the PA Stormwater Best Management Practices Manual, the Erosion and & Sediment Pollution Control Program Manual, and the Riparian Forest Buffer Guidance. We oppose the inclusion of the Oil and Gas Operators Manual (1997) which is outdated and does not address horizontal drilling and high volume hydraulic fracturing practices that are used in the unconventional formations in the State.

Conventional drilling is not adequately guided by this manual because practices have changed and technology has evolved since 1997, making the guidance irrelevant and potentially wrong.

It is completely inappropriate and misguided to allow consultation with the Oil and Gas Operators Manual which does not provide guidance applicable to unconventional shale gas drilling and fracking, the type of well that represents most of the drilling and permitting in the State.

According to DEP's Oil and Gas website, this year (1.1.2015-5.25.2015) 346 unconventional wells have been drilled and 117 conventional wells have been drilled. In this same time period, DEP has issued permits for 1,053 unconventional wells and 840 conventional wells. And yet DEP has not issued new a guidance manual that is applicable to unconventional well drilling – similarly needed as the revised regulations that are meant to address unconventional well development - for the lion's share of wells that are being developed in the state. This is unacceptable and exposes the environment and the public to avoidable and unnecessary risks and direct harm.

DEP should remove the Oil and Gas Operators Manual (1997) from this section for both conventional and unconventional well drilling. If DEP does not remove it, DEP should make clear that the PA Stormwater Best Management Practices Manual and/or the Erosion and Sediment Pollution Control Program Manual always take precedent over the Oil and Gas Operators Manual for design standards and the Oil and Gas Operators Manual is only to be used for industry specific issues not addressed in the Stormwater Best Management Practices and/or the Erosion and Sediment Pollution Control Program Manuals.

This is critically important; as many of the most commonly used practices at unconventional well sites today use the far less stringent and not applicable Oil and Gas Operators Manual standards, rather than the current

and appropriate Stormwater Best Management Practices Manual and/or Erosion and Sediment Pollution Control Program Manual standards because DEP allows this choice. The "menu of options" in this section will allow this damaging practice to continue. A common example is the "vegetated strips", which are widely used for well pads and almost always designed to the ineffective Oil and Gas Standards rather than the Stormwater Best Management Practices Manual Standards.

DEP should publish Notices of Intent as defined in § 102.1, for Oil and Gas Operations in the Pennsylvania Bulletin, with a mandatory 30 day period for public review and comment.

78a.55(f). Copies of well operator's PPC Plan should be provided electronically to DEP, the other agencies listed and to local government units. The copies should also be made publicly available on an easily accessible web platform.

78a.56. Temporary Storage

78a.56(a). We support the prohibition of open pits for storage of waste or other potentially hazardous materials. The use of pits on wells sites for storage of flowback, produced water, and hydraulic fracturing fluids has been the source of numerous incidents of water and air pollution at oil and gas sites. Pits should be prohibited for conventional drilling sites as well as unconventional drilling sites; dangerous chemicals and other hazardous substances are used in conventional drilling and are produced by drilling in conventional formations, making it essential that pits be prohibited at conventional drilling sites as well to prevent pathways of pollution to water, air and the environmental resources of the State.

One of the reports cited in comments above shows water well contamination located 1 to 3 km from shale gas wells in Pennsylvania.[xxxix] The gas well not only had a leak at the well bore but also an open waste pit was reported to have leaked (the operator was cited with violations for the well bore leak and the pit leak by DEP).

Tests revealed foaming from unknown chemicals in three water wells (DEP determined no cause for the foaming). Comprehensive testing of the well water by researchers showed 2-n-Butoxyethanol, a chemical commonly used in drilling and fracking. Researchers concluded that the chemical compounds found in the water wells (2-n-Butoxyethanol and glycols) were likely caused by drilling and fracking of the gas wells.[xl] The use of a waste pit on these well sites led to a leak and aquifer contamination. If no pit had been employed, it is possible this pollution could have been avoided.

Air emissions result from open pits, threatening the health of area residents. Polycyclic aromatic hydrocarbons (PAH) were found by researchers in Ohio near natural gas wells in higher levels closer to gas wells and at higher levels than previously found in rural areas. PAH was found above the U.S. EPA's acceptable risk level, posing a significant health risk from air pollutants emitted at gas extraction sites.[xli]

The opportunity for pollution to be released is greater when these pits are utilized to hold hazardous substances such as these highly toxic pollutants that can be released through liner tears, seeps or holes. DEP should not allow open pits on either conventional or unconventional well sites. A recent report by the United States Geologic Survey concluded that a closed storage system was safest for wastewater storage due to the presence of volatile organic compounds (VOCs). Sampling conducted by the agency on gas wells in

Pennsylvania found that the presence of VOCs was not predictable, leading to the recommendation that open pits are not safe unless accompanied by extensive testing of the waste as it is produced.[xlii] This protocol is not included in this proposed rulemaking. The use of closed and sealed containers for temporary storage should be required by DEP.

We support the prohibition of open pits but DEP should make clear that no open tanks are allowed as well. All tanks should have sealed lids and be vented with filtration equipment that will remove air pollutants to ensure that these tanks are not sources of air emissions of substances that have the potential for adverse human health effects or negative environmental impacts. Other studies cited in comments above at 78a.15(f.1.vi.) and 78a.15(f.1.vii.) support the prohibition of open pits, open tanks or other open containers.

DEP should expand the list of substances that must be contained. Many substances used in well development, particularly hydraulic fracturing, are not regulated under Safe Drinking Water Act or EPA standards. These chemicals fall into the category of "unregulated" chemicals despite that they may have adverse health effects. Researchers from the U.S. Geological Survey and the Environmental Protection Agency found eighteen unregulated contaminants of concern in one third of the water utilities sampled in the U.S. in 2013.[xliii] The health effects of many of the 80,000 chemicals in use today are not well studied or understood.

Endocrine disrupting chemicals (EDC) used in hydraulic fracturing fluids and found in flowback now stored in open pits are of special concern due to the biological effects of these constituents at extremely low concentrations. Scientists and health professionals are beginning to analyze these materials and measure their impacts on human health in a different way, testing these compounds at very low levels in the range of human exposures and at various endpoints.[xliv] In an effort to protect human health from these very dangerous materials, scientists are concluding that there are no safe doses for endocrine disrupters; the fact that they have biological effects proves that EDC's have biological activity – what the induced effects are is the question.[xlv]

DEP should amend the underlined text at this section to "…"the operator shall contain regulated substances, potentially harmful chemicals and wastes from…"

78a.56(a1). DEP should prescribe specific standards for "other approved storage structures". This vague language does not provide needed clarity about the standards such structures must meet and leaves the public in the dark. Any request regarding equivalent or superior practices should be included in a permit, noticed for public comment and subject to a full public review process. The request and approval regarding equivalent or superior practices should be made publicly available on an easily accessible web platform.

78a.56(a5). DEP should not allow any open structures or tanks, as discussed above. Size and number of tanks on one site should be limited to allow for effective maintenance and operation; allowing over 20,000 gallon capacity requires more oversight, management and monitoring to protect health and safety. Because of the high toxicity of the materials being contained, DEP should require alarm systems with remote sensors for all storage structures in case of spills or breaks to provide rapid response to leaks and spills as part of the Pollution Prevention Plans for sites.

