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SUSQUEHANNA RIVER BASIN COMMISSION

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Title: Guidelines for Preparing an Alternatives Analysis

Effective Date: _____

Authority: Public Law 91-575, 84 Stat. 1509 *et seq.*, Sections 3.1, 3.4(2), 3.5(1) and 3.10, 18 C.F.R. §§ 806.2, 806.4, 806.5, 806.6, 806.13, 806.14, 806.16 and 806.21 - 806.24.

Policy: The Susquehanna River Basin Commission (Commission or SRBC) established regulatory requirements for water withdrawals, consumptive use and diversions at Part 806, including general provisions, application procedures, standards for review and terms of approval. Section 806.14 details the contents of applications to the Commission and includes a requirement for an alternatives analysis for new and major modifications that request an increase to an existing surface water withdrawal in settings with a drainage area of 50 square miles or less, or in a waterway with exceptional water quality. Section 806.14 also includes a requirement that a proposed out-of-basin diversion will meet the standards in § 806.24(b)(1)(i), which requires a demonstration that project sponsors have considered other alternatives to the proposed out-of-basin diversion. The Commission may require an alternatives analysis for other new projects on a case-by-case basis in limited circumstances under § 806.14(b)(2) and (3). In its regulation of water withdrawals, consumptive uses and diversions, the Commission intends to advance the purposes of the Compact, including the specific purposes of protection of public health, safety and welfare; stream quality control; economic development; protection of fisheries and aquatic habitat; recreation; dilution and abatement of pollution; the regulation of flows and supplies of groundwater and surface waters; the avoidance of conflicts among water users; and protection of the Chesapeake Bay (18 C.F.R. 806.2).

Purpose: This policy introduces procedures that should be followed by project sponsors regarding a formal evaluation of options for a proposed source. The document is intended to provide clarifying information about when an alternatives analysis is required or may be required, guidelines to the regulated community for conducting the analysis, and implementation guidance on the process and criteria used to evaluate an alternatives analysis consistent with the standards set forth in regulation.

Applicability: This policy applies to the review of all project applications where an alternatives analysis is required by regulation and on a case-by-case basis in limited circumstances to other projects where such an analysis is requested by the Commission. The document has been developed to provide guidelines to the regulated community. It may also be used by the public to gain information and insight on the Commission's project review program.

Disclaimer: The policy outlined in this document is intended to supplement existing requirements. Nothing in this policy shall affect regulatory requirements. The policies and procedures herein are not an adjudication or a regulation. This document establishes the framework within which the Commission will exercise its administrative discretion in the future and provides guidance for how the Commission will fulfill its regulatory review requirements. The Commission reserves the discretion to deviate from this policy statement if circumstances warrant.

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GUIDELINES FOR PREPARING AN ALTERNATIVES ANALYSIS

I. Introduction

This policy of the Susquehanna River Basin Commission (Commission or SRBC) introduces procedures that should be followed by project sponsors for preparation of a formal evaluation of alternatives. The general purpose of the regulatory requirements for an alternatives analysis is to promote better management of the water resources in the Susquehanna River Basin (Basin). Through an alternatives analysis, project sponsors can demonstrate that they have made good faith efforts to evaluate a range of options to develop and conserve sources that would satisfy the project's water demand, in terms of both quantity and quality.

Some areas in the Basin have natural conditions or existing demands that limit the amount of water resources available, and these locations may support very little additional water resource development without exacerbating diminishing water levels, increasing competition among users, and expanding dry stream reaches. Other areas may have pristine water courses with healthy aquatic communities that may be especially sensitive to resource over-development. In these settings, the Commission routinely imposes stringent passby requirements, withdrawal limitations and other operating conditions in its withdrawal approvals to avoid potential significant adverse impacts due to lowering of stream flow levels; surface water availability, including cumulative uses; rendering competing supplies unreliable; affecting other water uses; causing water quality degradation that may be injurious to any existing or potential water use; affecting fish, wildlife or other living resources or their habitat; affecting wetlands; or affecting low flow of perennial or intermittent streams. The policy encourages new development of water resources in more optimal settings that ensure the magnitude and nature of a proposed water withdrawal or use is balanced with water availability and water quality concerns.

