

**DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF MINING AND RECLAMATION**

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TITLE: Water Supply Replacement and Compliance

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AUTHORITY: Surface Mining Conservation and Reclamation Act (SMCRA), Non-Coal Surface Mining Conservation and Reclamation Act (NC SMCRA), and the Bituminous Mine Subsidence and Land Conservation Act (BMSLCA).

POLICY:

The Department will, to the greatest extent possible, ensure the rapid and adequate replacement of all existing or currently designated water supply sources receiving protection under the law and regulations that suffer adverse hydrologic impacts from surface mining or underground bituminous coal mining.

PURPOSE:

This guidance provides direction to the District Mining staff by establishing procedures to be followed for water supplies that are adversely affected by surface mining or by underground bituminous coal mining activities.

APPLICABILITY:

This policy applies to anthracite and bituminous surface coal mine and coal preparation plant operators, government-financed reclamation projects, and underground bituminous coal mine operators conducting mining operations in Pennsylvania. This policy also applies to surface mining activities related to underground anthracite coal mine operations but not to underground mining activities. This policy also contains procedures for handling water supply problems associated with industrial mineral extraction sites.

DISCLAIMER:

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

The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of the Department to give these rules that weight or deference. This document establishes the framework, within which the Department will exercise its administrative discretion in the future. The Department reserves the discretion to deviate from this policy statement if circumstances warrant.

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TECHNICAL GUIDANCE:

BACKGROUND:

For years, Section 4.2(f)(1) of SMCRA and Sections 87.119(a) and 88.107(a) have required a surface coal mine operator who affects a water supply to replace the affected supply with an alternate source adequate in water quantity and quality for the purpose served by the supply. This was accomplished in one of two ways. In the first case, the complainant contacted the mine operator directly. If the operator determined that his mining was responsible for the impacts to the water supply, the supply was normally replaced to the satisfaction of the complainant with no intervention by the Department. In the second case, the complainant either contacted the Department initially or contacted the Department if he was unable to reach a suitable arrangement with the operator. The Department's routine response to this contact was to initiate a hydrologic investigation to determine if the mining operation adversely affected the water supply. If the investigation concluded that the mining operation adversely impacted the water supply, then the operator was directed to replace or restore the water supply. If a hydrologic connection between the mining operation and the supply could not be established, then the complainant was notified that the mining could not have impacted the supply or that there was insufficient evidence to establish a hydrologic connection. Depending upon the length of time required to complete the hydrologic investigation, the complainant might wait several weeks before receiving relief.

Acts 173 and 43 added Section 4.2(f)(2)—(7) to SMCRA that creates a presumption of liability on the part of a surface coal mine operator or mine owner for pollution or diminution of private or public water supplies located within a "rebuttable presumption area". For surface mining permits issued after February 16, 1993, water supplies within the rebuttable presumption area include those that are within 1,000 linear feet [304.80 meters] of the boundaries of the areas bonded and affected by coal mining operations, areas of overburden removal and storage, and support areas, except for haul and access roads. If surface mining activities are conducted on areas that are not permitted or bonded, the presumption of liability would apply to those public or private water supplies within 1,000 linear feet [304.80 meters] of the land affected by the surface mining activities.

For both bituminous and anthracite coal surface mining operations the presumption of liability is as follows:

- (1) It shall be presumed, as a matter of law, that a surface mine operator or mine owner is responsible without proof of fault, negligence or causation for all pollution, except bacteriological contamination, and diminution of public or private water supplies within 1,000 linear feet [304.80 meters] of the boundaries of the areas bonded and affected by coal mining operations, areas of overburden removal and storage and support areas except for haul and access roads.
- (2) If surface mining activities are conducted on areas which are not permitted or bonded, it shall be presumed, as a matter of law, that the surface mine operator or mine owner is responsible without proof of fault, negligence or causation for all pollution, except

bacteriological contamination, and diminution of public or private water supplies within 1,000 linear feet [304.80 meters] of the land affected by the surface mining activities.

An intent of these statutes is to provide quick relief to the water supply user. However, it is recognized that water supplies meeting the rebuttable presumption criteria may be adversely affected by some cause other than the mining activity. Thus, the amendments specify ways that an operator may rebut the presumption of liability.

The statutes also give the Department authority to require restoration or replacement of water supplies that are adversely affected by government-financed reclamation projects. 25 Pa. Code Sections 87.119(a) and 88.107(a) state that the operator of any mine or a person engaged in government-financed reclamation who affects a water supply by contamination, pollution, diminution or interruption shall restore or replace the affected water supply with an alternate source, adequate in water quantity and water quality, for the purpose served by the water supply. However, the rebuttable presumption provisions do not apply to government-financed reclamation projects.

SMCRA is silent on the use of waivers but 25 Pa. Code Sections 87.119 and 88.107 address the use of waivers. The forms that must be completed if a waiver applies are included with this guidance document in Appendix D. In addition, the amendments provide for the Department to provide a replacement supply if the operator fails to do so.

Act 54, which amended the Bituminous Mine Subsidence and Land Conservation Act, was signed into law on June 22, 1994 and became effective on August 21, 1994. The law now requires underground bituminous coal mine and coal preparation plant operators to replace or restore water supplies that are contaminated, diminished or interrupted by their operations. Similar to the surface coal mining statutes, Act 54 incorporates rebuttable presumption area criteria and requirements for water supplies. After the effective date of the act, the bituminous underground coal mine operator is presumed to have caused the contamination, diminution, or interruption if the water supply is within an area defined by projecting a 35-degree angle from the vertical from the outside of any area where the operator has extracted coal from an underground mine to the surface (the rebuttable presumption area). The operator also has the opportunity to rebut the presumption. Act 54 specifies ways that an operator may rebut the presumption. Prior to the passage of Act 54, there was no obligation on the part of underground bituminous coal mine operators to replace supplies that their operations had impacted. In addition, bacteriological contamination of water supplies is not excluded for underground bituminous coal mines as it is for surface mines.

The significance of these laws is that they place the burden of proof upon the operators for those cases where the water supply falls within the rebuttable presumption area. Previously, the Department was required to prove that mining affected the water supply for surface coal mines. Prior to Act 54 there was no duty under state law for operators to replace water supplies affected by underground bituminous coal mining. Now, if the affected supply is within the rebuttable presumption area, the operator must prove that his operation did not affect the supply. The burden of proof remains with the Department when an affected water supply falls outside the rebuttable presumption area. The Department also has the burden of proof in those cases where

the Department has reason to believe that the mining operation caused the water supply problem but the operator successfully provided a rebuttable presumption defense. (An example is where the mining operation appears to have affected the quality of a water supply but the supply owner refused access to the supply prior to permit issuance.) However, the Surface Mining Conservation and Reclamation Act also included a provision for a surface mine operator to recover costs from the Department if he successfully challenges a Department order. (The legislation does not contain a provision for the bituminous underground coal mine operator to recover costs). Thus, it is important that the District mining staff proceed quickly but cautiously in cases where the operator provides a rebuttal to the presumption of liability.

There are subtle differences in the regulations between the surface and underground operations with respect to rebuttable presumption. As a result, the procedures to be followed in addressing water supply complaints for surface and underground mines are different. This technical guidance therefore contains separate procedures for surface mines and for underground bituminous coal mines. This guidance also contains procedures for handling water supply complaints where the water supply does not meet the rebuttable presumption criteria and for water supplies associated with industrial mineral extraction operations.

In addition, forms and procedures governing waivers and cost calculations will be the same as those used for the permitting process. Those sections of the water supply replacement and permitting technical guidance are incorporated in this document in the Appendices. The procedures for evaluating adequacy of the replacement supply differ from those for the permitting process.

PROCEDURES

A. Addressing Water Supply Pollution or Diminution – Surface Coal Mines

All water supply problems related to surface coal mines should be referred to the appropriate District Mining Office. The District Mining Office will follow the procedures outlined in this section. Water supply problems regarding government-financed reclamation projects should be referred to the BAMR or DMO field office that issued the contract.

Generally, water supply related problems come to the attention of the Department in one of three ways: notification by the water supply user, notification by the operator, or discovery of the problem by the Department when reviewing monitoring data.

1. The complaint coordinator in the District Mining Office should collect initial information on a water supply complaint. The coordinator should ascertain the following information:
 - a. Name, address, and phone number of the complainant.
 - b. Township and county where the water supply is located.