78a.56(a7). There is no definition of freshwater; freshwater should be defined numerically as comments above under Definitions. Freshwater impoundments should only contain uncontaminated water; otherwise, the fire prevention and spill response requirements should apply to all fluids in tanks.

78a.56(a9). ALL tanks containing any substances, including drill cuttings from above the casing seat, should be impermeable and impervious to prevent a pathway for pollution. Given the nature of the material stored and the expense associated with clean up, a double liner system with leak detection between layers must be considered. The leak detection system is the critical part of the double liner system.

78a.56(a10). We support secondary containment for condensate tanks but it should be clear that ALL tanks containing regulated substances or other substances used in well development require secondary containment to prevent pollution from being released into the environment. DEP should also require sealed lids for all condensate tanks that prevent vapors from being released. A redundantly protective filter system should be provided to remove all air pollutants and meet air quality regulations should vapors escape.

78a.56(a10.b). Any request regarding equivalent or superior practices should be noticed for public comment and subject to a full public review process. The request and approval regarding equivalent or superior practices should be made publicly available on an easily accessible web platform.

78a.56(a10.c). We oppose the disposal of any materials generated by oil and gas well development, including oil and gas well drilling and fracking, by land burial in a pit on a well site or through land application. All waste should be disposed of in facilities designed and permitted for this purpose off the well site. See comments below at 78a.57.

78a.56(d). We support the removal of existing and currently used pits for temporary containment. We support immediate closure of existing pits, no later than the six months recommended in this section. The use of existing pits by both conventional and unconventional wells for waste and fluid containment threatens public health and the environment. According to STRONGER in its most recent state review of DEP oil and gas regulations (September 2013) DEP reported to the review team that there are about 1600 drilling production pits in Pennsylvania.[xlvi] These represent a substantial risk of pollution and degradation and should be closed immediately.

78a.57. Control, storage and disposal of production fluids

78a.57(a). We support the prohibition of pits and open top structures for storage of production fluids.

78a.57(c). DEP should require that dikes or other methods of secondary containment include impermeable and impervious liners that are compatible with the materials to be contained. Given the nature of the material stored and the expense associated with clean up, a double liner system with leak detection between layers must be considered. The leak detection system is the critical part of the double liner system.

78a.57(e). DEP should not allow tanks to be buried or partially buried. This makes inspection more difficult and can delay the detection of leaks.

78a.57a. Centralized Tank Storage

78a.57a(b). DEP has the authority and responsibility to "...deny the issuance of a permit if it finds that the applicant has failed or continues to fail to comply with any provision..." of a law, order, permit, condition of any permit, etc. It is not clear why this text is placed here and nowhere else in the proposed regulations. This factual statement should apply to all section of Chapter 78 and 78a.

78a.57a(f). DEP should change the method and analysis used to establish safe setbacks as per comments above at 78a.52a and 78a.55(a). The setbacks in this section that limit the location of a centralized tank storage site are inadequately small. Lids are not required on the containment systems. An open container that holds waste from oil and gas wells releases air pollution. USGS concluded that closed containment systems are needed to prevent release of dangerous Volatile Organic Compounds.[xlvii]

No capture of air emissions from containment systems is required by this section and no filtering that would provide a means to meet clean air standards. There is no air monitoring system required to measure cumulative emissions from containers in the region. DEP should require containment systems to be set back further from all features, to have sealed lids, to be equipped with air filters and should require air monitoring of the region's air that could potentially be affected by emissions from the storage areas.

Containers without lids are also subject to spills and overflows and the effects of weather, increasing the potential pathways of pollution of this hazardous material. See comments above at 78a.52a and 78a.55(a).

78a.57a(f.1). We support that no portion of a centralized tank storage site may be constructed in a floodplain. However, DEP should require that the site may not be constructed in the 500 year floodplain to provide the necessary protection from severe storm events. Additionally, riparian buffers should be required beyond the floodplain and the riparian area should be defined by the presence of riparian soils. Buffers should in no instance be less than 100' on either side of a waterway measured from the top of the bank; 300' for all special protections waters; 150' for impaired waters in accordance with Section 303 of the Clean Water Act and implementing State regulations or any other state program.

78a.57a(f.2). We support setbacks from wetlands but DEP should require wetlands of any size (under 1 acre is not protected in the proposed section) to be protected. The setbacks should not be set by an arbitrary 300' and 100' distance but should be based on the surrounding area necessary to protect the hydrologic functions that support the wetlands. An analysis should be done of the wetland area to determine the distance where no disturbance should occur to protect the wetland including soils, vegetation, adjacent water features, and surface and subsurface hydrologic conditions.

78a.57a(f.4-8). DEP should require that tanks should have sealed lids and air filtration equipment, and air monitoring stations. DEP should limit the number and size of tanks on one site to control the emissions, potential for spills and leaks, and for ease of inspections and management. There is no requirement that the centralized tank storage be enclosed and there are no limits on size or number of storage units. Tanks that are open will release air pollution which can travel off site, to nearby receptors, and for great distances, depending on topography, weather, and other site specific conditions.

The Maryland Department of Public Health concluded that there is a "high likelihood" that unconventional gas development will cause air pollution at levels that will impact public health. Researchers have found that 60% of the samples taken contained chemicals exceeding federal guidelines, meaning they are dangerous to human health; eight such chemicals exceeded those levels. See above comments at 78a.52a and 78a.55.2(a).

78a.57a(i). Tanks should have lids, air pollution filtration equipment, air monitoring devices; the tank shall be constructed of material that is compatible with the wastes stored.

78a.57(i.10 and 15). DEP should not allow materials collected in secondary containment to be released from a monitoring point; all material captured should be stored in a close system where it can be retrieved and sampled for constituents. This will determine what type of disposal facility the materials should be taken to for processing to ensure that the facility is designed to process the materials captured. If substances are to be discharged they should be subject to an individual National Pollution Discharge Elimination System (NPDES) permit and the highest treatment standards applied to avoid degradation and pollution of drinking water and the environment.

78a.57(i.16). DEP should require an alarm with remote sensing to a response center to be placed on the leak detection system.

78a.57(i.17). DEP should require a more rigorous inspection schedule, especially since this is the beginning of the new tank requirement and there will be a learning curve and technological ramp-up that will require careful monitoring in its first years.

78a.57(i.17.j). Fencing should be required in all circumstances to avoid accidents and tampering.

78a.57(i.17.n). DEP should require a restoration plan for the site that includes a pre-survey to establish baseline conditions. Prior to site disturbance, identification of soil types and locations, soil layer depths, and at least 98% of existing plant species (identify genus and species) including herbaceous plants, shrubs and trees, and a calculation of the prevalence of those species, should be required to inform site restoration. Utilization of qualified soil scientists for the soil investigation, and qualified botanists for the plant species identification and quantification should be required. The plant survey should be performed in season(s) appropriate for identifying the herbaceous species. For sites larger than 1 acre, provide mapping of the locations of soils and species groups is necessary and should be required.

78a.57(i.17.l.iv.B) and (i.17.l.iv.C). DEP should require that the closure plan provide erosion and sediment control that complies with Chapter 102, including post construction stormwater management and employ management practices included in best management manuals as commented above at 78a.53. Soil analysis should include compaction analysis and compacted soils should be renovated to natural soil conditions prior to disturbance.