A project sponsor is encouraged to review the Commission's Cumulative Water Use and Availability Study (CWUAS) report and interactive web map (<http://www.srbc.net/planning/cwuas.htm>) early in the planning process. The web map is a planning tool that can help identify watersheds that are likely to meet the projected demand and those where the proposed project is more likely to be denied or approved at reduced quantities or otherwise conditioned to limit impacts. The Commission also strongly recommends scheduling a pre-application conference as one is planning a new facility. While siting and design flexibility still allow consideration of alternative locations or alternate sources, Commission staff can discuss project needs and options, as well as the project review process and applicable regulatory requirements (including an alternatives analysis, if appropriate). Commission staff can help identify those settings that provide the best opportunities for sustainable water supplies while avoiding significant adverse impacts and the potential for conditions that may restrict operations.

The Commission has broad authority for water resources management under Article 3 of the Susquehanna River Basin Compact (SRBC, 1971). Sponsors of projects subject to review and approval of the Commission under 18 C.F.R. §§ 806.4 or 806.5 are responsible for submitting a complete application in accordance with Commission regulation 18 C.F.R. § 806.13. Requirements for a complete application are given in 18 C.F.R. § 806.14 and are described in application forms for proposed withdrawals and consumptive water uses. Additional informational requirements for diversions are listed in 18 C.F.R. § 806.24.

In its evaluation of all water withdrawals, consumptive uses and diversions subject to Commission review and approval, general standards set forth in § 806.21 require that a project shall be feasible and not be detrimental to the proper conservation, development, management, or control of the water resources of the Basin. If the Commission determines that a proposed project is not in the best interest of the conservation, development, management, or control of the basin's water resources, or conflicts with the comprehensive plan, it may modify the proposed project and approve it as modified or it may disapprove the project. In addition to the general standards in § 806.21, water withdrawals, consumptive uses and diversions subject to review and approval must also meet special standards at § 806.22, 806.23 and 806.24, respectively. To this end, the Commission has for several decades required project sponsors proposing diversions, and certain other projects upon its request, to conduct a formal analysis of various alternatives to the proposed project and to document that evaluation as part of their application.

Recent revisions of regulations under 18 C.F.R. § 806.14(b) clarify those circumstances in which an alternatives analysis is always required, while reserving discretion to request such an analysis for other proposed projects on a case-by-case basis. Under 18 C.F.R. § 806.24(b)(1)(i), project sponsors proposing an out-of-basin diversion are required to demonstrate their consideration of other reasonable alternatives to the diversion, including efforts to develop and conserve water within the importing basin.

Project sponsors applying to simply renew the Commission's approval of their existing project are not required to submit an alternatives analysis, unless otherwise requested by the Commission.

A formal exploration of alternatives by project sponsors should document whether there are other options that would satisfy project needs. This policy is intended to provide clarifying information to the regulated community regarding the applicability of the alternatives analysis requirement to a project, guidelines to assist project sponsors in preparing an Alternatives Analysis if required, and insight as to the factors and key items that are evaluated in Commission permitting decisions.

A. Definition of an Alternatives Analysis

For purposes of this document, an Alternatives Analysis is defined as a concise report submitted by a project sponsor as part of the technical information in a water withdrawal, consumptive use, or diversion application to document the alternatives to the proposed project that were considered during their planning process and the rationale to select the proposed project, be it a source of supply or quantity of withdrawal or use. The range of alternatives

should achieve most of the basic objectives of the project but would also avoid or substantially lessen any adverse impacts to water resources of the Basin.

The Commission will review the proposed project application, including the alternatives identified by the project sponsor. Commission staff will preview their findings and preliminary recommendations for the project, as proposed, with the project sponsor. Commission staff may also discuss alternatives considered by the project sponsor, other potential options and possible revisions to the proposed project.