- c. Name of the operator and the SMP number.
 - d. Nature of the problem, e.g. water supply loss or diminution and whether the supply is a well or a spring.
 - e. Date when the problem was first noticed.
 - f. Whether the complainant is the water supply owner or user. If the complainant is the user, the name, address, and phone number of the owner should be obtained. The District Mining Office should notify the owner of the supply of status and resolution of the complaint as well as the user.
 - g. The substance of any communications between the water supply owner or user and the mine operator. The complainant should be encouraged to notify the mine operator as they may resolve the complaint without further action from the Department.
 - h. Ask the complainant if they wish the complaint to remain confidential. However, explain that if the supply meets the rebuttable presumption criteria, the complaint cannot remain confidential. The operator must be given the opportunity to rebut the presumption.
2. The complaint coordinator will enter the complaint into the District Mining Office Complaint Tracking system.
 3. The complaint coordinator will notify the appropriate Mine Conservation Inspector (MCI), the Mine Conservation Inspector Supervisor (MCIS), and the lead Hydrogeologist of the complaint.
 4. The MCI shall determine if the two criteria for rebuttable presumption are met:
 - a. if the water supply lies within 1000 feet [304.8 meters] of the active mining operation (the rebuttable presumption area), and
 - b. if the SMP was issued after February 16, 1993 (the effective date of the act).
 5. The MCI shall contact the complainant to determine additional information about the water supply. This information should include but is not limited to the following:
 - a. any information the complainant has to validate the claim of diminution or degradation or to determine if additional water sampling is needed. The operator is not presumed liable if bacteriological contamination has occurred to a water supply within the rebuttable presumption area. However, a hydrological investigation by the Department may indicate the

operator is responsible for the bacteriological contamination 52 P.S. Section 1396.4b(f)(2).

- b. All uses of the water supply and whether there is another water supply on the property and its status.
- c. Explain to the water supply owner or user that the Department will initiate an investigation and attempt to validate the claim. If the complaint is valid and the water supply lies within the presumptive liability area, the operator will be contacted and asked to provide a temporary water supply if needed or present the Department with information that would rebut the presumption of liability. However, it is incumbent upon the owner of the supply to allow the operator reasonable access to investigate the supply. If the complaint does not meet the criteria for presumptive liability, then the claim will be referred to a hydrogeologist for investigation.
- d. The MCI and the lead hydrogeologist should review the monitoring data in an effort to validate the claim. If the monitoring data clearly indicates that the complaint is not valid, the MCIS should notify the complainant of this finding by phone followed by a letter confirming that the case is closed. The letter should include a paragraph that instructs the complainant to contact the Director, Bureau of Mining and Reclamation for an informal review if they are dissatisfied with the finding of the District Mining Office.
- e. If the complaint is not clearly invalid and the criteria for rebuttable presumption are not met, the MCI should refer the complaint to the lead hydrogeologist so a hydrological investigation can be initiated.
- f. If the complaint is not clearly invalid and the criteria for rebuttable presumption are met, the MCIS should notify the operator of the complaint by phone and in writing (a sample letter is in Appendix A) to provide one of the following within 24 hours of receipt of the letter:
 - (1) A temporary water supply to the complainant if needed, adequate in quality and quantity for the needs of the user. The quantity of the temporary supply will be dependent upon the condition of the existing supply. If the present supply is adequate in quality and quantity for most domestic uses (washing clothes, showering) but is not potable, then the temporary supply should be equal to one gallon per person per day or five gallons per family per day, whichever is greater, of potable water. If the present supply is lost or not adequate in quantity and quality for most domestic uses, then the temporary supply should be 75 gallons per person per day of potable water, plumbed into the existing water supply system, unless specific needs require higher amounts. In addition, the

operator is to submit a plan for the permanent replacement of the water supply within 15 days, or...

- (2) Any and all information known to the operator that supports any of the statutory defenses to the presumption of liability. There are five defenses, 52 P.S. Section 1396.4b(2), which are listed below. Any one of these is sufficient to rebut the presumption.
 - (a) The landowner or water supply company (not just the water user) refused to allow the surface mine operator or mine owner access to conduct a water supply survey prior to commencing mining. If using this defense, the operator or owner shall submit evidence to the Department demonstrating that the landowner or water supply company was notified by certified mail or personal service that the refusal of access to conduct a water supply survey could be used to rebut a presumption of liability.
 - (b) The water supply is not within the rebuttable presumption area.
 - (c) The pollution or diminution existed prior to the surface mining activities as evidenced by a water supply survey conducted prior to commencing surface mining activities and documented in the approved surface mine permit application submitted to the Department prior to permit issuance.
 - (d) The pollution or diminution occurred as a result of some cause other than the surface mining operations. If this defense is used, then any report documenting the cause must bear the seal of a Registered Professional Geologist. If the mine operator intends to pursue this defense and a temporary supply is not necessary, the operator can request in writing a reasonable amount of time to complete an investigation.
 - (e) The landowner, water supply user or water supply company refused to allow the surface mine operator or mine owner access to determine the cause of pollution or diminution or to replace or restore the water supply.
- (3) A properly executed water supply waiver in writing on forms provided by the Department (Appendix D). Everyone possessing an ownership interest in the affected water supply must sign the

waiver. For example, if the landowner has leased the property as a residence, both the landowner and the tenant must sign the waiver.

6. If the operator indicates an unwillingness to replace the supply, then a hydrological investigation should be initiated. The reason for this is twofold. First, if the operator submits a rebuttal to the presumption of liability, e.g. the owner denied access for background sampling, the operator may still be shown to be liable but the burden of proof shifts to the Department. Second, if the company submits a report showing the pollution or diminution occurred as a result of some cause other than surface mining operations, the Department's investigation will serve as a basis for evaluating the report.
7. If the operator fails to provide temporary water (if directed) or the requested information to the Department within 24 hours of receipt of written notification, the MCI should issue a compliance order to the mine operator directing the operator to provide temporary water (if needed) within 24 hours and a plan for permanent replacement with a timetable for plan implementation. The operator will remain in violation until one of the following occurs:
 - a. He complies with the order.
 - b. The water supply problem abates on its own.
 - c. The operator submits an acceptable defense to rebuttable presumption as stated in 5.f.2.(a) through (e).
 - d. The operator permanently corrects the problem or replaces the water supply with an adequate supply as defined earlier (adequacy of replacement supply is addressed in Appendix B).
 - e. The operator produces an agreement between the operator and the water supply owner that shows the operator is in compliance with that agreement (waivers for water supply replacement are included in Appendix D).
8. If the operator successfully rebuts the presumption of liability, the District Mining Office shall notify the water supply owner of this finding in writing. The letter should include a paragraph that instructs the complainant to contact the Director, Bureau of Mining and Reclamation for an informal review if there is dissatisfaction with the findings of the District Mining Office.

Regardless of whether or not the rebuttable presumption applies, the District Mining Office will continue to investigate those cases where it is possible that mining is the cause of contamination, diminution, or interruption. The Department has the burden of proof in cases where the rebuttable presumption does not apply. The information provided by the operator shall be evaluated along with the information obtained in the District Office investigation. If the operator fails to

successfully rebut the presumption of liability, he shall be put on notice to permanently replace the affected water supply.

9. If the supply is replaced, then the Hydrogeologist will direct the operator to evaluate the supply for adequacy in accordance with the adequacy conditions as detailed in Appendix B. The evaluation of adequacy includes a determination of any increased operating costs to determine if the costs are *de minimis* or if the operator needs to make provisions for the increased costs. A *de minimis* cost increase is one which meets one of the following criteria: (a) is less than 15% of the annual operating and maintenance costs of the previous water supply that is restored and replaced, or (b) is less than \$60 per year. The cost calculation is detailed in Appendix C. The Hydrogeologist will evaluate this information when it is received. The Hydrogeologist will take additional steps as necessary to insure that the replacement supply meets the adequacy requirements and that the necessary agreements are in place if the costs are greater than *de minimis*.
10. The MCIS shall contact the District Office Administrative Officer for Purchasing to execute an emergency contract to provide for a temporary supply suitable for the needs of the user if:
 - a. the operator fails to respond affirmatively to the written order, or
 - b. the Department finds that immediate replacement of an affected water supply used for potable or domestic purposes is required to protect public health or safety.

