

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Office of Oil and Gas Management

DOCUMENT NUMBER: 800-0810-002

TITLE: Policy for the Replacement or Restoration of Private Water Supplies Impacted by Unconventional Oil and Gas Operations

EFFECTIVE DATE: August 8, 2020

AUTHORITY: The 2012 Oil and Gas Act (58 Pa.C.S. §§ 3201–3274); The Clean Streams Law (35 P.S. §§ 691.1–691.1001); The Land Recycling and Environmental Remediation Standards Act (35 P.S. §§ 6026.101–6026.908); Sections 1905-A, 1917-A and 1920-A of The Administrative Code of 1929 (71 P.S. §§ 510-5, 510-17 and 510-20); and 25 Pa. Code Chapter 78a (relating to unconventional wells).

POLICY: The Department of Environmental Protection (Department or DEP) will follow the guidance presented in this document to implement the requirements relating to the restoration or replacement of private water supplies adversely impacted by well operators conducting unconventional oil and gas operations with a water supply of adequate quantity and/or quality for the purposes served by impacted water supply source(s).

PURPOSE: The purpose of this guidance is to inform Department staff, the regulated industry and the public of how to comply with the private water supply restoration and replacement requirements in the 2012 Oil and Gas Act, The Clean Streams Law and 25 Pa. Code Chapter 78a.

APPLICABILITY: This document is the Department’s guidance for ensuring compliance with legal requirements related to restoration and replacement of private water supplies adversely impacted by unconventional oil and gas operations.

DISCLAIMER: The policies and procedures outlined in this guidance are intended to supplement existing requirements. Nothing in the policies or procedures shall affect regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. DEP does not intend to give this guidance that weight or deference. This document establishes the framework, within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

PAGE LENGTH: 19 Pages

BACKGROUND:

Section 3218(a) of the 2012 Oil and Gas Act (58 Pa.C.S. § 3218(a)) requires a well operator that adversely affects a public or private water supply by pollution or diminution to restore or replace the impacted supply with an alternate water source adequate in quantity and quality for the purpose served by the supply. The quality of a restored or replaced water supply must meet the standards established under the Pennsylvania Safe Drinking Water Act (35 P.S. §§ 721.1–721.17) or is comparable to the quality of the water that existed prior to pollution if the water quality was better than these standards. *See* 58 Pa.C.S. § 3218(a); *see also* 25 Pa. Code § 78a.51(d)(2).

If a landowner, water purveyor, affected person or a well operator contacts the Department with a complaint that a water supply may have been adversely impacted by unconventional oil and gas operations, the Department will conduct an investigation to determine whether the water supply has been affected by unconventional oil and gas operations. *See* 58 Pa.C.S. § 3218(b); 25 Pa. Code § 78a.51(b), (h). If the Department determines that unconventional oil and gas operations have adversely impacted a water supply or a well operator is presumed to be responsible for impacting a water supply in accordance with Section 3218(c) of the 2012 Oil and Gas Act, the Department will issue orders to the well operator *necessary* to assure compliance. *See* 58 Pa.C.S. § 3218(b) (emphasis added). Accordingly, the Department will take appropriate enforcement measures to require a responsible well operator to restore or replace the impacted water supply and issue orders when a responsible well operator does not achieve compliance with the law through voluntary compliance. For more information relating to the Department’s procedures for enforcement actions, please refer to the Department’s technical guidance document titled, “Standards and Guidelines for Identifying, Tracking, and Resolving Oil and Gas Violations” (Document Number 820-4000-001).

If an affected person indicates or complains that human health is being affected as a result of unconventional oil and gas operations, the Department will provide the affected person with contact information for the Pennsylvania Department of Health. If the Department determines that unconventional oil and gas operations have adversely impacted a water supply, the Department will also inform the Pennsylvania Department of Health of this determination.

If a causal connection between unconventional oil and gas operations and the water supply impact cannot be established and the “rebuttable presumption” (see below) does not apply, the complainant will be notified that unconventional oil and gas operations did not impact the water supply or that there was insufficient evidence to determine that unconventional oil and gas operations caused the impacts to the water supply.

Section 3218(c) of the 2012 Oil and Gas Act creates a rebuttable presumption of liability on a well operator for the pollution of a water supply if the supply is located within a “rebuttable presumption area” and the pollution occurs within a defined period of time. *See* 58 Pa.C.S. § 3218(c). For an unconventional gas well, a water supply is within the rebuttable presumption area if the water supply is within 2,500 feet of the vertical well bore and the pollution occurred within 12 months of the later of completion of drilling, stimulation, or well alteration of the unconventional well. *See* 58 Pa.C.S. § 3218(c)(2).

Section 3218(d)(2) of the 2012 Oil and Gas Act provides the well operator an opportunity to rebut the presumption of liability. There are five statutory defenses to the presumption of liability which are listed below. Any one of these defenses may rebut the presumption of liability for unconventional wells.

1. The pollution existed prior to the drilling, stimulation or alteration activity as determined by a predrilling or prealteration survey.
2. The landowner or water purveyor refused to allow the operator access to conduct a predrilling or prealteration survey. The operator should submit evidence to the Department demonstrating that the landowner or water purveyor was notified by certified mail or personal service that the refusal of access to conduct a predrill or prealteration survey could be used to rebut a presumption of liability.
3. The water supply is not within 2,500 feet of an unconventional vertical well bore.
4. The pollution occurred more than 12 months after the later of completion of drilling, stimulation, or well alteration activities for unconventional wells.
5. The pollution occurred as a result of a cause other than the drilling or alteration activity. Given the technical nature of this defense, a report documenting the cause should be prepared, signed and sealed by a geologist licensed in this Commonwealth or accompanied by an explanation of why a geologic analysis was unnecessary based on the facts.