78a.57(i.17.l.iv.B) and (i.17.l.iv.D) through (i.17.l.iv.G). DEP should require a Restoration Plan that includes a pre-survey as described at 78a.57(i.17.n).

DEP should require a Restoration Plan that follows these standards:

Prior to site disturbance, identification of soil types and locations, soil layer depths, and at least 98% of existing plant species (identify genus and species) including herbaceous plants, shrubs and trees, and a calculation of the prevalence of those species, should be required to inform site restoration. Utilization of qualified soil scientists for the soil investigation, and qualified botanists for the plant species identification and quantification should be required. The plant survey should be performed in season(s) appropriate for identifying the herbaceous species. For sites larger than 1 acre, provide mapping of the locations of soils and species groups is necessary and should be required.

Soil during use of the site should not be compacted and if compacted should be renovated. Soil analysis should include a compaction analysis (such as a soil permeability test and/or soil pore analysis) and compacted soil should be renovated to natural soil conditions. There should be a minimum requirement for the top 6" minimum of the soil to be "conducive for plant growth typical in the area". This prevents backfill of the upper portions with material detrimental for plant growth. This needs to be increased in areas where the pre-disturbance survey reveals additional topsoil depth.

The vegetation that is planted should establish a diverse, effective, permanent, vegetative cover which is capable of self-generation and plant succession. Vegetation should be native species unless pre-condition is lawn or crops. Original conditions that must be restored include pre-construction soils types and layers, herbaceous plants, shrubs, and trees. An exception to the requirement to return to pre-conditions is that non-native invasive plant species should to be installed even if they were pre-existing. This is to prevent the addition of invasive species, which harm ecosystems and habitats.

DEP should require that the site support the land uses that existed prior to the gas and oil operations, including ecosystem functions such as plant communities and habitats that support wildlife species. "To the extent practicable" needs to be carefully applied in regards to restoration because in order to restore to original conditions fence enclosure to prevent deer and other animal predation, soil renovation, leaf compost layers, and monitoring and maintenance until plants are established add costs but are essential in order to meet a standard that does avoid degradation of the natural environment.

78a.57(o). DEP should not allow any deviation from the requirements of this section at the request of the owner or operator. Off-site impacts to neighbors and the environment can occur by deviating from the requirements, harming human health and the environment and there are no established standards on which to base deviations, making this allowance arbitrary and subject to inconsistent application that can unfairly burden an area. If deviation is allowed, permitting of all activities relevant to this section must be required. DEP should also provide a public process required for the approval of any deviation from these requirements. Otherwise, neighboring property owners, the public and others such as local government units, are left in the dark and poorly prepared to address issues related to centralized tank storage.

78a58. Onsite processing

78a58(a). DEP should not allow onsite processing and reuse of fluids that result from onsite processing without water quality standards set that all reused fluids must meet before being used again. Standards should be promulgated through rulemaking by DEP and uniformly applied. Safe Drinking Water Act water quality standards must be applied to ensure the fluids being reused do not exceed safe limits because these fluids are being injected through the aquifer and can leak into the groundwater from pits or tanks or as a

result of casing or cement leakage or construction flaws, can spill on the surface and seep into the ground or migrate through underground fissures and fractures and through natural migration of groundwater to surface water, or the surface of the land. This exposes aquifers, which supply drinking water to residents, surface water supplies, and the environment and its living resources to an unacceptable risk of contamination.

"Mine influenced" water, which contains contaminants, should not be allowed to be mixed with freshwater for use without prior treatment to water quality standards. DEP should require "mine influenced" water to be treated as wastewater. DEP should remove the allowance to use "mine influenced" water to develop, drill or stimulate a well. In no instance should DEP allow "mine influenced" water to be used from unconventional wells in conventional wells; this would move specific contaminants from unconventional wells to conventional wells, expanding the potential for pollution of water and air resources.

Fluids that result from drilling and hydraulic fracturing that are typically reused contain many contaminants. Contaminants "...can include, but are not limited to: salts (chlorides, bromides, and sulfides of calcium, magnesium, and sodium); metals (including barium, manganese, iron, and strontium); oil, grease, and dissolved organics (including benzene and toluene); naturally occurring radioactive materials; and production chemicals from hydraulic fracturing...Exposure to these contaminants at high levels may pose risks to human health and the environment".[xlviii]

The lack of water quality standards for produced water or flowback that is reused poses a substantial water quality problem. Operators reported to the GAO that they "treat the water to meet their own operating requirements" and that "...they had previously treated the water to a very high quality before reusing it for hydraulic fracturing, they are currently experimenting with lower levels of treatment."[xlix] For example, one operator reported that they used to remove the salt but no longer go to that expense to reduce operating costs and is considering eliminating other treatment if the reused wastewater can still meet their individual operating needs.[l]

One problem caused by reuse is the resulting concentration of certain contaminants. Reuse of this produced water will generally increase the contaminant load in the produced water in the subsequent well, both from additives and formation contaminants because there will be no dilution of the contaminants. If a leak occurs in the top few hundred feet in the gas well being fractured, the leak will contain very contaminated water under high pressure, and even a small leak can release large amounts of contaminants that can pollute aquifers and usable domestic water.[li]

Fluids containing chemicals comingle with formation fluids and the toxic contaminants they naturally contain during the construction, drilling, stimulation (such as fracking), and extraction and production of gas from the gas well. Drill cuttings and muds that are produced by drilling and fracking also mix with these fluids during well development and may be stored together in pits or tanks. The chemical additives used in fracking are examined in New York State's Draft Supplemental Generic Environmental Impact Statement (DSGEIS). Table 5-3 lists many of the fracking chemicals, which include biocides, friction reducers, scale inhibitors, proppants, stabilizers, gelling agents, surfactants, corrosion inhibitors, cross linkers, iron control, and acids.[lii]

Chemical suppliers operating in Pennsylvania's Marcellus Shale, West Virginia, and other states provided additive product compositional information to New York which includes approximately 260 unique

chemicals whose CAS numbers have been disclosed to the New York Department of Environmental Conservation (DEC) and an additional 40 compounds which require further disclosure since many are mixtures. Table 5.4 of the DSGEIS lists products which only partial chemical composition information has been provided to the DEC. Table 5.6 is a list of chemical constituents and their CAS numbers that have been extracted from complete chemical compositional information and MSDS information submitted to New York and includes nearly 200 products used or proposed for use in hydraulic fracturing operations. Compound specific toxicity data are limited for many of the chemical additives so chemicals are grouped together based on their chemical structure in Table 5-7.[liii]

According to the GAO, produced water is "generally of poor quality, with levels of contaminants varying widely".[liv] Fracking can yield poorer quality produced water than other extraction processes.[lv] A previous study from the U.S. Department of Energy concludes that produced water from gas drilling is 10 times more toxic than those from off shore oil drilling.[lvi]

The Marcellus Shale contains radionuclides including uranium-238, thorium-232, and their decay products. Radioactive concentrations in the Marcellus Shale formation are at concentrations 20 to 25 times background, making shale gas wastewater extremely radioactive.[lvii] The produced water from Marcellus Shale has higher levels of radionuclides than water from Barnett Shale wells, according to the GAO.[lviii] Sampling and data-gathering by New York State detected radiological parameters in Marcellus Shale flowback, including Radium-226[lix], the longest lived isotope of radium with a half-life of 1600 years. Gross Alpha, Gross Beta, Total Alpha Radium and Radium-228 were also found.[lx] This is a significant wastewater management issue because radioactivity poses human health risks.