The MCIS shall also initiate procedures to provide a permanent supply. The Department may use funds from the Surface Mine Conservation and Reclamation Fund to restore or replace the affected supply. The District shall then use legal remedies to recover the costs of the replacement supply from the owner.

11. If the Department's investigation concludes that a credible case that the operator affected the water supply cannot be established (e.g., there is not enough evidence to prove that the mining operation caused the water supply problem), the MCIS will send a letter to the supply owner or user indicating the reasons for not taking action and send a copy to the mine operator. The letter should include a paragraph that instructs the complainant to contact the Director, Bureau of Mining and Reclamation for an informal review if there is dissatisfaction with the findings of the District Mining Office.
12. The final disposition of all water supply cases will be recorded in the complaint tracking system.
13. The District Mining Office should not become involved in enforcing the terms of voluntary replacement agreements. If a party to a voluntary replacement agreement alleges that the agreement is invalid, the District Mining Office should ask the party alleging that the agreement is invalid to provide proof that the

agreement is invalid (such as a court ruling that the agreement is invalid or proof that the agreement was never signed). Cases for which replacement agreements are determined to be invalid will be treated in the same manner as cases for which there are no voluntary replacement agreements.

14. If a replacement water supply is provided, the operator shall be sent a letter requesting revisions to the permit reflecting the new location and water supply information.

B. Addressing Water Supply Pollution or Diminution - Underground Bituminous Coal Mines

All claims regarding water supply problems related to underground bituminous coal mines should be referred to the McMurray District Mining Office. When the District Mining Office learns of a water supply problem, the complaint coordinator shall determine whether the person providing notification of the claim is the operator or the water supply owner or user. The following steps should be taken.

1. Since the mine operator may be responsible for restoring or replacing a contaminated, diminished or interrupted water supply, the District Mining Office should ascertain if the complainant has notified the operator of the mine suspected of causing the problem (hereinafter "operator"). Under BMSCLA the complainant must notify the operator (52 P.S. Section 1406.5b(a)(1)), and the operator must notify the Department. The District Mining Office should obtain the name and address of the complainant and the following information:
 - a. Determine the nature of the complaint (interruption, contamination, diminution, or failure to maintain temporary water supply).
 - b. Determine the location of the water supply and mine(s) over which it is situated.
 - c. Determine the date on which problems were first noticed.
 - d. Determine the use(s) of the water supply.
 - e. Learn the substance of any communications between the water supply owner or user and the mine operator. Request copies of any written correspondence.
 - f. Determine whether the water supply owner previously entered into any agreement with the mine operator regarding replacement of the water supply.
 - g. Determine whether the water supply owner or user refused to allow the operator access to conduct a premining or postmining survey to determine the quality and quantity of the water supply.
 - h. Determine whether the complainant is the water supply owner or user or both. If the complainant is not the water supply owner, the District Mining Office should notify the water supply owner.
 - i. Determine if the water supply user has an alternate water supply that is readily available to serve his needs.

- j. Determine whether the operator has provided temporary water adequate in quality and quantity for the needs of the user.
2. The District Mining Office will enter the complaint into the complaint tracking database.
3. The District Mining Office will assign the complaint to a hydrogeologist who will determine the following:
 - a. Has the water supply been contaminated, diminished or interrupted?
 - b. Is there no readily available alternate water supply adequate in quality and quantity for the needs of the user?
 - c. Are there any mine workings mined after August 21, 1994 within an area determined by projecting a 35° angle from the vertical downward and outward from the water supply to the level of the coal seam (i.e., the distance where the rebuttable presumption applies -- the rebuttable presumption area)?
 - d. Did the water supply owner or user report the problem to the operator?
4. If the answer to all four of the preceding questions is yes, the Department shall contact the mine operator by phone and in writing (a sample letter to the operator is included in Appendix A) and direct the operator to provide a temporary water supply within 24 hours of receipt of the letter.

The letter should also inform the operator that he may successfully rebut the presumption by affirmatively proving that the landowner denied the operator access to the property on which the water supply is located to conduct a premining survey or a postmining survey of the quality and quantity of the water supply and that the operator complied with the notification procedure in Section 89.145a(a)(3). Affirmatively proving that an operator was denied access to conduct a premining or postmining survey of a water supply does not relieve the operator of liability for the contamination, diminution or interruption when the landowner, affected water user or the Department proves the operator's underground mining activities caused the contamination, diminution, or interruption.

The letter should also inform the operator that he will not be required to restore or replace the water supply if he can demonstrate one of the following:

- a. The contamination, diminution or interruption existed prior to the underground mining activities as determined by a premining survey, and the operator's underground mining activities did not worsen the preexisting contamination, diminution or interruption.

- b. The contamination, diminution or interruption occurred more than 3 years after mine closure and reclamation.
 - c. The contamination, diminution or interruption occurred as the result of some cause other than the underground mining activities.
 - d. The claim for contamination, diminution or interruption of the water supply was made more than 2 years after the water supply was adversely affected by the underground mining activities.
 - e. The operator has done one of the following:
 - (1) Has purchased the property for a sum equal to the property's fair market value immediately prior to the time the water supply was affected or has made a one-time payment equal to the difference between the property's fair market value determined immediately prior to the time the water supply was affected and the fair market value determined at the time payment is made.
 - (2) The landowner and operator have entered into a valid voluntary agreement under Section 5.3 of BMSCLA (52 P.S. Section 1406.5c) which does not require restoration or replacement of the water supply or authorizes a lesser amount of compensation to the landowner than provided by section 5.3(a)(5) of BMSCLA.
5. If the operator fails to provide a temporary water supply or does not demonstrate that he is not legally required to replace or restore the water supply within 24 hours of receiving notification, then the District Mining Office shall issue a compliance order requiring temporary water to be provided. The temporary water supply must be adequate in quality and quantity for the needs of the user.
6. If the affected water supply has not been restored or an alternate water supply has not been provided by the operator or if the operator provides and later discontinues an alternate source, the landowner or water supply user may so notify the Department and request that the Department conduct an investigation in accordance with the following procedure:
- a. Within 10 days of notification, the Department will commence an investigation of the landowner's or water supply user's claim. Initially, the operator should be contacted to determine why the supply has not been restored or an alternate supply has not been provided or why the alternate source has been discontinued. The operator should also be asked if he plans to submit a defense to the presumption of liability.

- b. Within 45 days of notification, the Department will make a determination of whether the contamination, diminution or interruption was caused by the operator's underground mining activities and will notify all affected parties of the Department's determination. If the operator has not provided information to the Department that would relieve him of liability for replacing or restoring the water supply or if the operator has not provided a defense to the presumption of liability, and the criteria in 3.a-3.d (above) are met then the operator is presumed liable for the replacement or restoration of the water supply.
 - c. If the Department determines that the operator is liable to restore or replace the contaminated, diminished or interrupted water supply, the Department will issue any orders that are necessary to assure compliance with BMSLCA (52 P.S. Section 1406.1-1406-21) and Chapter 89.
- 7. Regardless of whether or not the rebuttable presumption applies, the District Mining Office will continue to investigate those cases where the office has reason to believe that mining is the cause of contamination, diminution or interruption. The Department has the burden of proof in cases where the rebuttable presumption does not apply. Only those cases where water supply problems are due to mining conducted after August 21, 1994, can be pursued for enforcement under Act 54. Cases involving water supply impacts that occurred between October 24, 1992, and August 21, 1994 will be referred to the Federal Office of Surface Mining.
- 8. If the information provided by the operator does not relieve it of liability and the District Mining Office has reason to believe that the water supply contamination, diminution or interruption was caused by mining activities that took place after August 21, 1994, further investigation is warranted. Within 45 days the District Mining Office should determine whether:
 - a. The affected water supply meets the qualifications for restoration or replacement under Sections 5.1, 5.2 and 5.3 of BMSLCA, that is:
 - (1) The water supply was contaminated, diminished or interrupted due to underground mining activity that occurred after August 21, 1994.
 - (2) The water supply was contaminated, diminished or interrupted less than 3 years after the mine was closed and reclamation was completed.
 - (3) The water supply contamination, diminution, or interruption was reported within 2 years of its occurrence.
 - (4) The water supply was used for public, domestic, commercial, industrial, recreational, or agricultural purposes, including but not

limited to livestock watering or irrigation (note that irrigation supplies are only covered if the irrigation system was in existence on August 21, 1994).