Additionally, the Department may investigate any complaints alleging pollution to waters of the Commonwealth, including those pertaining to private water supplies. The Department may issue orders to ensure compliance with The Clean Steams Law.

The Clean Streams Law gives the Department the authority to, among other things, receive and act upon complaints; issue such orders as may be necessary to implement the provisions of the Clean Streams Law or the rules and regulations of the Department; and make such inspections of public or private property as are necessary to determine compliance with the provisions of the Clean Streams Law, and the rules, regulations, orders or permits issued thereunder. *See* 35 P.S. § 691.5(b)(6)-(8).

Section 305 of the Clean Streams Law requires the Department to “investigate and ascertain, as far as practicable, all facts in relation to the pollution of the waters of the Commonwealth by industrial waste. Its agents may enter upon lands, buildings, and premises as may be necessary for its investigations.” *See* 35 P.S. § 691.305.

PROCESS:

A. Addressing Water Supply Pollution or Diminution.

Generally, water supply related issues come to the attention of the Department in one of three ways: 1) a complaint by an affected person, 2) notification by the operator, or 3) discovery of the problem by the Department while conducting an investigation in the area of the water supply. *See* 25 Pa. Code § 78a.51(b), (h).

All water supply concerns related to unconventional oil and gas operations should be referred to the appropriate Oil and Gas District Office; the contact information for those offices is provided

in Appendix A. Oil and gas related complaints may also be directed to the state-wide toll-free number at 1-866-255-5158.

When an operator receives notice from a landowner, water purveyor or affected person that a water supply has been affected by pollution or diminution, the operator shall report the notice from the landowner, water purveyor, water system operator or affected person to the Department within 24 hours of receiving the notice. The notice is to be done electronically to the Department through its web site. *See* 25 Pa. Code § 78a.51(h).

The procedure for how the Department conducts all water supply investigation requests related to unconventional oil and gas operations can be found in the Department's technical guidance document titled, "Standards and Guidelines for Identifying, Tracking, and Resolving Oil and Gas Violations" (Document number 820-4000-001).

Once the Department makes a positive determination that an unconventional well operator is responsible for adverse impacts to a water supply, the Oil and Gas District Offices should use the procedures outlined in this document and in "Standards and Guidelines for Identifying, Tracking, and Resolving Oil and Gas Violations" (Document number 820-4000-001) as guidance to ensure adequate and timely replacement or restoration of an affected water supply. Oil and Gas District Offices should follow this guidance unless the circumstances of a specific case warrant a different approach to resolving the case, within the requirements of the law.

B. Providing Water to Users of an Impacted Water Supply.

If the Department observes an indicator for a potential impact of quality (e.g., effervescence, turbidity, odor, sheen) to a water supply in which the rebuttable presumption applies, the Department will request that the operator takes measures to ensure delivery of water to the affected person within 24 hours of the operator being notified. The operator should then provide to the Department all information known to the operator that may support any of the statutory defenses to the rebuttable presumption of liability as soon as practicable. The Department may rescind its request for an operator to ensure delivery of water to the affected person within 24 hours, if in the interim, the operator provides and the Department determines that there is a valid statutory defense to the rebuttable presumption of liability.

The Department will notify the affected person that the rebuttable presumption applies to their specific case and provide a fact sheet explaining the rebuttable presumption and their rights under the 2012 Oil and Gas Act.

If the Department makes a determination that unconventional oil and gas operations have adversely impacted a water supply or presumes the well operator responsible for the impacted water supply, the Department will request that the responsible operator take measures to ensure delivery of water to the affected person within 24 hours of being notified of its findings. The Department will also notify the landowner, water purveyor and affected person of the determination in writing, copying the responsible operator.

The owner of the water supply may notify the Department if the owner of the water supply prefers not to be supplied temporary water or if the owner of the water supply prefers not to have the water supply restored or replaced. Any such notice should be provided to the Department in writing.

1. Water for Immediate Needs:

Upon notice by the Department for the need to provide water to the user, operators should take immediate measures, within 24 hours, to address the water consumption needs of those affected by the impacted water supply. The immediate response of providing potable water for drinking should be at least one gallon per person per day or five gallons per household per day, whichever is greater. Additional quantities of water may be necessary to address immediate needs depending on the use of the water supply (e.g., animals dependent on the impacted water supply, including pets and livestock).

If the operator fails to ensure delivery of potable water to address immediate water needs of the impacted party within 24 hours of the Department's notification, the Department may issue an administrative order directing the operator to provide potable water immediately.

2. Temporary Water Supply:

If the Department determines that the operator is responsible for the impact to the water supply or presumes the well operator responsible for the impacted water supply, a temporary water supply of adequate quantity and quality for the purposes served by the impacted water supply should be established within 72 hours of the Department's notice. Temporary water replacement should only be provided for a period approved by the Department and does not relieve the operator of the obligation to restore or replace the water supply. The Department will not allow a temporary water supply to be used indefinitely and, when necessary, may issue an administrative order directing the operator to replace a temporary water supply with a permanent water supply. *See* 25 Pa. Code § 78a.51(f).