The radioactive component is also particularly challenging, since any "treatment" of the waste water to remove the radioactive components (e.g. radium) will result in a more concentrated (but lower volume) waste with proportionally higher radioactivity. The radioactive elements do not "go away", but are simply concentrated in some other form if removed from the produced water.

The Maryland Department of Public Health concluded that there is a "high likelihood" that unconventional natural gas development will cause air pollution at levels that will impact public health.[lxi] The Maryland Department of the Environment and the Maryland Department of Health and Mental Hygiene concluded from scientific literature that the closer a gas well is to drinking water wells, the more likely it is to be impaired[lxii]. An EPA report concludes that fluids produced by hydraulic fracturing contain the original fracturing fluids and natural pollutants from the target oil and gas formation such as radionuclides and heavy metals.[lxiii] Another study found that chemicals from hydraulic fracturing fluids and methane can spread into the aquifer from various natural and drilling and fracturing-related forces.[lxiv]

DEP should delete this allowance.

78a58(b.1). DEP should not allow the mixing of fluids on well sites. We oppose the mixing of fluids with what DEP calls "freshwater" – the definition of freshwater is not explicitly provided and should be defined as uncontaminated water. See comments above at 78a58(a). DEP should delete this allowance.

78a58(b.2). DEP should require that all aerated fluids be monitored for air pollutants and filtered to remove pollution to meet clean air standards. Area air monitoring should be required.

78a58(b.3). DEP should not allow the filtering of solids on well sites due to the hazardous materials that can be contained in the solids. If DEP allows filtering on site, DEP needs to provide greater safeguards for the filtering of solids. The filtering of solids from fluids can emit pollutants into the air and, unless properly contained, can also be a source of pollution to air, soil and water. This activity needs the strictest of required safeguards to eliminate pollution pathways. DEP fails to provide those safeguards in this section.

Radioactive materials, NORM and TENORM, are contained in Marcellus shale. Uranium-238 and its radioactive decay products are at much higher levels than the normal background. The liquids and solids produced represent a health and safety hazard when being processed to the workers and areas surrounding the well site. Of particular concern is radium 226, the longest lived isotope of radium with a half-life of 1600 years. Radium-226 is taken up like calcium into bone[lxv] where it concentrates. Radium-226 can cause lymphoma, bone cancer, and diseases that affect the formation of blood, such as leukemia and plastic anemia. The radioactive decay product of radium is radon, which is very dangerous and is the second leading cause of lung cancer in the United States.[lxvi] EPA has set federal air limits, cleanup standards, and a maximum contaminant level for radium 226 and 228 under the Safe Drinking Water Act due to human health hazards.[lxvii]

See comments above at 78a58(a).

78a58(e). DEP should not allow drill cuttings to be processed on site; this practice should be performed at an industrial site that is equipped to process and capture pollutants that will be handled and potentially emitted. DEP sets no standards for "processing" which leads to inconsistency in practices used by operators across the state, unfairly burdening areas where less protective measures are taken to control pollution. Drill cuttings can contain and emit pollutants that are health hazards and environmental hazards. All drill cuttings should be removed to facilities designed for this purpose.

Drill cuttings can contain metals, including aluminum, barium, boron, calcium, iron, magnesium, manganese, sodium, arsenic, chromium, potassium, strontium, titanium, and zinc. Barium has been found in Marcellus shale drill cuttings as high as hundreds of parts per million. Analyses of Marcellus shale gas well drill cuttings from Dimock, PA contained Al at 8,930 mg/kg; As at 26.3 mg/kg; Ba 12,4000 mg/kg; Mg 8,150 mg/kg; Mn 630 mg/kg; Fe 24,2000 mg/kg. Total dissolved solids, specific conductance, chloride, pH, oil and grease, and TOC are also found in drill cuttings. The levels of these contaminants can pose substantial health and environmental hazards and should not be processed on a well site. See comments above at 78a58(a).

Drill cuttings can also contain high levels of radioactivity at concentrations far above background and above safe standards. See comments above at 78a58(a). Marcellus shale drill cuttings have been found to raise the levels of radioactivity in leachate at West Virginia landfills, averaging 250 picocuries per liter in 2014 at one landfill and spiked as high as 2,000 picocuries per liter.[lxviii] Based on the EPA cleanup standards of 5 pCi/g on the top 15 cm of land and 15 pCi/g below 15 cm for radium 226 and 228, cuttings from the Marcellus shale can contain concentrations that are far in excess of acceptable limits and should not be processed on well sites.[lxix] New York Department of Environmental Conservation environmental agency found radium-226 at concentrations as high as 206 pCi/g from drill cuttings going to a landfill in New York.[lxx]

DEP should delete this allowance and should only allow drill cuttings to be processed at an industrial facility designed to process contaminated cuttings.

78a58(f). The entirety of the Solid Waste Management Act must be adhered to by all operators, not only Section 6018.1003.

78a58(g). DEP should not allow the manner used to process fluids on one site to be used on subsequent sites and should require each site to test the fluids before applying water quality standards and processing methods appropriate to the constituents to be processed. Subsequent wells can vary greatly in quality and properties of the fluids generated, so methods of processing can vary depending on the constituents of the materials. A recent study by USGS found that the quality of fluids that result from drilling and extraction is not predictable because VOCs are not distributed evenly.[lxxi] The GAO found that "Generally, the quality of produced water from oil and gas production is poor, and it cannot be readily used for another purpose without prior treatment. The specific quality of water produced by a given well, however, can vary widely according to the same three factors that impact volume—hydrocarbon, geography, and production method."[lxxii]
These findings support individual well testing to ascertain the safest management and processing practices.

78a58(h). DEP's requirement that sludges, filter cake, or other solid waste be characterized under Section 287.54 supplies needed protocols. However, DEP should place more rigorous controls on the testing and tracking of this waste. USGS found that VOCs are not predictably consistent from different wells and the GAO found that the quality of water produced by a well can vary widely by hydrocarbon, geography, and production method.[lxxiii] These findings forecast the difficulty in predicting the content of the waste materials, including the sludges and solids that remain after processing on the well site.

The residual waste chemical analysis only requires annual reporting and that can be waived if the operator certifies that the waste has not changed. Without testing and tracking each shipment of materials that leave the well site in order to determine the proper disposal system required to treat the constituents, it is not reasonable or possible to assure adequate treatment and disposal of these materials. DEP should develop a more robust chemical analysis process that addresses the known variability of the solids that leave the well site.

78a59a. Impoundment embankments

DEP should require that freshwater impoundment embankments for oil and gas activities meet the applicable requirements of 25 Pa. Code Chapter 105, Subchapter B. Dams and Reservoirs. This includes the sections on classification and design criteria for approval of construction, operation, modification, and maintenance; the construction requirements; the requirements related to the commencement of the storage of fluids; the requirements related to the restoration of aquatic life; the requirements related to operation, maintenance, and emergencies. The Chapter 105 requirements are far more complete and ensure the safety, sizing, operation, and construction standards that should apply to these impoundments and to the restoration of living resources.