- b. There is sufficient, credible evidence to show that the contamination, diminution, or interruption was caused by the suspect mining operation. If the operator was denied access to conduct a premining or postmining survey of the water supply, either the water supply owner, water user or the Department must be able to provide “affirmative proof” of premining baseline data relative to the supply.
 - c. There is a valid agreement in place that governs the resolution of the claim.
9. If the Department’s investigation shows that the water supply is protected under BMSLCA and sufficient evidence exists to show that the suspect mine is the cause of the contamination, diminution or interruption, then the operator should be ordered to:
 - a. Provide temporary water (if the operator has not already done so).
 - b. Permanently replace or restore the affected water supply no later than 3 years from the date on which the water supply owner or user first reported the problem to the operator or the Department, whichever occurred first.
10. If the Department concludes that there is not enough evidence to prove that the mining operation caused the water supply problem, the District Mining Office will send a letter to all affected parties indicating the reasons for not taking action. The letter should include a paragraph that instructs the complainant to contact the Director, Bureau of Mining and Reclamation for an informal review if there is dissatisfaction with the findings of the District Mining Office.
11. If the supply is replaced, then the District Mining Office will direct the operator to evaluate the supply for adequacy in accordance with the adequacy conditions as detailed in Appendix B. The evaluation of adequacy includes a determination of any increased operating costs to determine if the costs are *de minimis* or if the operator needs to make provisions for the increased costs. The cost calculation is detailed in Appendix C. The District Mining Office will evaluate this information when it is received. The District Mining Office will take additional steps as necessary to ensure that the replacement supply meets the adequacy requirements and that the necessary agreements are in place if the costs are greater than *de minimis*.
12. If an affected water supply is not restored or reestablished or a permanent alternate source is not provided within three years, the mine operator may be relieved of further responsibility by entering into a written agreement providing compensation

acceptable to the landowner. Prior to entering into an agreement with the mine operator, the landowner may submit a written request to the Department asking that the Department review the operator's finding that a permanent alternate source cannot reasonably be provided. The Department shall provide its opinion to the landowner within sixty days of receiving the landowner's request. This opinion shall be advisory only, including for purposes of assisting the landowner in selecting the optional compensation authorized under the act.

13. The final disposition of all water supply cases will be recorded in the complaint tracking database.

C. Involvement in Compensation Agreements for Water Supply Losses Associated with Underground Bituminous Coal Mines

1. The District Mining Office will require operators to document the final disposition of cases where water supply complaints were resolved by property purchase or compensation for reduction in fair market value as provided for under Section 5.2(g) of BMSLCA. Documentation should be in one of the following forms:
 - a. A copy of the agreement executed by the mine operator and property owner.
 - b. A signed statement from the property owner indicating that the case has been settled.
 - c. A copy of the deed for the purchased property.
 - d. A copy of the canceled check demonstrating payment for reduction in the fair market value of the affected property.
2. The District Mining Office should not become involved in enforcing the terms of voluntary replacement agreements under Sections 5.2(g) or 5.3 of the BMSLCA. If a party to a voluntary replacement agreement alleges that the agreement is invalid, the District Mining Office should ask the party alleging that the agreement is invalid to provide proof that the agreement is invalid (such as a court ruling that the agreement is invalid or proof that the agreement was never signed). Cases for which replacement agreements are determined to be invalid will be treated in the same manner as cases for which there are no voluntary replacement agreements.
 - a. The District Mining Office should not become involved in resolving disputes over the fairness of compensation offered under 5.2(g)(1) of BMSLCA. It is the operator's burden to show that he has complied with the provisions of 5.2(g) in cases where he cannot restore or replace a water supply in a permanent manner.

D. Addressing Water Supply Pollution or Diminution – Non Rebuttable Presumption Cases and Industrial Minerals Extraction Sites

The Department has an obligation to investigate water supply complaints that do not meet the rebuttable presumption criteria as well as those where the operator submitted an acceptable defense to rebuttable presumption, but the Department has reason to believe that the mining operation caused the problem with the supply (discussed in Sections A and B). In addition to the types of mining discussed in Sections A and B, this Section also applies to industrial minerals extraction sites. In these cases the Department has the burden of proof. Pennsylvania has no statutory authority to require replacement or restoration of water supplies that were affected by underground anthracite coal mines. All cases involving water supply impacts from underground bituminous coal mines were covered in Section B.

All water supply problems related to surface coal mines should be referred to the appropriate District Mining Office. The District Mining Office will follow the procedures outlined in this section. Water supply problems regarding government-financed reclamation projects should be referred to the BAMR field office or District Mining Office that issued the contract.

Generally, water supply related problems come to the attention of the Department in one of three ways: notification by the water supply user, notification by the operator, or discovery of the problem by the Department when reviewing monitoring data.

1. The complaint coordinator in the District Mining Office should collect initial information on a water supply complaint. The coordinator should ascertain the following information:
 - a. Name, address, and phone number of the complainant.
 - b. Township and county where the water supply is located.
 - c. Name of the operator and the SMP number.
 - d. Nature of the problem, e.g. water supply loss or diminution and whether the supply is a well or a spring.
 - e. Date when the problem was first noticed.
 - f. Whether the complainant is the water supply owner or user. If the complainant is the user, the name, address, and phone number of the owner should be obtained. The District Mining Office should notify the owner of the supply of status and resolution of the complaint as well as the user.
 - g. The substance of any communications between the water supply owner or user and the mine operator. The complainant should be encouraged to

notify the mine operator as they may resolve the complaint without further action from the Department.

- h. Ask the complainant if they wish the complaint to remain confidential. However, explain that if the supply meets the rebuttable presumption criteria, the complaint cannot remain confidential. The operator must be given the opportunity to rebut the presumption.
2. The complaint coordinator will enter the complaint into the District Mining Office Complaint Tracking system.
 3. The compliant coordinator will notify the appropriate Mine Conservation Inspector (MCI), the Mine Conservation Inspector Supervisor (MCIS), and the lead Hydrogeologist of the complaint.
 4. The MCI shall determine if the two criteria for surface coal mine or coal preparation plants rebuttable presumption are met:
 - a. if the water supply lies within 1000 feet [304.8 meters] of the active mining operation (the rebuttable presumption area), and
 - b. if the SMP was issued after February 16, 1993 (the effective date of the act).
 5. If the rebuttable presumption criteria are not met or if the operation is an industrial minerals extraction site, the MCI shall contact the complainant to determine additional information about the water supply. This information should include but is not limited to the following:
 - a. Any information the complainant has to validate the claim of diminution or degradation or to determine if additional water sampling is needed.
 - b. All uses of the water supply and whether there is another water supply on the property and its status.
 - c. Whether the water supply owner signed a waiver agreeing to a lesser supply.
 - d. Explain to the water supply owner or user that the Department will initiate an investigation.
 6. The MCI and the lead hydrogeologist should review the monitoring data in an effort to validate the claim. If the monitoring data clearly indicates that the complaint is not valid, the MCIS should notify the complainant of this finding by phone followed by a letter confirming that the case is closed. The letter should include a paragraph that instructs the complainant to contact the Director, Bureau

of Mining and Reclamation for an informal review if there is dissatisfaction with the finding of the District Mining Office.

7. If the complaint appears valid, the MCI should refer the complaint to the lead hydrogeologist for a hydrological investigation to be initiated.
8. Within 45 days of notification, the Hydrogeologist will make a determination of whether the contamination, diminution or interruption was caused by the operator's mining activities.
 - (a) If the Department determines that a credible case cannot be established that the operator affected the supply, the MCIS shall notify the complainant of the findings in writing. The letter should include a paragraph that instructs the complainant to contact the Director, Bureau of Mining and Reclamation for an informal review if there is dissatisfaction with the finding of the District Mining Office.
 - (b) If the Department determines that the operator is liable to restore or replace the contaminated, diminished or interrupted water supply, the Department will meet with the operator and explain the findings in the case. The operator will be instructed to provide temporary water, if necessary, until the water supply is restored or replaced. The operator should be given 10 business days to submit any information he has which may change the decision of the Department.
 - (c) If the operator fails to proceed with replacement or restoration of the supply, the Department should issue any orders that are necessary to assure compliance.