Temporary water must be adequate in quantity and quality for the purposes served by the impacted water supply. For sources used for human consumption,¹ the temporary water meets the requirement when it is from a potable water supply that conforms to and is transported in a manner that meets the requirements in the Pennsylvania Safe Drinking Water Act (35 P.S. §§ 721.1-721.17) and 25 Pa. Code Chapter 109 (relating to safe drinking water). Also, temporary water storage tanks and their associated plumbing accessories must be certified for conformance with NSF/ANSI Standard 61.

The temporary water supply for domestic use is adequate in quantity and quality if at least 75 gallons per person, per day, of potable water is plumbed into the existing water supply system, unless specific needs require higher amounts (e.g., pets, plants, and other domestic needs).

Temporary water supplies used in lieu of water supplies for agricultural, commercial, industrial or other legitimate beneficial uses is adequate in quantity and quality if it meets an acceptable standard in a necessary quantity, as determined by the Department, to allow the continuance of the uses that were dependent on the impacted water supply.

¹ For the purposes of this document, the term "human consumption" in relation to water supplies includes drinking, bathing, showering, cooking, dishwashing, and maintaining oral hygiene.

After the impacted water supply has been sampled and the extent of the pollution determined, an operator may propose to the Department the use of a treatment system(s) to meet requirements to provide temporary water to the affected parties. Prior to installation, the operator should submit all information for the proposed treatment system(s) as required by the Department. A temporary water treatment system sample/maintenance plan should also be submitted to the Department for review that shows the contaminants deemed to be of concern will be sampled appropriately and the treatment system will be maintained on a routine basis to ensure its effectiveness.

All new plumbing accessories associated with the temporary water treatment system must be certified for conformance with NSF/ANSI Standard 61. This includes pipes, valves, faucets, storage tanks, treatment units (including media and ion exchange resins), filters, gaskets, adhesives, lubricants, etc. A Department Professional Geologist will typically review the temporary treatment system sample/maintenance plan within 7 calendar days of its submission to the Department.

Temporary water must continue to be supplied, uninterrupted, by the operator to the users of the affected water supply until the Department determines, in writing, that the need for a temporary water supply no longer exists.

C. Short Term Water Supply Impacts.

The Department recognizes that some water quality impacts with water supplies are temporal and may remedy themselves within a short amount time or by remedial action(s) taken by an operator at a location other than the water supply. Examples of short-term water supply impacts include increased turbidity, induced gasses and changes in color. While providing temporary water to the affected person, an operator may submit a written request to the Department to allow additional time to evaluate a water supply to demonstrate that the impact may be temporary or may be corrected by remedial action(s) at a location other than the water supply in a short amount of time. Under these circumstances, an operator may submit a corrective action/monitoring schedule, along with a request to evaluate the water supply, outlining what measures will be taken by the operator to demonstrate that the quality of the water supply is being restored, as demonstrated by the predrill survey, and the issue(s) may be temporary. This period should not exceed six months without written Department approval. Within six months, the operator should provide the Department with evidence showing that the water supply has been restored to its pre-impact condition as demonstrated by the pre-drill survey or submit a plan for the permanent restoration or replacement of the water supply. The Department may issue an administrative order directing the operator to provide a permanent water supply restoration or replacement plan within specified timeframes.

D. Permanent Restoration or Replacement of a Private Water Supply Requirements.

If the Department determines that a private water supply must be restored or replaced due to pollution or diminution, within 30 calendar days following a final positive determination, the Department should issue, as appropriate, a letter Notice of Violation or a written Request for Corrective Action requesting, among other things, a permanent water supply restoration or replacement plan (PWS Plan) with specified timeframes for milestones. *See* “Standards and

Guidelines for Identifying, Tracking, and Resolving Oil and Gas Violations” (Document number 820-4000-001).

Permanent Water Supply Restoration or Replacement Plan (PWS Plan).

The operator’s PWS Plan should propose, at a minimum, water treatment options, water supply servicing/rehabilitation measures, a newly constructed well, a new water source, or connection to a public water system. Any combination of these options is also acceptable.

The PWS Plan should state what measures will be taken by the operator to permanently restore or replace the impacted water supply and be prepared and signed by a qualified professional (e.g., P.E., P.G.) with expertise on the subject matter in the proposal. The PWS Plan should include the manufacturer’s specifications, instructions, and literature for all equipment proposed to be installed as part of the PWS Plan. The PWS Plan should also include any drawings, calculations, photographs, maps, sample data and narrative as requested by the Department to be part of the plan. The PWS Plan should include a proposed water sampling plan and operation and maintenance plan, as needed, to demonstrate the effectiveness of the proposed remedy.

As provided in Section 78a.51(g), if the well operator and any affected persons are unable to reach agreement on the means for restoring or replacing the water supply, the Department or either party may request a conference under Section 3251 of the 2012 Oil and Gas Act (relating to conferences) to help facilitate the review and approval of the means for permanently restoring or replacing the water supply.

A restored or replaced water supply must meet the following:

1. The quality of a restored or replaced water supply must meet the standards established under the Pennsylvania Safe Drinking Water Act (35 P.S. §§ 721.1–721.17) or be comparable to the quality of the water supply before it was affected by the operator if the quality of the water supply was better than those standards. *See* 58 Pa.C.S. § 3216(a); 25 Pa. Code § 78a.51(d)(2).