78a59b. Freshwater Impoundments

78a59b(a). DEP should require that freshwater impoundment embankments for oil and gas activities meet the applicable requirements of 25 Pa. Code Chapter 105, Subchapter B. Dams and Reservoirs. This includes the sections on classification and design criteria for approval of construction, operation, modification, and maintenance; the construction requirements; the requirements related to the commencement of the storage of fluids; the requirements related to the restoration of aquatic life; the requirements related to operation, maintenance, and emergencies. The Chapter 105 requirements are far more complete and ensure the safety, sizing, operation, and construction standards that should apply to these impoundments and to the restoration of living resources.

78a59b(b). DEP should require the closure of all existing freshwater impoundments that do not comply with Chapter 105 within six months to one year. This section only requires registration and allows the old impoundments which had even fewer standards than are being proposed herein to remain in use. This endangers public health and safety.

78a59b(c). DEP should require that registration information that is electronically filed be made publicly available on an easily accessible web platform.

78a59b(d). DEP should require liners to be constructed of material that is compatible with the fluids stored; this will require sampling of the fluids as each batch is added to the impoundment and will also require sampling of the impoundment "water" to provide accurate characterization of the substances in the impoundment. Given the nature of the material stored and the expense associated with clean up, a double liner system with leak detection between layers must be considered. The leak detection system is the critical part of the double liner system.

78a59b(e). DEP should require fencing at all sites at all times to provide protection and prevent accidents or tampering. Netting to prevent birds from using the impoundment should be considered to protect wildlife.

78a59b(f). DEP should not allow impoundments to be as close as 20 inches above the seasonal high groundwater table due to danger of pollution to the groundwater and aquifers. The potential for leaks and seeps into the groundwater table through liners is great. According to a report by State University of New York at Stony Brook researchers, "According to PA-DEP records from July 2009 to June 2010, there were about 4,000 permitted Marcellus wells in PA. Of these wells, about 850 wells were producing gas, 400 wells were not producing, and 2,800 wells were planned or in process. During this same time, 630 environmental, health, and safety violations were issued for Marcellus wells in PA, of which approximately half were for discharges up to 60 m3 or for potential to cause discharge. These data are acknowledged by public officials to be underreported."[lxxiv] The presence of contaminants in the fluids to be contained in the impoundments poses an unacceptable risk of pollution to the aquifer and to water supplies that rely on the aquifer.

DEP should not allow an underdrain to lower the seasonal high water table. This is damaging to the groundwater, can cause damaging changes to the shallow groundwater system and the hydrologically connected water systems such as wetlands, vernal pools, and base flow to streams. The statement that "In no case shall the regional groundwater table be affected" is not possible if the seasonal high ground water table is being drained. The drained seasonal high groundwater is the recharge that eventually moves into and

becomes the regional groundwater table. It is important to remember that the elevated seasonal high groundwater table provides the additional head level that promotes a higher rate of recharge in the late spring than at any other time of the year. To remove and drain the seasonal high groundwater is to remove the annual recharge reaching the aquifer and should not be allowed.

There appears to be some confusion as to the definition of seasonal high groundwater and perched groundwater tables both in this section and in the definition section. In either case, shallow ground waters should not be drained as these resources support wetland hydrology in the dry, hot summer months as well as baseflow and other features such as vernal pools.

78a59b(g). DEP should require a comprehensive restoration plan that follows these standards:
Prior to site disturbance, identification of soil types and locations, soil layer depths, and at least 98% of existing plant species (identify genus and species) including herbaceous plants, shrubs and trees, and a calculation of the prevalence of those species, should be required to inform site restoration. Utilization of qualified soil scientists for the soil investigation, and qualified botanists for the plant species identification and quantification should be required. The plant survey should be performed in season(s) appropriate for identifying the herbaceous species. For sites larger than 1 acre, provide mapping of the locations of soils and species groups is necessary and should be required.

Soil during use of the site should not be compacted and if compacted should be renovated. Soil analysis should include a compaction analysis (such as a soil permeability test and/or soil pore analysis) and compacted soil should be renovated to natural soil conditions. There should be a minimum requirement for the top 6" minimum of the soil to be "conducive for plant growth typical in the area". This prevents backfill of the upper portions with material detrimental for plant growth. This needs to be increased in areas where the pre-disturbance survey reveals additional topsoil depth.

The vegetation that is planted should establish a diverse, effective, permanent, vegetative cover which is capable of self-generation and plant succession. Vegetation should be native species unless pre-condition is lawn or crops. Original conditions that must be restored include pre-construction soils types and layers, herbaceous plants, shrubs, and trees. An exception to the requirement to return to pre-conditions is that non-native invasive plant species should not be installed even if they were pre-existing. This is to prevent the addition of invasive species, which harm ecosystems and habitats.

DEP should require that the site support the land uses that existed prior to the gas and oil operations, including ecosystem functions such as plant communities and habitats that support wildlife species. "To the extent practicable" needs to be carefully applied in regards to restoration because in order to restore to original conditions fence enclosure to prevent deer and other animal predation, soil renovation, leaf compost layers, and monitoring and maintenance until plants are established add costs but are essential in order to meet a standard that does avoid degradation of the natural environment.

78a59b(h). DEP should prohibit "mine influenced water" in freshwater impoundments. "Mine influenced water", which contains contaminants, should not be allowed to be mixed with freshwater in impoundments. DEP should require "mine influenced" water to be treated as wastewater. There is no monitoring or sampling of the water added to the impoundment required (the proposed text at this section states testing "may" be required), no sampling of the impoundment water and inadequate controls and safeguards are

provided for potentially hazardous substances in the "mine influenced water"; only uncontaminated water should be allowed in freshwater impoundments.

78a59c. Centralized Impoundments

78a59c(a). DEP should require a comprehensive restoration plan upon closure of existing impoundments that follows the standards stated above at 78a59b(g).

78a59c(a). DEP should require all currently used and existing centralized impoundments to be closed within 6 mos., not three years. The standards to which current impoundments were built are less stringent and could provide pollution pathways and dangers to health and safety.

DEP should not allow centralized impoundments for fluids that result from gas and oil well extraction. Even under the Residual Waste Disposal Impoundment permitting program, the waste in these impoundments is highly toxic and poses water and air pollution hazards. See comments above at 781.55(a) and 78a58(a). We oppose the use of open impoundments for the storage of oil and gas wastewater and fluids; all waste and fluids should be stored in closed and sealed containers with filtration systems and comprehensive secondary containment.

78a59c(b.2). DEP should require a comprehensive restoration plan that follows these standards:
Prior to site disturbance, identification of soil types and locations, soil layer depths, and at least 98% of existing plant species (identify genus and species) including herbaceous plants, shrubs and trees, and a calculation of the prevalence of those species, should be required to inform site restoration. Utilization of qualified soil scientists for the soil investigation, and qualified botanists for the plant species identification and quantification should be required. The plant survey should be performed in season(s) appropriate for identifying the herbaceous species. For sites larger than 1 acre, provide mapping of the locations of soils and species groups is necessary and should be required.