APPENDICES:

- Appendix A Sample Notice Letters to Surface Coal Mine Operator and to Underground Bituminous Coal Mine Operator
- Appendix B Adequacy of Replacement Water Supplies
- Appendix C Cost Calculation Comparisons for Existing and Replacement Supplies
- Appendix D Water Supply Replacement Agreements

Appendix A: Sample Letter to Surface Coal Mine Operator

OPERATOR:

Address

Address

Re: Water Complaint (complaint #)
Operator
SMP # _____
Township
County

Dear Operator:

The Department recently received an inquiry concerning (user's name) water supply, (Monitoring Point ID) involving (nature of problem). After considering the available information, the Department has concluded that this supply may have been adversely affected by your operation. The water supply has been (describe the nature of the problem). Since the water supply is located within 1000 feet (304.80 meters) of the area bonded and affected by mining operations and the surface mining permit was issued after February 16, 1993, it falls under the rebuttable presumption provisions of the Surface Mining Conservation and Reclamation Act. Section 4.2(f) of the Act states that an operator is presumed liable for pollution and/or diminution of private water supplies within 1000 feet (304.80 meters) of a permit area unless the operator affirmatively demonstrates one of the following:

- Landowner refused to operator access to conduct a premining survey.
- The water supply is not within 1000 feet (304.80 meters) of the area bonded and affected by surface mining activities.
- Pollution/diminution is a premining condition as determined by a premining survey.
- Pollution/diminution occurred as a result of some cause other than the mining.
- Landowner refused the operator access to determine the cause of the pollution/diminution or to replace/restore the water supply.

Therefore, the Department hereby requests that, within 24 hours of receipt of this letter, you either 1) provide information that affirmatively demonstrates one of the five defenses listed above or 2) provide a temporary water supply and take additional steps to restore the water supply to a quality and quantity adequate for the needs of the user. If you believe that the cause is other

than your mining, please contact (name of hydrogeologist) immediately to discuss the details of your rebuttal. (Include when appropriate: (The temporary water supply shall be potable water procured from a licensed bulk or bottled water supplier in an amount equal to one gallon per person per day or five gallons per family per day, whichever is greater. In addition, you are to provide a supply suitable for other domestic uses in an amount equal to 75 gallons per person per day.)). Finally, within 15 days of receipt of this letter submit a proposal to this office detailing the course of action planned to replace and/or rehabilitate this supply as well as a schedule outlining the time table for the project.

This is not a notice of violation; however, failure to restore or replace the supply or to make an affirmative demonstration will constitute a violation and may result in additional action by the Department.

This action is in accordance with Section 87.119 of 25 Pa Code and Sections 4.2 and 18.6 of the Surface Mining Conservation and Reclamation Act.

Should you have any questions, please feel free to contact this office at your convenience.

Sincerely,

Monitoring and Compliance Manager
District Mining Operations

Sample Letter to Operator – Underground Bituminous Coal Mine Operator

OPERATOR:

Address

Address

Re: Water Complaint (complaint #)

Operator

SMP # _____

Township

County

Dear Operator:

The Department recently received an inquiry concerning (user's name) water supply, (Monitoring Point ID) involving (nature of problem). After considering the available information, the Department has concluded that this supply may have been adversely affected by (Operator Mine Name). The water supply has been (describe the nature of the problem) and there is no readily available alternate water supply adequate in quality and quantity for the needs of the user. There are mine workings mined after August 21, 1994 within an area determined by projecting a 35° angle from the vertical downward and outward from the water supply to the level of the coal seam (i.e., the distance where the rebuttable presumption applies -- the rebuttable presumption area). The water supply owner or user reported this problem to you on (date). This supply falls under the rebuttable presumption provisions of Act 54, the Bituminous Mine Subsidence and Land Conservation Act. The Act states that an operator is presumed liable for pollution and/or diminution of private water supplies within the rebuttable presumption area.

You may rebut the presumption by affirmatively proving that the landowner denied you access to the property on which the water supply is located to conduct a premining survey or a postmining survey of the quality and quantity of the water supply and that you complied with the notification procedure in Section 89.145a(a)(3) of the regulations.

In accordance with Subchapter F, Section 89.145(a)(e)1 you have an obligation to restore or replace the water supply with an alternate source, adequate in water quantity and water quality, for the purpose served by the water supply if the landowner or water user is without a readily available alternate source. Thus, within 24 hours please provide a temporary source of potable water to the (complainant's) residence.

You will not be required to restore or replace the water supply if you can demonstrate one of the following:

- (1) The contamination, diminution or interruption existed prior to the underground mining activities as determined by a premining survey, and the operator's underground mining activities did not worsen the preexisting contamination, diminution or interruption.

- (2) The contamination, diminution or interruption is due to underground mining activities that occurred more than 3 years prior to the onset of water supply contamination, diminution or interruption.
- (3) The contamination, diminution or interruption occurred as the result of some cause other than the underground mining activities.
- (4) The claim for contamination, diminution or interruption of the water supply was made more than 2 years after the water supply was adversely affected by the underground mining activities.
- (5) The operator has done one of the following:
 - (i) Has purchased the property for a sum equal to the property's fair market value immediately prior to the time the water supply was affected or has made a one-time payment equal to the difference between the property's fair market value determined immediately prior to the time the water supply was affected and the fair market value determined at the time payment is made.
 - (ii) The landowner and operator have entered into a valid voluntary agreement under Section 5.3 of BMSCLA (52 P.S. Section 1406.5c) which does not require restoration or replacement of the water supply or authorizes a lesser amount of compensation to the landowner than provided by section 5.3(a)(5) of BMSCLA.

Therefore, the Department requests that you initiate steps to restore the water supply to a quality and quantity adequate for the needs of the user. Within 24 hours of receipt of this letter, you are to begin supplying a temporary source of potable water to the (complainant's) residence. This temporary supply must be procured from a licensed bulk or bottled water supplier and, at a minimum, must be equal to one gallon per person per day or five gallons per family per day, whichever is greater. (In addition a supply suitable for other domestic uses shall also be supplied in an amount equal to 75 gallons per person per day. (Include this statement if the affected water supply cannot be used for domestic purposes.)) Within 15 days of receipt of this letter, you must either submit a letter proposal to this office detailing the course of action planned to replace and/or rehabilitate this supply as well as a schedule outlining the time table for the project or affirmatively demonstrate to the Department why (Operator) is not responsible using the parameters listed above.

This is not a notice of violation; however, failure to restore or replace the supply or to make an affirmative demonstration will constitute a violation and may result in additional action by the Department.

This action is in accordance with Subchapter F, Section 89.145(a)(e)1 and Section 5.2 of the Bituminous Mine Subsidence and Land Conservation Act.

Should you have any questions, please feel free to contact this office at your convenience.

Sincerely,

District Mining Manager
McMurray District Mining Operations

Appendix B: Adequacy of Replacement Water Supplies

A. Quantity of a Replacement Supply

Section 4.2 (f) of the Surface Mining Conservation and Reclamation Act (SMCRA) provides that a replacement water supply must be “adequate for the purposes served by the supply.” In order for a supply to be adequate, it must pass four tests: quantity, quality, cost of operation, and control. This section deals with the quantity issue.

The Department concludes that a replacement yield of 5 gallons per minute (gpm) ($31.54 \times 10^{-2} \text{ dm}^3/\text{s}$) is generally adequate for domestic water supplies. The replacement yield varies for other uses (e.g. agricultural, commercial). This guidance recommends using the EPA “Manual of Individual Water Supply Systems” (1982) to assist in determining the minimum quantity required. However, while the EPA manual is useful to estimate average water consumption rates and peak use rates, it is difficult to translate these figures into a well yield requirement.

A family of four, each using 150 gallons (567.81 dm^3) of water per day, would in theory only require a well with a yield of 0.5 gpm ($3.15 \times 10^{-2} \text{ dm}^3/\text{s}$). Actual requirements greatly exceed this owing to peak demands, varying usage rates, seasonal yield variations, and demands for lawn and garden irrigation, swimming pools, and other uses.

Note that the minimum requirements that define a suitable replacement supply in this document vary somewhat from those found in the guidance document titled “Water Supply Replacement and Permitting” (563-2112-605). This is not a contradiction, but is intended to recognize an inherent difference between permitting and compliance water supply replacement scenarios. Permitting replacement issues occur during the planning stage of a mining operation, where the emphasis is on preventing irreparable impacts to water supplies, and where options such as changing mining plans and limiting mined areas are available. Compliance replacement issues occur after mining has caused an impact on a water supply, where the emphasis is on restoring the water supply to a suitable standard under set conditions that often limit available options.