The Department may determine that additional treatment of a public drinking water supply used to replace an impacted water supply is necessary to meet these conditions.

2. Meet the quantity requirements for the purposes served by the impacted water supply and deliver the amount of water necessary to satisfy the water user’s needs and the demands of reasonably foreseeable uses. *See* 25 Pa. Code § 78a.51(d)(3). With respect to agricultural water supplies, the term reasonably foreseeable uses includes the reasonable expansion of use where the water supply available prior to drilling exceeded the actual use. *See* 25 Pa. Code § 78a.51(d)(3)(iii). Quantity requirements may be met by using a combination of water source(s) yield and storage to deliver the amount of water necessary to satisfy the water user’s water demands when needed.
3. Be as reliable as the previous water supply. *See* 25 Pa. Code § 78a.51(d)(1)(i).
4. Be as permanent as the previous water supply. *See* 25 Pa. Code § 78a.51(d)(1)(ii).
5. Not require excessive maintenance. *See* 25 Pa. Code § 78a.51(d)(1)(iii).

6. Provide the water user with as much control and accessibility as exercised over the previous water supply, once ownership/responsibility of the restored or replaced water supply is conveyed to the owner. *See* 25 Pa. Code § 78a.51(d)(1)(iv). The connection to a public water supply as a replacement water supply is considered as providing the owner and the user adequate control and accessibility.
7. Include provisions for all necessary plumbing, conveyance, pumping or auxiliary equipment and facilities necessary for the water user to utilize the water supply. *See* 25 Pa. Code § 78a.51(d)(4).
8. Not result in increased costs to operate and maintain. If the operating and maintenance costs of the restored or replaced water supply are increased, the operator shall provide for permanent payment of the increased operating and maintenance costs. *See* 25 Pa. Code § 78a.51(d)(1)(v).
9. When an impacted water supply is permanently replaced with a public water supply regulated by the Department's Safe Drinking Water Program, the provisions for the permanent payment of the increased operating and maintenance costs are made to the parties, and the Department determined that additional treatment is necessary but the property owner does not wish to be provided with any additional treatment measures to water from the public water supply, the Department will consider the remedy as having met the requirement for the responsible operator to permanently restore or replace the affected supply.
10. All new plumbing accessories associated with the permanent restoration or replacement of a private water supply must be certified for conformance with NSF/ANSI Standard 61. This includes pipes, valves, faucets, storage tanks, treatment units (including media and ion exchange resins), filters, gaskets, adhesives, lubricants, etc.

E. Considerations for permanent water supply restoration or replacement plans.

The Department will consider a number of factors when evaluating a PWS plan. These include, but are not limited to:

1. Effectiveness – The ability of the remedial response to mitigate the impacts from the site-specific contaminants. PWS Plans must provide responses that meet Pennsylvania Safe Drinking Water Act standards or better, as outlined in Section F. *See* 25 Pa. Code § 78a.51(d)(2). PWS Plans for water supplies used for purposes other than human consumption must be adequate for the purposes served by the supply. *See* 25 Pa. Code § 78a.51(e).
2. Timeframe of the Response – The ability of remedial response to provide a timely permanent water supply remediation to affected parties.
3. Reliability – The ability of remedial response to consistently meet all required health-based and performance-based standards in addition to quantity demands. If a restored or replaced water supply remediation response fails to reliably meet the water quality and/or

quantity requirements, the Department will require the responsible party to employ a more reliable solution.

4. Implementation – The feasibility of restoring versus replacing the water supply.
5. Cost – DEP will consider the long-term operation and maintenance costs in addition to the initial capital cost of replacing or restoring a water supply.

F. Permanent Water Replacement/Restoration Planning.

1. Preliminary Consultation:

The operator, any affected persons, consultants and the Department should discuss what remedial action will be taken to restore or replace the impacted water supply. This will provide all parties involved with a better understanding of the Department’s expectations for restoring/replacing the impacted water supply. PWS Plans and corresponding sample plans should be shared by the operator with any affected persons and their consultant(s).

2. Restoration of a Water Supply with Treatment System(s), Servicing, Rehabilitation:

If an operator is proposing to restore an impacted water supply with treatment system(s) and/or servicing/rehabilitation measures, the information for the proposed treatment system(s) and/or servicing/rehabilitation measures must be provided to the Department in the PWS Plan at least 15 days prior to commencement of work.

Restoration of a private water supply with treatment system(s) should meet the following:

- a. Restore the water quality of the contaminant(s)² impacted by unconventional oil and gas operations as prescribed below, with such restoration confirmed by comparison to post-restoration analytical sampling results and surveys taken by qualified representatives of the Department, the operator, and/or the water supply user/owner.
 - (i) If prior to the impact of unconventional oil and gas operations as demonstrated by a pre-drill survey, a water quality contaminant level was better than primary or secondary Maximum Contaminant Levels (MCL) standards established under the Pennsylvania Safe Drinking Water Act, the restored contaminant level must be comparable to the pre-impact quality of the water.
 - (ii) If prior to the impact of unconventional oil and gas operations as demonstrated by a pre-drill survey, an impacted water quality contaminant level was worse than the primary or secondary MCL standards established under the Pennsylvania Safe Drinking Water Act, the restored contaminant level must meet the respective MCL established under the Pennsylvania Safe Drinking Water Act.