Soil during use of the site should not be compacted and if compacted should be renovated. Soil analysis should include a compaction analysis (such as a soil permeability test and/or soil pore analysis) and compacted soil should be renovated to natural soil conditions. There should be a minimum requirement for the top 6" minimum of the soil to be "conducive for plant growth typical in the area". This prevents backfill of the upper portions with material detrimental for plant growth. This needs to be increased in areas where the pre-disturbance survey reveals additional topsoil depth.

The vegetation that is planted should establish a diverse, effective, permanent, vegetative cover which is capable of self-generation and plant succession. Vegetation should be native species unless pre-condition is lawn or crops. Original conditions that must be restored include pre-construction soils types and layers, herbaceous plants, shrubs, and trees. An exception to the requirement to return to pre-conditions is that non-native invasive plant species should to be installed even if they were pre-existing. This is to prevent the addition of invasive species, which harm ecosystems and habitats.

DEP should require that the site support the land uses that existed prior to the gas and oil operations, including ecosystem functions such as plant communities and habitats that support wildlife species. "To the extent practicable" needs to be carefully applied in regards to restoration because in order to restore to

original conditions fence enclosure to prevent deer and other animal predation, soil renovation, leaf compost layers, and monitoring and maintenance until plants are established add costs but are essential in order to meet a standard that does avoid degradation of the natural environment.

78a60. Discharge Requirements

78a60(b). DEP should not allow the discharge of tophole and pit water. Tophole and pit water contains toxic pollutants, including NORM and TENORM, hazardous substances, concentrated salts, and other pollutants, that are not addressed in this section. See comments above at 78a.58(a).

78a60(b.4). DEP should not use "sheen" as a measurement of the presence of oil, gas and grease. Sheen is not a good judge of whether water is polluted—many oil and gas pollutants do not cause a sheen.

78a60(b.7). DEP should expand the setback to be protective of water supplies, wetlands and water courses. See comments above at 78a.55(a) and 78a.58(a).

78a60(b.8). DEP must conduct a site specific inquiry with consideration of cumulative and long term impacts when considering allowing discharge to the land surface of tophole water or water from a pit.

78a60(c). DEP should require that compliance with this subsection be documented in a report filed electronically to DEP and made publicly available on an easily accessible web platform.

78a61. Disposal of drill cuttings

78a61(a). DEP should prohibit the disposal of drill cuttings on both conventional and unconventional well sites, no matter what location in the well bore they are from. Drill cuttings contain hazardous materials and should not be allowed to enter the environment. We oppose the burial of drill cuttings on well sites under any circumstances due to the potential pathways of pollution that are made available for the pollutants in the cuttings. All drill cuttings should be required by DEP to be disposed of in facilities designed to fully and safely treat the waste. See comments above at 78a.55(a) and 78a.58(a).

78a61(a.3 and 4). DEP should prohibit the disposal of drill cuttings on well sites, no matter what the setbacks. See comments above at 78a61(a).

78a62. Disposal of residual waste--pits

78a62(a). DEP should not issue permits for disposal of residual waste in pit at both conventional and unconventional well sites. Drill cuttings contain hazardous materials and should not be allowed to enter the environment. We oppose the burial of drill cuttings on well sites under any circumstances due to the potential pathways of pollution that are made available for the pollutants in the cuttings. All drill cuttings should be required by DEP to be disposed of in facilities designed to fully and safely treat the waste. See comments above at 78a.55(a) and 78a.58(a).

78a63. Disposal of residual waste—land application

78a63(a). DEP should prohibit the land application of residual waste at both conventional and unconventional well sites. Drill cuttings contain hazardous materials and should not be allowed to enter the environment. We oppose the land application of drill cuttings on well sites under any circumstances due to the potential pathways of pollution that are made available for the pollutants in the cuttings. All drill cuttings should be required by DEP to be disposed of in facilities designed to fully and safely treat the waste. There are no standards provided for this disposal method and no permitting proposed, which does provide the protections required under the law and regulations. See comments above at 78a.55(a) and 78a.58(a).

78a63a. Alternative Waste Management

DEP must not allow alternative waste management by an operator on a well site through a request to DEP. There is no requirement that the alternative is part of a formal permit. There are no standards set for the alternative methods and no analysis of the cumulative impacts. Additionally, a public review process provides transparency and public access to information and decision making and should be provided at all decision points but there is no public review of this action. DEP should delete this section.

78a64. Containment around oil and condensate tanks

78a64(a). DEP should regulate all tanks, even those under 1,320 gallons due to importance to prevent pollution pathways from this dangerous material, including condensate.

78a64(e). DEP should require all existing and currently used tanks should be closed within 6 months, not two years. The standards to which current impoundments were built are less stringent and could provide pollution pathways and dangers to health and safety.

78a64a (d.2). DEP should require the containment system components to be impermeable and impervious. Given the nature of the material stored and the expense associated with clean up, a double liner system with leak detection between layers must be considered. The leak detection system is the critical part of the double liner system.

78a64a (f and f.1). DEP should not allow subsurface containment systems at wells site due to the lack of ability to inspect and monitor the tanks efficiently and because of the highly hazardous substances contained in the tanks, including condensate.

78a65. Site restoration

DEP should require a comprehensive restoration plan that follows these standards:
Prior to site disturbance, identification of soil types and locations, soil layer depths, and at least 98% of existing plant species (identify genus and species) including herbaceous plants, shrubs and trees, and a calculation of the prevalence of those species, should be required to inform site restoration. Utilization of qualified soil scientists for the soil investigation, and qualified botanists for the plant species identification and quantification should be required. The plant survey should be performed in season(s) appropriate for identifying the herbaceous species. For sites larger than 1 acre, provide mapping of the locations of soils and species groups is necessary and should be required.

Soil during use of the site should not be compacted and if compacted should be renovated. Soil analysis should include a compaction analysis (such as a soil permeability test and/or soil pore analysis) and compacted soil should be renovated to natural soil conditions. There should be a minimum requirement for the top 6" minimum of the soil to be "conducive for plant growth typical in the area". This prevents backfill of the upper portions with material detrimental for plant growth. This needs to be increased in areas where the pre-disturbance survey reveals additional topsoil depth.

The vegetation that is planted should establish a diverse, effective, permanent, vegetative cover which is capable of self-generation and plant succession. Vegetation should be native species unless pre-condition is lawn or crops. Original conditions that must be restored include pre-construction soils types and layers, herbaceous plants, shrubs, and trees. An exception to the requirement to return to pre-conditions is that non-native invasive plant species should to be installed even if they were pre-existing. This is to prevent the addition of invasive species, which harm ecosystems and habitats.

DEP should require that the site support the land uses that existed prior to the gas and oil operations, including ecosystem functions such as plant communities and habitats that support wildlife species. "To the extent practicable" needs to be carefully applied in regards to restoration because in order to restore to original conditions fence enclosure to prevent deer and other animal predation, soil renovation, leaf compost layers, and monitoring and maintenance until plants are established add costs but are essential in order to meet a standard that does avoid degradation of the natural environment.