In order to simplify matters, this guidance document recommends using the Peak Demand Test (PDT) to determine if a replacement system is adequate for normal domestic purposes. Many lending institutions use the PDT to verify that a property being sold has a water supply of adequate yield. The test is used to simulate well usage during peak demands, and does not provide a specific yield value. It only tests a delivery system’s ability to provide water to the user. The use of the PDT also helps to ensure that a property remains marketable. If the water supply is serving other uses (e.g. industrial, commercial, or agricultural), the adequacy of the replacement supply would be evaluated on a case-by-case basis.

A well with a sustainable yield of 5 gpm will pass the PDT and such a well would constitute an adequate replacement supply from the standpoint of quantity for normal domestic uses. However, the Department recognizes that obtaining a well yield of 5 gpm is often difficult in many areas of the state. Thus, in some cases it is apparent that the only way some replacement systems may be deemed adequate in quantity is to allow the use of water storage systems in conjunction with the

replacement well. Water storage systems may only be considered where the replacement supply safe yield is 2 gpm ($12.62 \times 10^{-2} \text{ dm}^3/\text{s}$) or greater and would be evaluated on a case-by-case basis for water supplies with withdrawal rates greater than 5 gpm ($31.54 \times 10^{-2} \text{ dm}^3/\text{s}$). Replacement water supplies that are not adequate in yield cannot be made acceptable by adding storage systems without written consent of everyone with an ownership interest in the water supply in the form of a properly executed acceptance agreement for a lesser supply. Water supplies with a safe yield of less than 2 gpm are unreliable supplies because they are susceptible to drought or chemical and biological fouling. Storage system supplies generally require greater maintenance of plumbing fixtures, and chlorination. As such, it is likely that the cost of operating a system with storage tanks will result in a more than *de minimis* cost increase.

The initial test for adequacy of a replacement supply will be the determination of safe yield, which is described in a later section. In order to maintain consistency, the method that is recommended by this guidance is a short-duration specific capacity test. The volume of water in borehole storage is subtracted from the total volume pumped before calculating the specific capacity.

B. Determining Adequate Supply Yield

Accurate determination of water supply “yield” is important from a compliance standpoint for a variety of reasons. If a water supply is alleged to have been impacted by mining, premining yield, determined during the permitting process, must be compared with the allegedly diminished yield. This involves retesting of the same supply. If a water supply has been impacted and a replacement supply is proposed, it is necessary to determine the adequacy of the yield of the replacement supply. This section looks at methods used for determination of adequacy an yield.

Well Yield

Well yield is a term frequently misused and abused in the context of water supply replacement. Well yield is defined as the maximum pumping rate that can be sustained by a well without lowering the water level in the well below the pump intake. Although there are different methods for determining well yield, this guidance recommends the use of a short-duration specific capacity test with borehole storage subtracted from the total volume of water pumped during the test to arrive at an adjusted pumping rate as described below.

When comparing the performance of two wells, or one well at two different times, the term “yield” is essentially meaningless unless the defining parameters are presented and understood. For instance a well driller’s “blown yield” is not the same as a measurement of how much water comes out of a faucet, neither of which can be compared to a specific capacity test. Nor can two specific capacity tests performed under different conditions be meaningfully compared. When tests are being used to compare two different water supplies or to compare the performance of one water supply at two different times, it is critical that the tests be duplicated as nearly as possible. For example, it is not valid to compare the results of a specific capacity test conducted for twenty minutes at a discharge rate of 10 gpm ($63.09 \times 10^{-2} \text{ dm}^3/\text{s}$) to one conducted for two hours at a discharge rate of 2 gpm ($12.62 \times 10^{-2} \text{ dm}^3/\text{s}$). Tests should be reproducible through the use of

standard equipment. The conditions of the well quantity test must be recorded in detail and presented along with the test results.

Operators need to provide the physical attributes of the water supply provided in Module 8.2h or 8.2(A)(5)(depth, width, casing length, pump setting, etc.) and the following:

- The date of the test.
- Recent climatic conditions and their influence, if known, relative to the type of supply. For instance, recent heavy precipitation may have an influence on a well recharged from a shallow aquifer system.
- The time and approximate quantity of any domestic water usage in the 12 to 24 hours before the test. The supply user should curtail usage of the well prior to the test. The well should be fully recovered from any previous drawdown prior to the start of the test.
- Duration of the test.
- Discharge rate measured at numerous intervals during the test. The discharge rate should be held constant throughout the test to the extent possible. Discharge measurements should be taken at least every 5 minutes during the initial stages of the test and then every 10 minutes for the duration of the test. The discharge rate should be held relatively constant at a rate simulating normal usage rates.
- Remarks on the appearance of the water and repeated measurements of field parameters, including pH, temperature, and specific conductivity. This type of data will aid in determining the aquifer system or multi-aquifer systems.
- A chemical analysis of water collected near the end of the pumping test.
- Frequent water level measurements (1 - 2 minute intervals for the first 10 to 20 minutes of the test), especially during the start of the test and/or during periods of rapid drawdown are considered a normal practice. Thereafter, water level measurements should be taken at 5 minute intervals for the duration of the test. Water level measurements to determine the capacity of a well should be continued until the water level has stopped or practically stopped lowering.
- The time of all measurements should be recorded.
- Measurements of the recovery rate of the water level in the well after the pump is shut down. These measurements should be taken until the water has returned to, or nearly to, its original level.
- When nearby wells are available for observation purposes, the depth to water in them should be measured periodically. However, at the low pumping rates of short duration yield tests normally used on domestic water supplies, it will be unusual to witness any effect at nearby wells unless the wells are within a few feet (meters) of the pumping well. When drawdown at nearby wells is observed, water level data from the nearby wells can give an idea of how large an area will be affected by pumping and aid in determining the characteristics of the water-bearing formation.

C. Types of Tests

Specific Capacity

The “specific capacity” of a well is the number of gallons of water produced per minute for each foot of well drawdown. Well yield can be calculated by multiplying the available drawdown in the well (the distance between the static water level and a few feet above the normal pump setting in feet) with the specific capacity (units in gallons per minute per foot), the result having the units of gallons per minute (gpm). This calculated yield takes into consideration both the storage capacity of the well and the aquifer performance under the limited conditions of the specific capacity test. Since pumping rate and the test duration both affect the specific capacity, they need be nearly the same to compare results of two tests either between different wells or on the same well at different times. Seasonal variations of a well’s recharge can influence yield.

The duration of a specific capacity test is often dictated by practical considerations such as how long the well users are willing to tolerate an interruption in their supply, or how quickly the well goes dry. The test duration of a domestic water supply should be designed to simulate the typical usage stresses. A test duration of 1 – 3 hours at a pumping rate of 5 gpm ($31.54 \times 10^{-2} \text{ dm}^3/\text{s}$) should be sufficient to simulate most household conditions. The test duration may be limited by some of the characteristics of the well, the pump and the plumbing. When using the existing, in-place water supply pump, a discharge rate of 5 gpm may not be obtainable. Well plumbing fixtures, such as the pressure shutoff switch, sediment filter, and pressure tank may need to be bypassed or disconnected to maintain a stable, steady pumping rate. The test should be terminated when the water level drops to within 5 ft. (1.5 m) of the pump, so the pump is not damaged by running it dry.

Well storage becomes overemphasized in short-duration specific capacity tests. Unlike a long-duration test of a high-performance, industrial well, a short-duration test of a low-yielding well, especially a deep well, may result in borehole storage water representing most of the water discharged during the test. The borehole storage problem becomes significant if the specific capacity, calculated with borehole storage, is then multiplied by the available drawdown to calculate a yield. This process would count the borehole storage twice. A poor performing, unreliable well can appear to have a relatively good yield when an inappropriate test method is used. The recommended approach allows well storage to be considered but not over emphasized by subtracting the volume of borehole storage from the amount of water discharged prior to calculating specific capacity, then calculating the well yield. This approach gives credit for borehole storage, but does not count it twice.