² For the purposes of this document, the term “contaminant” is defined in accordance with the Pennsylvania Safe Drinking Water Act, 35 P.S. § 721.3 as “[a]ny physical, chemical, biological or radiological substance or matter in water.”

- (iii) If a water quality contaminant with no primary or secondary drinking water standard established under the Pennsylvania Safe Drinking Water Act is determined to be impacted by unconventional oil and gas operations as demonstrated by a pre-drill survey, the contaminant level in the restored water supply must be comparable to the pre-impact water quality.
 - (iv) If the pre-drilling or pre-alteration concentration of a Pennsylvania Safe Drinking Water Act water quality contaminant impacted by unconventional oil and gas operations is unknown, the restored contaminant level must meet the respective primary or secondary MCL standard established under the Pennsylvania Safe Drinking Water Act.
 - (v) If a water quality contaminant is impacted by unconventional oil and gas operations and that contaminant has no primary or secondary drinking water standard established under the Pennsylvania Safe Drinking Water Act and the pre-impact concentration is unknown, the restored water supply must meet an applicable health-based criteria used by the Safe Drinking Water Program and/or the Statewide Health Standards for Groundwater used by the Department's Environmental Cleanup and Brownfields Program. These programs will be consulted to determine an acceptable level for restoration requirements.
 - (vi) The Department may determine what an acceptable limit should be for a contaminant in the restored water supply if 1) there is no applicable primary or secondary MCL established under the Pennsylvania Safe Drinking Water Act, 2) there is not an applicable health-based criteria used by the Safe Drinking Water Program, and 3) there is not an applicable Statewide Health Standard for Groundwater used by the Department's Environmental Cleanup and Brownfields Program. In making the determination, the Department may take into consideration the limitations of the Best Available Technology (BAT) that is economically reasonable for abatement of the contaminant. Under these circumstances, what constitutes an acceptable contaminant limit, when making determinations, may be subject to change based upon future development and cost of the BAT for abatement of a specific contaminant and other site-specific considerations. Such limits may be set as a maximum allowable limit or as a targeted range.
- b. The sample plan needs to demonstrate that the restoration actions for the water quality contaminant(s) determined to be impacted by unconventional oil and gas operations meet the applicable standards outlined in paragraphs F.2.a.(i-vi), above.

All restoration analytical samples and documentation must be performed in accordance with the affiliated Pennsylvania-accredited laboratory's approved sample collection, preservation and handling procedures and chain of custody.

For restored water supplies utilizing only one treatment system or if multiple treatment systems are employed serially, post-treatment water samples should be collected to ensure the effectiveness of the treatment system(s).

If the Department identifies any contaminant(s) of concern based on its investigation and/or information the operator submits to the Department that are affecting the water supply or resulting from the restoration measures, the operator must sample and analyze for those contaminants of concern.

The Department may request that the operator collect samples to analyze for suite(s) of contaminants to identify the presence of contaminant(s) of concern. The Department may then require that the operator sample for the detected contaminant(s) or tentatively identified contaminant(s) to specify the necessary restoration criteria, as set forth in paragraphs F.2.a.(i-vi), above.

Additional rounds of sampling to confirm the adequacy of the restoration may be required to continue following the initial phase of sampling results that meet the requirements of the law and/or an order of the Department.

3. Permanent Replacement of a Water Supply with a New Water Source:

If an operator is proposing to replace a water supply with a new water source, information relating to the proposed alternative source of water must be submitted to the Department in the PWS Plan 15 calendar days prior to connecting the new water supply to the affected property. Unregulated surface water sources or groundwater sources under the direct influence of surface water should not be used to replace the existing private water supply intended for human consumption unless a treatment system is installed to provide continuous filtration and disinfection to ensure adequate treatment to reliably protect users from the adverse health effects of microbiological contaminants, including pathogenic bacteria, viruses and protozoan cysts.

Replacement of a private water supply with a new water source should meet the following:

- a. Ensure the replaced water supply meets all primary and secondary MCL standards established under the Pennsylvania Safe Drinking Water Act. *See* Appendix B.
 - (i) If prior to impact by unconventional oil and gas operations as demonstrated by a pre-drill survey, a water quality contaminant was better than the primary or secondary MCL standards established under the Pennsylvania Safe Drinking Water Act, the water quality contaminant in the replacement water supply should be comparable to the pre-impact quality of the water.
 - (ii) If a water quality contaminant with no primary or secondary drinking water MCL standard established under the Pennsylvania Safe Drinking Water Act is determined to be impacted by unconventional oil and gas operations, the concentration of the contaminant in the replacement water supply must be comparable to the pre-impact water quality.

- b. Prevent any cross connection to the original water supply.
- c. When a polluted water well is abandoned, the operator should properly fill or seal the water well in accordance with the water well abandonment procedures found in “Groundwater Monitoring Guidance Manual” (Document number 383-3000-001). Any well abandonment must also comply with the Water Well Drillers License Act (32 P.S. §§ 645.1-645.13) and its implementing regulations at 17 Pa. Code Chapter 47.
- d. The sample plan needs to demonstrate that the new water source meets the applicable standards outlined in paragraphs F.3.a.(i-ii), above, for contaminant(s) of concern as required by the Department.

If a treatment system(s) is also required for the new water source, post-treatment samples should be collected in lieu of raw water samples.

Additional rounds of sampling to confirm the adequacy of the new water source may be required to continue following the initial round of sampling results that meet the requirements of the law and/or an order of the Department.