B. Applicability of Alternatives Analysis Requirements

The requirements for when an alternatives analysis must be prepared are set forth in § 806.14 - Contents of Application. An alternatives analysis is required by regulation as follows:

Surface water withdrawals¹: Pursuant to § 806.14(b)(1)(v), project sponsors are required to prepare and submit an alternatives analysis for a proposed new surface water withdrawal or major modification that requests an increase of an existing surface water withdrawal that is:

- Located within a drainage area of 50 square miles or less, or
- Located in a waterway with exceptional water quality².

Project sponsors may be required by the Commission to prepare and submit an alternatives analysis for other new surface water projects and major modifications that request an increase of an existing withdrawal.

Diversions: Pursuant to § 806.14(b)(5)(i), project sponsors are required to provide information that a proposed out-of-basin diversion will meet the standards in § 806.24(b)(1)(i) – Standards for Diversions. These standards require project sponsors to demonstrate that they have considered reasonable alternatives to the diversion, including efforts to develop and conserve water within the importing basin. Thus, project sponsors are required to prepare and submit an alternatives analysis for any proposed out-of-basin diversion. Project sponsors applying for approval of an into-basin diversion are commonly not required to submit an alternatives analysis.

Groundwater withdrawals: Pursuant to § 806.14(b)(2)(v), project sponsors may be required by the Commission to prepare and submit an alternatives analysis for new projects and major modifications that request an increase of an existing groundwater withdrawal.

¹ Surface water withdrawals by public water suppliers subject to the provisions of the Pennsylvania Water Rights Act of 1939 are commonly reviewed under the Memorandum of Understanding between the Commission and the Pennsylvania Department of Environmental Protection regarding coordination of project review functions. Project sponsors need not submit an alternatives analysis related to an allocation request, unless notified during the water allocation permit review process being conducted by PA DEP that a separate Commission approval is required.

² Exceptional water quality, although undefined in Commission regulations, is generally considered to be present in streams designated as TS (Trout Spawning Waters) [NY]; Exceptional Value (EV) [PA] and Tier II Waters [MD]. In Pennsylvania, wetlands in watersheds tributary to watercourses with the state designation of EV are generally considered to have exceptional water quality. Recent water quality data or the results of an Aquatic Resource Survey conducted by the Commission may also be used to identify streams or wetlands functioning as exceptional quality surface waters.

Consumptive uses: Pursuant to § 806.14(b)(3)(iii), project sponsors may be required by the Commission to prepare and submit an alternatives analysis for new projects. Note that under § 806.4(a)(1), to the extent that a proposed consumptive use involves a withdrawal from groundwater or surface water, the project is also subject to the standards set forth in § 806.23 and the corresponding application requirements set forth in § 806.14.

Factors for requesting an Alternatives Analysis: An alternatives analysis also may be required by the Commission under § 806.14(b)(2) and (3) on a case-by-case basis for other new projects. In the past, the Commission has only rarely exercised its discretion to require an alternatives analysis when not specified in regulation. This policy does not anticipate any changes to that past practice.

The Commission considers various factors in its determination of whether a formal analysis of alternatives is necessary to complete its technical review of a project application. These factors consider the specific details and purpose of the proposed project, assess the inherent quality of the environment of the proposed setting and its relative sensitivity to potential impacts from the project (both context and magnitude), and ensure consistency with the *Comprehensive Plan for the Water Resources of the Susquehanna River Basin* (2013), among others. The Commission can provide project-specific guidance at pre-application meetings.

The Commission will notify the project sponsor that an Alternatives Analysis is necessary to complete technical review as early as possible during the application process. Notification may occur during pre-application discussions or meetings, or during the application review process. In addition to any administrative and technical deficiencies noted in the materials submitted for review, an application will be deemed incomplete pursuant to § 806.16 until a required Alternatives Analysis is received.