The equations needed to calculate specific capacity and well yield from a short-duration test are given below:

$$SC=R/D$$

Where: SC = specific capacity (gpm/ft), R = adjusted discharge rate (gpm), and D = total drawdown (ft.)

$$R = (V_t - V_s) / t$$

Where: V_t = total volume of water discharged during test (gallons), V_s = volume of water discharged from borehole storage (gallons), and t = duration of the test (minutes).

$$V_s = 23.5D r^2$$

Where: V_s = volume of water discharged from borehole storage (gallons), D = total drawdown (feet), r = well radius in feet.

(Note, for a standard 6 1/2 inch diameter well, $V_s = 1.72 \text{ gal/ft.} \times D$)

$$\text{Safe Yield (gpm)} = AD \times SC \times (\text{safety factor})$$

Where: AD = available drawdown (feet) = depth to pump intake - static water level - 5 feet.

A safety factor is employed in the safe yield formula as compensation for short-duration specific capacity tests that do not consider the extent to which yield will decrease if the well is pumped for periods longer than the test period. The safety factor also compensates for the effect of seasonal or regional water level fluctuations which deviate from that which existed at the time of the test. Safety factors of 0.9 and 0.75 have been recommended for tests conducted between July - November and December - June, respectively. A well with a safe yield of less than 2 gpm will not be considered as a suitable replacement supply even with a storage system.

Peak Demand Test

This guidance recommends the use of the Peak Demand Test (PDT) to determine the ability of a replacement water supply system to provide sufficient water to a household during periods of peak use and is considered applicable for normal domestic use. This test will be necessary when the safe yield of a replacement water supply as determined in the preceding section is less than 5 gpm but is only applicable to those supplies that serve for normal domestic use. The peak demand test offers the advantage of taking into account the combined effect of yield, borehole storage, and any storage tank that might be included in the system.

The Peak Demand Test (PDT) is used by many lending institutions to verify that a property being sold has a water supply of adequate yield. The test is used to simulate well usage during peak demands, and does not provide a numerical yield value. It only tests a delivery system's ability to provide water to the user. The test is performed by running the water at a rate as close to 5 gpm as possible for 15 minutes and then allowing the well to rest for 15 minutes. The on/off pumping cycles are repeated for 4 hours or until the well fails, whichever comes first. The discharge rate must be recorded frequently during the test, and should be measured at least every 5 minutes (three times per pumping cycle). For the purpose of this test, a well is said to fail when the pump intake breaks suction and the discharge rate drops noticeably. If the well fails the PDT, then the system will be deemed inadequate.

The parameters of the PDT must be carefully recorded, and when two tests are being used for comparative purposes, they must duplicate one another as nearly as possible. For example, if the test is going to be used to compare the performance of two wells, then the discharge rates for the two wells must be nearly identical during the test. If not, the wells have not undergone the same stress and the results cannot be compared in a meaningful way. Maintaining a constant discharge

rate can be difficult to achieve, as in-place water delivery system for a home can be difficult to control and the discharge rate may decline as the test advances.

Quantity Tests for Springs

The quantity of an undeveloped spring can be easily determined by measuring the discharge flow rate by some reliable method such as a calibrated container with stopwatch or a narrow notched weir. Undeveloped springs should be measured at least once during the seasonal low flow period (July, August, and September).

Determining the quantity of water available from a developed spring can be more difficult. Measuring the overflow discharge of a developed spring is generally not an accurate measure of spring quantity. Frequently, springs are developed in such a way that water can both leave and enter the spring box through the bottom and sides, so that even very reliable springs may have little or no overflow from a reservoir. In such cases, installation of a temporary weir downslope from the spring may provide adequate flow data. The quantity of a developed spring can be reliably measured directly from the overflow pipe only if the spring is developed so that the entire flow of a spring is captured and piped into a watertight reservoir, such as a steel or concrete tank, and all flow to and from the tank is measured. Peak Demand Tests and specific capacity tests can sometimes be modified to test springs depending on the construction of the spring containment structure.

Water Quality

A replacement water supply must be adequate in quality for the needs of the user. In most instances, it will be necessary for the supply to meet drinking water standards. Similar to well yield, replacement supplies are often of a lesser quality than the original supply and treatment may be necessary for the water to meet the required quality standards. However, replacement water supplies that are of a lesser quality than the original supply cannot be made acceptable by adding treatment systems without written consent of the water supply owner in the form of a properly executed acceptance agreement for a lesser supply. In addition, cost calculations must be completed and the owner compensated if the increase in operating and maintenance costs is more than *de minimis*. If the operating and maintenance costs of the restored or replacement water supply represent more than a *de minimis* cost increase, the operator shall provide for the permanent payment of the increased operating and maintenance costs of the restored or replacement water supply.

Control and Accessibility

The replacement supply must provide the owner and the user with as much control and accessibility as exercised over the previous water supply. The use of a public water supply as a replacement water supply provides the owner and the user adequate control and accessibility.

Appendix C

Cost Calculation Comparisons for Existing and Replacement Supplies

Note: All costs should be calculated in current dollars. Cost should be rounded off to the nearest dollar.

Residence: _____ Operator: _____
 Previous Water Supply: _____ SMP Application # _____
 Monitoring Point I.D.: _____ Twp. _____
 Replacement Supply: _____ County: _____
 Number of Occupants: _____ Basis for Replacement: _____
 Current Uses: _____ Foreseeable Uses: _____

WORKSHEET A: INSTALLATION COSTS

		Existing System	Proposed System
1.	Cost of drilling:		
	Existing: _____ ft at \$_____ per foot	\$_____	\$_____
	Proposed: _____ ft at \$_____ per foot	\$_____	\$_____

2. Cost of well / spring containment construction materials (such as casing, piping of water system to residence, and labor), itemize below:

	Subtotal	\$_____	\$_____
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3. Cost of water system, including pump, pump riser pipe, well cap, pressure tank, and labor costs for their installation, itemize below:

	Subtotal	\$_____	\$_____
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WORKSHEET A: INSTALLATION COSTS (cont.)

4. **Cost of treatment** and/or conditioning system, including labor for installation, itemize below:

Subtotal \$ _____ \$ _____

5. **Total cost** for drilling and installation of well, water system and treatment system (add lines 1 through 4).

TOTAL \$ _____ \$ _____

WORKSHEET B: COST TO OPERATE AND MAINTAIN A PRIVATE WATER SUPPLY

Maintenance Costs

	Existing System	Proposed System
1. Maintenance of entire system estimated at 2% of initial costs. Multiply line 5 of Worksheet A by 2%.	\$ _____	\$ _____
2. Annual replacement cost of water system estimated at 8% of cost of the water system (12 year life). Multiply line 3 of Worksheet A by 8%.	\$ _____	\$ _____
3. Annual replacement cost of treatment system estimated at 8% of cost of the treatment system (12 year life). Multiply line 4 of Worksheet A by 8%.	\$ _____	\$ _____

Operating Costs

- 4. Calculate the cost of electricity** required for pumping. Provide documentation on how the costs were determined. The following formulas may be used.

Existing System:

$$\frac{(\text{Gals. used/day} \text{ ______} / \text{pump capacity in gpm} \text{ ______}) \times (365 \text{ days /yr.})}{(60 \text{ min./hr.})} = \text{ ______ } \text{ hours pumped/year}$$

$$\text{Hours pumped/year} \text{ ______ } \times \text{pump hp} \text{ ______ } \times 0.745 \text{ kwh/hph} = \text{ ______ } \text{ kwh/year}$$

Proposed System:

$$\frac{(\text{Gals. used/day} \text{ ______} / \text{pump capacity in gpm} \text{ ______}) \times (365 \text{ days /yr.})}{(60 \text{ min./hr.})} = \text{ ______ } \text{ hours pumped/year}$$

$$\text{Hours pumped/year} \text{ ______ } \times \text{pump hp} \text{ ______ } \times 0.745 \text{ kwh/hph} = \text{ ______ } \text{ kwh/year}$$

WORKSHEET B: COST TO OPERATE AND MAINTAIN A PRIVATE WATER SUPPLY (cont.)

5.	Cost per kilowatt hour from electric company.	\$_____ /kW hr	
			Existing System Proposed System
6.	Annual power costs to operate the water system, multiply figures from lines 4 and 5.	\$_____	\$_____
7.	Annual cost of chemical needs for the water system (if a treatment system is needed), itemize below:		
	Subtotal	\$_____	\$_____
8.	Total maintenance and operating costs per year (add lines 1, 2, 3, 6 and 7).	\$_____	\$_____

WORKSHEET C: MONTHLY COST OF WATER FROM PUBLIC WATER SUPPLY SYSTEM

Section 1: Calculation of Water Usage

1. Average usage per day per person (min. 75). _____ gallons/day
2. Number of members in household. _____
3. Average total daily usage of water for members of household (multiply line 1 by line 2). _____ gallons/day
4. Daily water usage for livestock (specify type and number of livestock, and estimated water usage for each in space below).