All replacement analytical samples and documentation must be performed in accordance with the affiliated Pennsylvania-accredited laboratory’s approved sample collection, preservation and handling procedures and chain of custody.

- e. Additional measures should be taken when proposing to drill a water well(s) as the remedy for water replacement, when the total withdrawal or withdrawal use from one or more points of withdrawal within a watershed operated as a system either concurrently or sequentially exceeds an average rate of 10,000 gallons a day in a 30-day period to ensure compliance with the applicable law. These measures are in subparagraphs (i-v) as follows:

- (i) Well Siting:

- A professional geologist licensed in this Commonwealth should be responsible for determining the siting of the proposed private water supply well at an appropriate location and should make reasonable efforts to obtain the highest quality groundwater sources available. It is important that the hydrogeologic setting be considered during the well siting phase of a project.

- The location of the water well should be adequate to protect the groundwater source from foreseeable sources of contamination, and reasonable measures should be taken to prevent diminution of source water quality. The well should be located so that it is protected against flooding and surface water influence. If the landowner disagrees with the location of the water well, the operator and/or landowner should request a conference under Section 3251 of the 2012 Oil and Gas Act (relating to conferences), see 58 Pa.C.S. § 3251.

If groundwater withdrawal has potential to impact a special protection water (High Quality or Exceptional Value) based on designated use classification per 25 Pa. Code Chapter 93, the operator should work with the Department in creating a plan that satisfies the guidelines outlined in the Department's guidance, *Water Quality Antidegradation Implementation Guidance*, (Document number: 391-0300-002).

(ii) Site Survey:

After the well is sited, locational data (latitude and longitude) should be provided to the Department prior to drilling the water well. The Department may choose to independently conduct its own site survey and evaluate the well location to survey and document the physical surroundings of the well and its proximity to any potential sources of contamination prior to approving the PWS Plan.

(iii) Well Drilling Plan:

After the site survey is conducted, the professional geologist should prepare and submit a well drilling plan to the appropriate Oil and Gas District Office. *See Appendix A.* The plan should establish a preliminary hydrogeologic understanding of the project site, a monitoring plan for aquifer testing (quality and quantity), and the proposed well construction design of the water well(s). Well drilling should not commence until the well drilling plan is reviewed by a Department Professional Geologist. The Department Professional Geologist will typically review the plan within 30 calendar days of its submission to the Department. For existing wells being proposed as a source of replacement water supply, a plan should still be submitted to the Department establishing a preliminary hydrogeologic understanding of the project site, a monitoring plan for aquifer testing (quality and quantity) and any available information on the existing water well(s), such as well driller logs and field tests.

Water well(s) should be drilled by a registered well driller licensed by the Commonwealth of Pennsylvania. The Department should be provided with dates and times of all water well drilling and testing activities.

Erosion and sediment control measures must be followed for all earth moving activities. *See 25 Pa. Code Chapter 102, Erosion and Sediment Pollution Control Manual*, (Document number 363-2134-008).

(iv) Drilling Plan Modifications:

After well drilling, the professional geologist should provide the Department with any modifications to the drilling plan as an addendum to the drilling plan.

(v) Aquifer Testing:

When proposing drilled water well(s) with potential to exceed demands of an average rate of 10,000 gallons a day in a 30-day period, the Department may require a constant rate pump test to be conducted on the well(s) being proposed as a new source in order to adequately define the hydraulic characteristics of the aquifer and well(s). The duration of the pump test will be based upon the required yield of the new source to meet the quantity requirements for the purposes previously served by the replaced water supply. The proposed duration of the pump test should be shared with the Department prior to commencement of the pump test. The yield must also deliver an amount of water necessary to satisfy the water user's needs and the demands of any reasonably foreseeable uses. Data from the test are subject to appropriate analysis to demonstrate the suitability of the well as a long-term water supply source including, when necessary, the evaluation of significant potential impacts from the groundwater withdrawal on other water resources. The results derived from properly conducted and analyzed aquifer tests will also provide oil and gas operators with the data necessary to support their claim that the water supply has been properly replaced to meet the requirements outlined in the 2012 Oil and Gas Act (58 Pa.C.S. §§ 3201, *et seq.*) and 25 Pa. Code §§ 78a.51-78a.52. All data and analysis derived from the aquifer test should be submitted to the Department for review.

For helpful information related to water well construction, refer to the Hydrogeologic Report requirements in the "Public Water Supply Manual" (Document number 383-2125-108); the "Aquifer Testing Guidance for Public Water Systems" (Document Number 394-2125-001; and the well abandonment procedures of the "Groundwater Monitoring Guidance Manual" (Document number 383-3000-001).

f. ***Additional measures to be taken when proposing to connect to a public water supply regulated by the Department's Safe Drinking Water Program as remedy:***

(i) Approval from public water purveyor/water authority:

An operator should consult with the public water supply/water authority on the feasibility of connecting new customers to their water supply. Many factors should be considered by the public water supply including:

- Available capacity to add additional consumers to public water supply,
- Federal, State, and Local approvals and permit requirements,
- Pennsylvania Public Utility Commission requirements (if applicable),
- Logistics and property easements.

(ii) Capital costs and long-term cost:

In addition to the cost of connecting an affected property to a public water supply, the operator shall provide for permanent payment of the increased cost for the service provided by the public water supply, compared to the historic operation and maintenance costs of the replaced water supply. *See* 25 Pa. Code § 78a.51(d)(1)(v).