78a66. Reporting and Remediating Spills and Releases

78a.66(b). DEP should require that the operator also notify water agencies and providers and water users downstream and in areas that could be affected by the pollution release. DEP should require that the operator also alert the Fish and Boat Commission as well as the local municipality, in addition to the DEP. It is important that the Fish and Boat Commission be alerted as many wells are located in remote areas where trout waters may be the impacted or receiving water body or where wetlands with endangered species may be located. Class A or wild trout waters are prevalent in areas where drilling is occurring.

The local municipality should also be made aware as they may have local knowledge about the area or be able to deploy hazardous teams on site to watchdog any cleanup efforts by the company. Nearby property owners, downstream residents and the property owner where the well is drilled must also be made aware. This is critical to protecting public health.

Local volunteer monitors and watchdogs such as Trout Unlimited and other water monitoring programs such as Delaware Riverkeeper Network and ALARM, often are the first line of defense when it comes to pollution events. They know where to access nearby streams and can be a tremendous resource to DEP staff on the ground; this could be accomplished through an emergency system that alerts local volunteers through a cooperative warning system. Local fire companies and health officials should also be notified so that they have a record of incidents occurring in their local region that is readily available.

Having this tiered approach that puts the onus of alerting local, county, and state officials on the responsible party is critical. The company's emergency response plan or SICC plan should include all these contact

names and numbers listed above and a notification system should be organized to assure all potentially affected and helpful parties are alerted in case of a spill, pollution incident, or catastrophic event.

78a.66(b.1.ii). Because drilling companies have tremendous resources and multiple staff available to them, it seems that an immediate call to the DEP would be appropriate and possible, rather than allowing a two hour window of time. DEP should require a faster call up time than what is stated in the proposed regulations. DEP regional staff may be a few hours away and they should have as much lead time as possible to be able to deploy and investigate the site. DEP should require an immediate or close to immediate call to DEP staff.

Rather than a 5 gallon threshold for reporting a spill, any amount of a pollutant spilled should be reported. Many of the chemicals being handled at the well site are highly toxic in minute amounts. The spill of concentrated chemicals or concentrated solids could have much greater impacts than a diluted or less toxic substance. According to the EPA, one gallon of motor oil can contaminate one million gallons of water—that's a years' supply of freshwater for 50 people. So any substance of any size that is spilled should be accounted for, cleaned up and reported. A spill of any size, because of the nature of the chemicals used in gas drilling and the abundance of drilling that occurs, must be reported so that tracking and accounting can occur for the large spills as well as the small spills that cumulatively can make a large impact. This information must be put on record so that the community and the state can track and see where potential contamination has occurred and where industry practices may need more oversight. DEP should change this section to require the reporting of a spill of any size.

Testing upstream and downstream of the spill or in the soil layers should also be required to ensure adequate remediation.

78a67. Borrow Pits

DEP should require all existing borrow pits to be registered immediately and brought into compliance immediately or closed within three months. These borrow pits are notoriously messy without adequate erosion and sediment control, safety measures, and typically there has been poor to no restoration or permanent best management practices installed after closure. They are also often not even registered or mapped with DEP.

78a68. Oil and gas gathering pipelines
78a.68a. Horizontal directional drilling for oil and gas activities
78a.68b. Well development pipelines for oil and gas operations.

We support that stormwater management under Chapter 102 has been added to the requirements to control erosion and sediment in this section. However, DEP does not include post construction stormwater management, a critically needed component to ensure that sites are equipped with an effective stormwater system after being built. DEP should change this section to: "shall comply with Chapter 102 (relating to erosion and sediment control) and Post Construction Stormwater Management requirements". See comments at 78a53. regarding restoration of disturbed areas.

We support the inclusion in this section of the PA Stormwater Best Management Practices Manual, the Erosion and & Sediment Pollution Control Program Manual, and the Riparian Forest Buffer Guidance. We oppose the inclusion of the Oil and Gas Operators Manual (1997) which is outdated and does not address horizontal drilling and high volume hydraulic fracturing practices that are used in the unconventional formations in the State. It also does not cover the current practices used at conventional drilling sites.

DEP should remove the Oil and Gas Operators Manual (1997) from this section for both conventional and unconventional well drilling. If DEP does not remove it, DEP should make clear that the PA Stormwater Best Management Practices Manual and/or the Erosion and Sediment Pollution Control Program Manual always take precedent over the Oil and Gas Operators Manual for design standards and the Oil and Gas Operators Manual is only to be used for industry specific issues not addressed in the Stormwater Best Management Practices and/or the Erosion and Sediment Pollution Control Program Manuals. See comments at 78a53.

DEP should not allow any fluids other than fresh water to be transported in well development lines to reduce the potential for pollution pathways.

Delaware Riverkeeper Network comments submitted to DEP regarding the Proposal to Modify and Reissue General Permit BWEW-GP-8 (Temporary Crossings and Environmental Testing or Monitoring Activities) dated January 10, 2014 is incorporated herein and attached.

78a69. Water Management Plans

DEP should develop requirements and standards for water management plans that are more comprehensive and takes into consideration the cumulative impacts of the depletion of the fresh water resources of the Commonwealth by oil and gas development. The reduction of available clean water due to pollution and degradation of quality of drinking water resources and natural water resources compounds the loss of volume. The standards are vague and not developed enough to be meaningful. We support the requirement for Water Management Plans but they need to have enforceable and environmentally-based standards that protect streams and other water features at all levels and assess the cumulative and long-term impacts of this consumptive use.

Expert comments contributed to this comment by:

Michele Adams, PE LEED AP, Meliora Design
Peter Demicco, PG [PG-003690E], Ground Water Associates
John Nystedt, RLA, LEED AP BD+C, Restoration Specialist, Registered Landscape Architect, Delaware Riverkeeper Network
Faith Zerbe, Biologist, Monitoring Program Director, Delaware Riverkeeper Network
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Submitted by,

Maya K. van Rossum
the Delaware Riverkeeper

Tracy Carluccio
Deputy Director

Attachment: Delaware Riverkeeper Network Comment **Re. Proposal to Modify and Reissue General Permit BWEW-GP-8 (Temporary Crossings and Environmental Testing or Monitoring Activities)** dated January 10, 2014.

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DELAWARE RIVERKEEPER NETWORK

January 10, 2014

Division of Wetlands, Encroachments, and Training
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RE: DRN Comment on Proposal to Modify and Reissue General Permit BWEW-GP-8 (Temporary Crossings and Environmental Testing or Monitoring Activities)

The Delaware Riverkeeper Network ("DRN") submit this comment letter in response to the Pennsylvania Department of Environmental Protection's (the "Department") announcement of a proposal to modify and reissue General Permit BWEW-GP-8 (Temporary Road Crossings) as General Permit BWEW-GP-8 (Temporary Crossings and Environmental Testing or Monitoring Activities), which allows the construction, operation, maintenance and removal of temporary crossings across regulated waters of this Commonwealth, including wetlands, where no practicable alternatives exist. For the reasons set forth below, DRN request that the PADEP amend the proposed BWEW-GP-8 ("GP-8") in accordance with the numbered comments articulated below. Until such time that the GP-8 the issues identified below are addressed significant portions of the permit are overly vague, unenforceable, and not sufficiently protective to human health and the environment. The Department has indicated that written comments on the proposed modifications to this General Permit by January 10, 2014.