II. Elements of an Alternatives Analysis

The Commission recognizes that not every industry, commercial enterprise or community can simply pick up and relocate. Public water suppliers, in particular, must consider the highest quality water for its supply which may limit options for potential source locations. However, it may be possible without sacrificing water quality to locate a proposed stream intake on a trunk stream rather than a first order tributary, or to simply move its location farther downstream so that the withdrawal is in a larger watershed. Other proposed projects, such as power generation facilities and out-of-basin diversions, have unique needs, regulatory requirements, or unusual features where specific or innovative alternatives should be evaluated. The alternatives analysis should address the specific circumstances and context of the proposed project, focusing on requirements in regulation where applicable or on factors where flexibility may be possible.

The Alternatives Analysis should include an evaluation of alternatives to the proposed project considered during the planning process, the extent of the investigation of these alternatives, and the rationale for the proposed project. An Alternatives Analysis should include the following general elements:

- A. Description of the proposed project;
- B. Identification of alternatives;
- C. Description and analysis of alternatives;
 - a. Technical feasibility;
 - b. Economic feasibility;
 - c. Water resources;
- D. Extent of the investigation;
- E. Rationale for the proposed project.

The amount of information and level of detail required should be comprehensive but need not be exhaustive, and depends upon the nature of the project. In regard to requests for a modification to an existing withdrawal, a project sponsor should only include the information that is relevant to the proposed increase.

The discussion below is intended as general guidance to assure the Alternatives Analysis submitted addresses important elements of project planning. The Commission has adopted specific standards for out-of-basin diversions (contained in § 806.24(b)) projects whereby the project sponsor must demonstrate that they have made good faith efforts to develop and conserve sources of water within the importing basin, and have considered other reasonable alternatives to the diversion. The Alternatives Analysis should follow the outline in Appendix E.

A. Description of the Proposed Project

The project sponsor should briefly describe relevant features of the proposed project for comparison with alternatives. The project description may be general in nature and summarize details included elsewhere in the application about the site, facility and its location, the anticipated long-term owner and operator, how the water withdrawn will be used or consumptively used, the quantity of water needed, and relevant site activities.

B. Identification of Alternatives

The project sponsor should clearly define the alternatives to the proposed project or major modification that were considered during their planning process. In exploring alternatives for analysis, the project sponsor should consider the following, as appropriate:

- Alternative locations and water sources, including larger watersheds and sources with more available water for withdrawals;
- Opportunities for use of lesser quality waters, including wastewater or stormwater;
- Opportunities for use of shared water sources (and interconnections);
- Alternate withdrawal rates and storage options that would support project need and purpose;
- Alternative project design, site layout, physical infrastructure, water conservation technologies, or operations;
- Opportunities to eliminate or reduce direct and indirect impacts to water resources of the Basin; and
- Other alternatives to the proposed project.

In the report, the project sponsor should describe a range of alternatives (commonly a minimum of three alternatives) that were evaluated. Each alternative should be clearly labeled to be identifiable and separate.

Consideration of alternative locations or alternate water sources is recommended whenever practicable.

C. Description and Analysis of Alternatives

The description and analysis of each alternative should include pertinent details about the proposed alternate location or site characteristics, alternate water sources and any reductions in demand and any other relevant activities, designs and technologies. The project sponsor should evaluate each alternative in terms of technical feasibility, economic feasibility, and water resources.

Specific elements for each project type to consider in its description and analysis of alternatives are contained in the appendices, as follows: Appendix A (Surface Water), Appendix B (Groundwater), Appendix C (Consumptive Use) and Appendix D (Consumptive Use for Power Generation Facilities). Out-of-Basin Diversions are addressed in Appendix E. These include as follows:

1. Technical feasibility: The project sponsor should describe the technical feasibility of each alternative. For technical feasibility, the project sponsor should consider project location and project logistics.
2. Economic feasibility: The project sponsor should consider estimated costs of each alternative, including cost of parcel acquisition, upfront and ongoing operations costs, cost of supporting infrastructure, and cost of consumptive use mitigation responsibilities. The project sponsor should provide the basis for comparing the alternatives selected for consideration. Consistent with the Comprehensive Plan, the Commission commonly gives highest consideration to the least costly means for meeting water supply needs consistent with environmental quality and resource conservation objectives and goals.
3. Water resources: For each alternative, the project sponsor should consider water resources in terms of contributing drainage area & water availability, water quality, source sustainability versus projected water needs, and other uses & users within the watershed. The project sponsor should consider each alternative water source's potential for impacts (direct, indirect, and cumulative) to water resources of the Basin and ability to satisfy the realistic projections of water demand required during operations, use during construction and any phasing of that demand; seasonal and monthly variability of withdrawal and uses.

D. Extent of the investigation

The project sponsor should clearly define the reasons for limiting their consideration to the alternatives evaluated in this document. The project sponsor should also fully explain and justify all assumptions in the submittal. These may include any assumptions used for projects in which project planning is incomplete, and any limitations used in project design, choice of technologies, location and setting.

E. Rationale for the proposed project

The project sponsor should conclude the Alternatives Analysis by summarizing the reasoning followed to select the proposed project, be it a source of supply or quantity of withdrawal or use. This section should provide a justification and rationale for the proposed project.

Appendix A. Surface Water Withdrawal - Description and Analysis of Alternatives

Suggested elements include, but are not limited to:

1. Technical feasibility
 - a. Project location
 - Source water name and parcel location
 - Site characteristics
 - Distance from where water will be used
 - Parcel limitations or constraints as related to project purpose
 - b. Project logistics
 - Sufficient parcel size
 - New development or redevelopment in existing footprint
 - Efficient/least-impact design method & water conservation technologies
 - Relationship between requested quantity and utilization of storage, to minimize daily and instantaneous withdrawal rates.
2. Economic feasibility
 - a. Estimated cost of parcel acquisition
 - b. Estimated cost of upfront and ongoing operations
 - c. Estimated cost of supporting infrastructure
 - d. Estimated cost of consumptive use mitigation
3. Water resources
 - a. Contributing drainage area size (Aquatic Resource Class)
 - b. Water availability at the point of withdrawal
 - c. Water quality classification
 - d. Source sustainability versus projected water needs
 - e. Existing uses and users (approved projects in same watershed, recreational uses, etc.)
 - f. Potential for impacts to water resources of the Basin

Appendix B. Groundwater Withdrawal - Description and Analysis of Alternatives

Suggested elements include, but are not limited to:

1. Technical feasibility
 - a. Project location
 - Parcel location
 - Site characteristics
 - Distance from where water will be used
 - Parcel limitations or constraints as related to project purpose, source water protection area requirement by state agencies (public water supply)
 - b. Project logistics
 - Sufficient parcel size
 - New development or redevelopment in existing footprint
 - Losses through distribution system (public water supply)
 - Water conservation efforts
 - Relationship between requested quantity and utilization of storage or water conservation technologies to minimize daily and instantaneous withdrawal rates
2. Economic feasibility
 - a. Estimated cost of parcel acquisition
 - b. Estimated cost of upfront and ongoing operations
 - c. Estimated cost of supporting infrastructure and treatment systems
 - d. Estimated cost of consumptive use mitigation (for non-public water supply)
3. Water resources
 - a. Hydrogeologic setting
 - b. Groundwater availability & recharge
 - c. Source water quality
 - d. Source sustainability versus projected water needs
 - e. Area of influence
 - f. Existing uses and users
 - g. Potential for impacts to water resources of the Basin

Appendix C. Consumptive Use - Description and Analysis of Alternatives

Suggested elements include, but are not limited to:

1. Technical feasibility
 - a. Methods for reducing overall consumptive use
 - b. Methods for implementing newer technologies to achieve water conservation
2. Economic feasibility
 - a. Estimated cost of methods to reduce consumptive use
 - b. Estimated cost of newer technologies for water conservation efforts
 - c. Proposed consumptive use mitigation method and estimated costs
3. Water resources
 - a. Point of discharge/return water as related to water loss from the withdrawal source
 - b. Use of alternate sources during low flow periods