TOTAL _____ gallons/day
5. Other water usage, or likely water usage such as lawn and garden watering, car washing, guests, filling swimming pool, etc. (specify). _____ gallons/day
6. Total average water usage per day for water supply (add lines 3 through 5). _____ gallons/day
7. Calculate average monthly usage by multiplying line 6 by 30 days. _____ gallons/month
8. Calculate a low, medium and high average monthly usage pattern for the household (if usage variable from month to month); or calculate an average (medium) monthly usage (if usage relatively constant throughout year).

Low usage (Line 7 x 0.5): _____ gallons
Medium usage (Line 7): _____ gallons
High usage (Line 7 x 1.5): _____ gallons

Section 2: Public Water Company Usage Rates

1. Enter the minimum or the fixed charge per month for an average residence (if applicable). \$ _____

2. Volume charge for first _____ gallons, at \$ _____ per 1,000 gallons per month.
for next _____ gals. \$ _____ per 1000 gallons/month
for next _____ gals. \$ _____ per 1000 gallons/month
for next _____ gals. \$ _____ per 1000 gallons/month
for usage over _____ gals. \$ _____ per 1000 gals/month

Section 3: Calculation of Monthly Household Water Bill

- A. Use this section to calculate monthly household water bill if water usage is relatively constant throughout the year.
1. Monthly water usage from line 8 of section 1 divided by 1,000.
Medium _____ / 1,000 = _____ 1,000 gallons per month

 2. Calculate usage charge based on gallons calculated in line 1 of section 3 and the usage rates in line 2 of section 2.
Volume charge:
Medium _____ + fixed or min. charge _____ = \$ _____ monthly
(line 1 of section 2) water bill

 3. Multiply the average usage values by the corresponding monthly water bill on line 2 of Section 3A.
12 Mos. x Medium usage cost/month \$ _____ = Total \$ _____/yr.

B. Use section below if usage varies widely from month to month.

1. Monthly water usage from line 8 of section 1 divided by 1,000

Low _____ / 1,000 = _____ 1,000 gallons per month

Medium _____ / 1,000 = _____ 1,000 gallons per month

High _____ / 1,000 = _____ 1,000 gallons per month

2. Calculate usage charge based on gallons calculated in line 1 of section 3A and the usage rates in line 2 of section 2.

Volume charge:

Low: _____ + fixed or min. charge _____ = \$ _____ monthly water bill
(line 1 of section 2)

Medium: _____ + fixed or min. charge _____ = \$ _____ monthly water bill

High: _____ + fixed or min. charge _____ = \$ _____ monthly water bill

3. Determine number of months closest to low, median and high usage and multiply each of these values by the corresponding monthly water bill on line 2 of Section 3B.

a. Months of low usage _____ x low usage cost/month = \$ _____

b. Months of med. usage _____ x med. usage cost/month = \$ _____

c. Months of high usage _____ x high usage cost/month = \$ _____

Total cost per year [sum of line 3 a, b and c above; or if rate is fixed, 12 x (section 2, line 1)]:

\$ _____

Worksheet D: Cost Calculation Summary for “*de minimis*” Cost Increase Determination

1. Annual Operation/Maintenance Cost of Proposed Supply from Worksheet B, line 8 or Worksheet C, Section 3, line B, #3. \$ _____
2. Annual Operation/Maintenance Cost of Existing Supply from Worksheet B, line 8. \$ _____
3. Annual Cost Difference (subtract line 2 from line 1). If line 3 is greater than zero, proceed to steps 4 and 5. \$ _____
4. Multiply line 2 by 1.15 \$ _____
5. Add \$60 to line 2 \$ _____
6. Is line 1 greater than line 4? yes _____ no _____
7. Is line 1 greater than line 5? yes _____ no _____
8. If line 1 exceeds both lines 4 and 5, then increased cost for the replacement water supply is not *de minimis*. Is the cost difference *de minimis*? yes _____ no _____
9. If the cost increase is not *de minimis*, the operator must pay for the increase in cost in perpetuity.

Appendix D

Consent to Lesser Water Supply

(To be used when consenting to a lesser supply and/or increased operation and maintenance costs and/or reduced access to or control over the replacement supply and/or increased maintenance.)

OPERATOR:

Name _____

Address _____

WATER SUPPLY OWNER(S):

Name (List everyone with an ownership interest in the water supply.)

Address _____

Directions: In the brackets[], underline the correct choice or choices and draw a line through the other choices. Draw a line through any other parts of this agreement that do not apply.

1. The operator has [proposed to mine/mined] at the _____ mine in _____ Township, _____ County, Permit [Application] No. _____.
2. The water supply for _____ is a [spring/well/(if other, specify _____)] identified as sample point _____ in the permit application.
3. Representative water quality and quantity of the water supply is as follows (identify units of measure):

Date	Flow/yield	pH	alk	acid	Fe	Mn	Al	SO ₄	TSS	Other
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
4. The purpose served by the water supply is [domestic/agricultural/industrial (if other, specify _____)].
5. **(A) By signing this consent form, the landowner understands and acknowledges that the Surface Mining Conservation and Reclamation Act (the Act) and the rules and regulations of the Department require:**
 - (i) **That a surface mining operator replaces the landowner's water supply, if the operator's mining activities cause contamination, interruption, or a decrease of that water supply;**
 - (ii) **That the surface mining operator replace the affected water supply at the operator's expense;**
 - (iii) **That the replacement water supply be of adequate quantity and quality for the purposes served by the original water supply;**
 - (iv) **That the replacement water supply cannot require excessive maintenance;**
 - (v) **That the operator reimburse the landowner for all future increase in operation and maintenance costs for the replacement water supply that**

exceed the operation and maintenance costs of the affected water supply by more than \$60 per year and more than 15% of the cost to operate and maintain the original supply;

(vi) That the landowner's access to and control over the replacement water supply is equivalent to the access and control the landowner had over the affected water supply.

(B) In signing this consent form, the landowner agrees to give up some or all of the rights identified below in paragraphs 6 through 12.

6. The operator has [proposed to replace/replaced] the water supply with a replacement water supply by _____.

7. The quality and quantity of the replacement water supply [will be/is] as follows (identify units of measure):

Date	Flow/yield	pH	alk	acid	Fe	Mn	Al	SO ₄	TSS	Other
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

8. As necessary to achieve the quality listed in paragraph 6, treatment [will be/has been] provided by the operator as follows:
_____.

9. Other provisions/agreements between operator and water supply owner (specify). _____

10. The operator and the water supply owner(s) have agreed to a settlement for all future operation and maintenance costs of the replacement water supply which exceeds the operation and maintenance costs of the affected water supply by more than a *de minimis* amount.

11. The operator and the owner(s) of the water supply have agreed to a settlement for any reduction in access to or control over the replacement water supply the owner(s) has as compared to the access and control the owner(s) previously had over the affected water supply.

12. The operator and owner(s) of the water supply have agreed to a settlement for any excessive maintenance required for the replacement water supply.

13. The deed for the property, which the water supply is for, is recorded in Book No. _____, Page No. _____ in _____ County.

14. This agreement shall be governed by, construed, interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania.

15. Any modification or amendment to the terms and provisions of this Agreement shall be valid and effective only if and when made in writing and duly executed on behalf of the parties hereto.

BY THE WATER SUPPLY OWNERS (Please read carefully):

I am voluntarily and knowingly executing this agreement and I waive my full legal right to a replacement of a water supply of like [quantity and quality] as described above under paragraph 5 by agreeing to the terms of this waiver.

(Provide signatures of everyone with an ownership interest in the water supply.)

Name: _____ Date _____ Name: _____ Date _____

BY THE OPERATOR:

I hereby agree to provide a replacement supply in accordance with the terms of this agreement.

Name: _____ Date _____
Title: _____

Name: _____ Date _____ CORPORATE SEAL
Title: _____

This instrument has been recorded in _____ County, Pennsylvania, this _____ day of _____, at Book _____, Page(s) _____.

Signed Print Name

Sealed