COMMENT

1) Item 2 states that "The Department shall have the discretion, on a case-by-case basis, to deny, revoke or suspend the authorization to use this General Permit for any project

which the Department determines to have a significant effect on the safety and protection of life, health, property or the environment or otherwise would not be adequately regulated by the provisions of this General Permit or determines that the representations made in the application to register are not accurate."

Comment: Item 2 provides a description of the Department's discretion to deny, revoke, or suspend authorization to use the GP-8; however, this provision provides no guidance or timeframe for review of potential violations that would result in a denial, revocation, or suspension of the permit. Without such a time frame this provision becomes unenforceable. For example, there needs to be a regulatory review process in place that ensures that once potential violations of terms and conditions of the permit occur as a result of construction activity, the potential violations are reviewed before the construction activity is completed. It is simply not possible to revoke or suspend a permit when the Department waits until all the activity is completed before reviewing the potential violation. This has already occurred in numerous linear infrastructure projects in Pennsylvania in the context of Chapter 105 and 102 permit authorizations (i.e. Tennessee Gas 300 Line Upgrade Project).

2) Item 6.C states that this general permit does not apply for temporary service lines that are "trenched or bored."

Comment: The terms "trenched" and "bored" are not defined in the "Definitions" section of the proposed GP-8, furthermore, there is no guidance anywhere in the

GP-8 that provides an explanation as to how the Department will interpret these terms. The Department needs to identify what level of ground disturbance triggers the term "trench" or "bored" as those terms are interpreted differently across the regulated community? The GP-8 should make clear that no trenching activies are permitted by the GP-8. Without more specific language identifying what activities are limited to under this item, this section is overly vague.

3) Item 6.E. states that this general permit does not apply for temporary service lines that "transmit hazardous or toxic material."

   Comment: The term "hazardous or toxic material" is not defined in the "Definitions" section of the proposed GP-8, furthermore, there is no guidance anywhere in the GP-8 that provides an explanation as to how the Department will interpret this provision. Without more specific language identifying what types of material are "hazardous" or "toxic" this provision is overly vague and unenforceable. Furthermore, the Department should require that the project applicant submit, and make publically available, what constituents each temporary line is carrying.

4) Item 6.H-I provide descriptions of activities that are not authorized under the GP-8.

   Comment: Section 6.H-I do not provide any prohibitions against adversely impacting Exceptional Value wetlands similar to the protections afforded in 25 Pa. Code 105.18(a) for similar linear activities. The provisions of 105.18(a) should be either expressly written into the proposal or incorporated by reference.

5) Item 7.A.2 states "The Department may extend the time, in writing, on a case by case basis not to exceed an additional one (1) year based on the owner's documentation of need."

Comment: The proposed GP-8 does not define the term "need" in the context of 7.A.2, furthermore, there is no guidance anywhere in the GP-8 that provides an explanation as to how the Department will interpret this provision. Without more specific language identifying how a project applicant can demonstrate "need" the provision is overly vague.

6) Item 12.A.4 states "Wetlands shall be identified and delineated in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual and the appropriate Regional Supplements to the Corps of Engineers Wetland Delineation Manual for use in Pennsylvania."

Comment: Item 12.A.4 should also indicate that the wetlands be classified as either "Exceptional Value" or "Other" consistent with the designations under 25 Pa. Code 105.17. The Corps of Engineers Wetland Delineation Manual does not provide for this specific designation.

7) Item 12.A.5 states "Temporary crossings of wetlands shall be avoided if an alternate location is possible. If the crossing of wetlands cannot be avoided, the crossing is permissible if it is located at the narrowest practicable point of the wetland."

Comment: Item 12.A.4 should describe generally what a project applicant needs to demonstrate in order to prove that a wetlands crossing cannot be avoided. For

example, is it sufficient for the project applicant simply to not own the ROW that would avoid the wetland? Does the applicant need to at least request permission for expanding the ROW from the landowner...etc? Does the Department perform a cost/benefit analysis in making this determination? The Department needs to provide guidance on how this provision will be interpreted.

8) Item 12.A.9 states "Pollution of the waterway, including its floodplains, with harmful chemicals, fuels, oils, greases, bituminous material, acid, and/or other harmful or polluting materials, is prohibited."

Comment: Item 12.A.9 should include protections from pollution not just for waterways but also for wetlands.

9) Item 12.A.13 states that "Temporary crossings of all watercourses, including support structures, shall be inspected by the owner on a regular basis to provide for continued operation and maintenance during the lifetime of the structure."

Comment: Item 12.A.9 must provide more specific guidance on the interval of time between inspections to satisfy this provision. The term "regular basis" is overly broad and is interpreted differently across the regulated community. Unless modified this item does not provide useful guidance on how to interpret this provision.

10) Item 12.G.6 states that "Temporary service line crossings of all watercourses transmitting fresh water which may contain any pollutional materials during the lifetime of the temporary crossing shall be done by a single continuous span of pipe at a minimum from

the outer limit of the floodway across the watercourse to the other side of the floodway outer limit."

Comment: Item 12.G.6 is inconsistent with item 6.E., which states that this general permit does not apply for temporary service lines that "transmit hazardous or toxic material." Yet, 12.G.6 indicates that a temporary service line may contain "pollutional materials." First, there is no definition or guidance in the GP-8 that demonstrates how the Department will interpret the term "pollutional materials." This term must be specifically defined. Furthermore, to the extent that it is defined, the definition must not conflict with the requirement that no "toxic" or "hazardous" materials are carried in the service line. As proposed, item 12.G.6 and item 6.E cannot be reconciled. The same problem arises in the context of item 12.G.7.

11) Item 12.G.8.a states that Temporary service line crossings of all watercourses transmitting fresh water which may contain any pollutional materials during the lifetime of the temporary crossing shall have an operations and maintenance plan which shall include at a minimum the following: Periodic inspection schedule of the temporary service line.

Comment: Item 12.A.9 must provide more specific guidance on the interval of time between inspections to satisfy this provision. The term "periodic" is overly broad and is interpreted differently across the regulated community. Unless modified this item does not provide useful guidance on how to interpret this provision.

DELAWARE RIVERKEEPER NETWORK

12) Item 12.G.16 states that "No regulated activity may substantially disrupt the movement of those species of aquatic life indigenous to the watercourse, stream or body of water, including those species which normally migrate through the area."

Comment: The term "substantially disrupt" is not defined in the "Definitions" section of the proposed GP-8, furthermore, there is no guidance anywhere in the GP-8 that provides an explanation as to how the Department will interpret this provision. Without more specific language identifying what types of material are "substantially disrupts" means and how it will be interpreted by the Department this provision is overly vague and unenforceable.

13) GP-8, generally.

Comment: Under what conditions may a project applicant fell trees for a ROW for a temporary service line? How wide may a ROW be for a temporary service line? What are the restoration and mitigation requirements for such activities?

CONCLUSION

Until such time that the items above are addressed significant sections of the proposed GP-8 permit are overly vague, unenforceable, and not sufficiently protective to human health and the environment. DRN respectfully requests that these changes be made before the permit is issued.

Dated: January 10, 2014

By: */s/ Maya K. van Rossum*

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