(iii) Notification to the Department:

Both the Department's Oil & Gas Management Program and Safe Drinking Water Program should be notified of the intent to connect users to a public water supply.

(iv) Include a sample plan with sampling requirements based on the public water system's classification as follows:

- Community Water Supply – Total Coliform, E. Coli and Heterotrophic Plate Count samples should be collected at a sample point after the connection to the public water system.
- Non-Transient Water Supply – Total Coliform, E. Coli and Heterotrophic Plate Count samples should be collected at a sample point after the connection to the public water system.
- Transient Water Supply – All contaminants required under the Pennsylvania Safe Drinking Water Act should be sampled at a sample point after the connection to the public water system. *See* Appendix B.

If a treatment system is installed onto the distribution system being served by the public water supply, post-treatment samples should be collected. Any water quality contaminant(s) deemed a concern by the Department for which the treatment system is targeting should also be sampled for in addition to those required in this section for public water supplies.

G. Water Supplies for uses other than human consumption.

Restored or replaced water supplies to be used for agricultural, commercial, industrial, or other legitimate beneficial uses should meet an acceptable standard, determined by the Department, to allow the continuance of the uses that were dependent on the impacted water supply. The operator shall demonstrate to the Department's satisfaction that the restored or replaced water supply is adequate for the purposes served by the supply. *See* 25 Pa. Code § 78a.51(e).

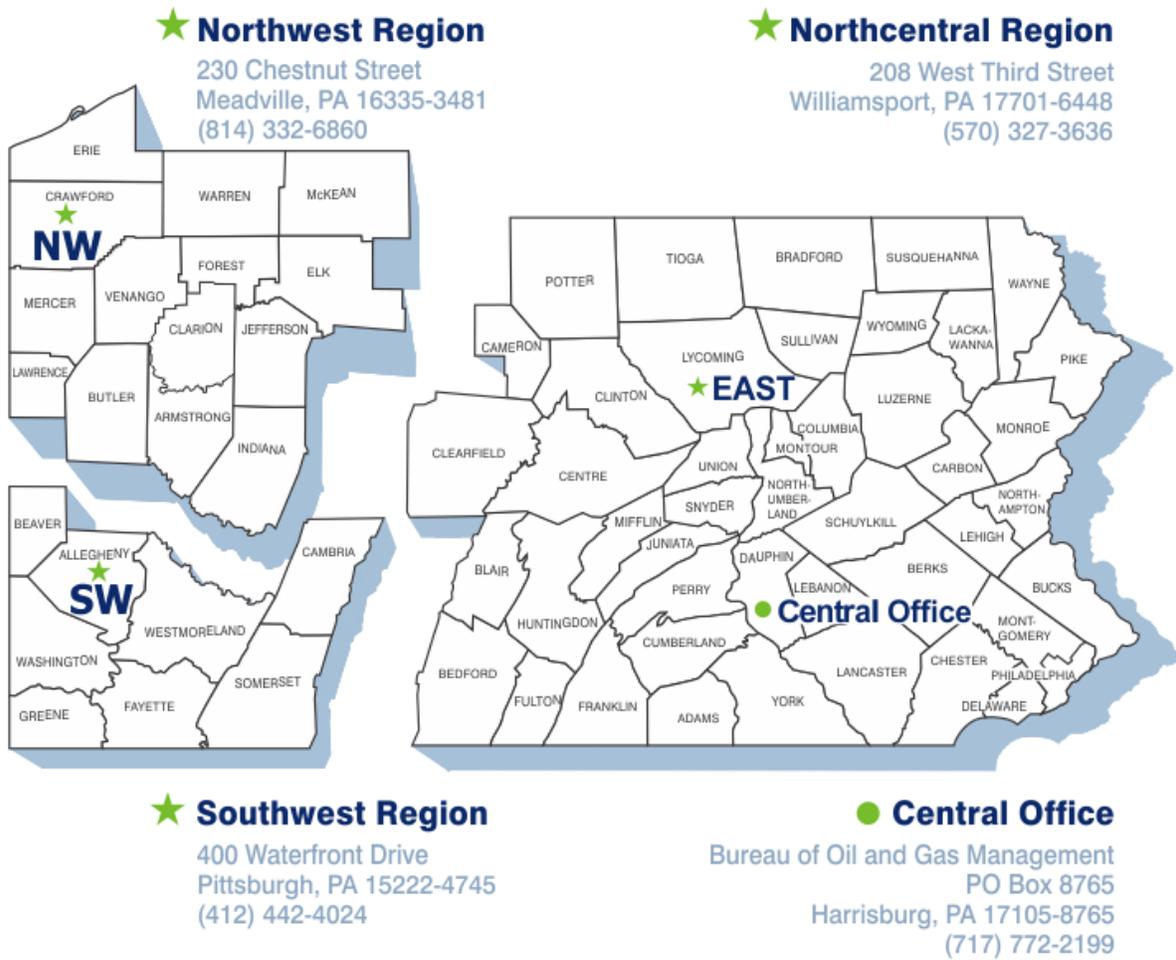
H. Laboratory Analysis.

All analyses of samples should be performed by a laboratory that is certified by the Department under 25 Pa. Code Chapter 252 (relating to environmental laboratory accreditation). The samples should be submitted to the laboratory in laboratory-issued bottle ware, with appropriate chain-of-custody documentation and within the required holding times.

A person independent of the well owner or well operator, who is not an employee of the accredited laboratory, may collect the sample and document the condition of the water supply, if the accredited laboratory affirms that the sampling and documentation is performed in accordance with the laboratory's approved sample collection, preservation and handling procedure and chain of custody.

Appendix A

Oil and Gas Districts



Appendix B

The following tables list the sampling requirements for new water sources required to be sampled and analyzed for all primary and secondary MCL standards established under the Pennsylvania Safe Drinking Water Act. The Department may require monitoring of any other contaminant(s) as determined necessary to adequately evaluate the quality of the replaced/restored water supply.

VOLATILE ORGANIC CHEMICALS (VOCs):		
BENZENE CARBON TETRACHLORIDE o-DICHLOROBENZENE para-DICHLOROBENZENE 1,2-DICHLOROETHANE 1,1-DICHLOROETHYLENE cis-1,2-DICHLOROETHYLENE	trans-1,2-DICHLOROETHYLENE DICHLOROMETHANE 1,2-DICHLOROPROPANE ETHYLBENZENE MONOCHLOROBENZENE STYRENE TETRACHLOROETHYLENE	TOLUENE 1,2,4-TRICHLOROBENZENE 1,1,1-TRICHLOROETHANE 1,1,2-TRICHLOROETHANE TRICHLOROETHYLENE VINYL CHLORIDE (See NOTE) XYLENES (Total)
NOTE: Monitoring for vinyl chloride is only required when one or more of the following two-carbon compounds are detected: trichloroethylene, tetrachloroethylene, trans-1,2-dichloroethylene, cis-1,2-dichloroethylene, 1,2-dichloroethane, 1,1-dichloroethylene, 1,1,1-trichloroethane.		

SYNTHETIC ORGANIC CHEMICALS (SOCs):		
ALACHLOR ATRAZINE BENZO(A)PYRENE CARBOFURAN CHLORDANE DALAPON DI(2-ETHYLHEXYL) ADIPATE DI(2-ETHYLHEXYL) PHTHALATE DIBROMOCHLOROPROPANE (DBCP) DINOSEB	DIQUAT ENDOTHALL ETHYLENE DIBROMIDE (EDB) ENDRIN GLYPHOSATE HEPTACHLOR HEPTACHLOR EPOXIDE HEXACHLOROBENZENE HEXACHLOROCYCLOPENTADIENE LINDANE	METHOXYCHLOR OXAMYL (VYDATE) PCBs (See NOTE) PENTACHLOROPHENOL PICLORAM SIMAZINE TOXAPHENE 2, 3, 7, 8-TCDD (DIOXIN) (See NOTE) 2, 4-D 2, 4, 5-TP (SILVEX)
NOTE: Monitoring for PCBs and/or Dioxin is required when there is a contamination source within 1,000 feet of the new groundwater source.		

INORGANIC CHEMICALS (IOCs):		
ANTIMONY ARSENIC ASBESTOS (See NOTE) BARIUM BERYLLIUM CADMIUM	CHROMIUM COPPER CYANIDE (as free cyanide) FLUORIDE LEAD MERCURY	NICKEL NITRATE (as Nitrogen) NITRITE (as Nitrogen) SELENIUM THALLIUM
NOTE: Monitoring for asbestos is required when DEP has reason to believe the source is vulnerable to contamination.		

RADIONUCLIDES:	
GROSS ALPHA (See NOTE)	BATA PARTICLE & PHOTON ACTIVITY (See NOTE)
COMBINED RADIUM - 226 & 228	URANIUM
NOTE: Gross Alpha MCL excludes Radon and Uranium particle activity. Bata Particle and Photon Activity MCL is for manmade radionuclides.	

MICROBIOLOGICAL CONTAMINANTS:	
TOTAL COLIFORMS CONCENTRATION	One sample for Total Coliform taken post treatment. MCL – Zero.

SECONDARY CONTAMINANTS AND OTHERS:		
ALUMINUM CHLORIDE COLOR CORROSITIVITY FOAMING AGENTS	IRON MANGANESE ODOR pH (See NOTE) SILVER	SULFATE TOTAL DISSOLVED SOLIDS ZINC
NOTE: pH measurements may be obtained in the field with a calibrated water quality meter within 15 minutes of sample collection.		

METHANE, ETHANE, PROPANE:
The Department may require sampling for Methane, Ethane and/or Propane if it is determined that the operator is responsible for introducing any of these contaminants into the local aquifer or there is concern the contaminants may be a present in the new water supply source.

(If applicable) DISINFECTION BYPRODUCTS:	
TOTAL TRIHALOMETHANES (TTHMs) HALOACETIC ACIDS (HAA5) BROMATE CHLORITE	One sample for Disinfection Byproducts taken post treatment if chlorine or other disinfectants are used as part of the newly installed treatment process to control microbial contaminants in the new water supply source

(If applicable) MICROSCOPIC PARTICULATE ANALYSIS (MPA)	MPA sampling should be conducted by a qualified person for all new groundwater sources to be used for human consumption which fall within the criteria of the <i>Guidance for Surface Water Identification Protocol</i> (Document number 383-3500-106), available on DEP’s website at www.dep.pa.gov .
---	--

OTHER CONTAMINANTS:
The Department may require monitoring of any other contaminant(s) as determined necessary to adequately evaluate the Quality of the source. Testing for additional contaminates will be determined based upon known current and historical impacts to the aquifer, known potential sources for contamination and geology.