Appendix D. Consumptive Water Uses Related to Power Generation (SRBC Resolution No. 2015-02)

Suggested elements include, but are not limited to:

1. Technical feasibility
 - a. Project location
 - The project sponsor should provide an analysis of other sites that were considered with respect to the availability of water, fuel source(s), transmission lines, and prospective markets. The analysis should demonstrate the benefits of the chosen alternative.
 - Major project milestones such as determination of site location, choice of technologies, design, procurement, construction and completion date.
 - b. Project logistics
 - The project sponsor should provide a net present value (NPV) analysis that demonstrates the time related project costs differential between a wet-cooling system and a dry cooling system or hybrid systems, as outlined in Commission Resolution No. 2015–02.
2. Economic feasibility
 - a. Estimated capital cost.
 - b. An NPV analysis that addresses differential on-going costs such as fuel efficiency, output reductions, and cost of CU mitigation.
 - c. The daily, monthly, and annual water use should be described, including any anticipated seasonal cycling.
 - d. The estimated output per unit of water consumed should be provided, such as gallons per MWh. For example, some combined cycle gas turbine (CCGT) plants using dry cooling technology produce 800 MWh and require 100,000 gallons of water per day. Rationale should be provided if the ratio of power output per water consumed is less. Similarly, CCGT plants using wet cooling technology should achieve a reasonable power output per water consumed ratio.
 - e. Major project milestones such as determination of site location, choice of technologies, design, procurement, construction and completion date.
3. Water resources
 - a. Potential impacts to aquatic life related to water withdrawal and consumptive use
 - b. Potential impacts to communities and wildlife habitat related to construction and maintenance of fuel pipelines and electric transmission lines

Appendix E. Out-of-Basin Diversions - Description and Analysis of Alternatives

For each alternative, suggested factors include, but are not limited to:

1. Stated goal of the alternative
 - a. Development of sources of water within the importing basin
 - b. Conservation of sources of water within the importing basin
 - c. Other alternatives to the diversion

2. Sources of water within the importing basin (surface water, groundwater, storage options, interconnections)
 - a. Technical feasibility
 - i. Are sources available?
 - ii. What is the distance from the location where the water will be used?
 - iii. What is the availability of water supply infrastructure?
 - iv. What are the limitations or constraints as related to project purpose?
 - b. Project logistics
 - i. New development of a water source, redevelopment or increase in existing source?
 - ii. Describe the projected water use needs through design year.
 - iii. Would this alternative reduce the amount, timing of the diversion, or the duration of the net diversion? (e.g., return of wastewater to the Susquehanna River Basin)
 - iv. What is the level and scope of land use and natural resource planning within the importing basin?
 - v. Is the state taking responsibility to ensure development is adequately supported by in-basin sources of water?
 - vi. Are there any requirements for source water protection areas?
 - c. Economic feasibility
 - i. What are the primary costs or any other appropriate figure for comparison purposes?
 - ii. An analysis to determine aspects of alternatives that inflate or reduce the primary costs for that alternative;
 - iii. Project re-design options that were considered to avoid impacts and still meet the basic purpose and projected needs of the project.

3. Water conservation
 - a. Technical feasibility
 - i. What water conservation measures have been implemented or are proposed?
 - ii. Could additional water conservation measures or new technologies reduce the amount, timing, or the duration of the diversion?
 - iii. What are the limitations or constraints as related to project purpose?
 - b. Project logistics
 - i. Availability of infrastructure
 - c. Economic feasibility of the water conservation technology options

- i. What are the primary costs or any other appropriate figure for comparison purpose?
- ii. An analysis to determine aspects of alternatives that inflate or reduce the primary costs for that alternative;
- iii. Project re-design options that were considered to avoid impacts and still meet the basic purpose and projected needs of the project.

4. Other Alternatives

- a. Technical feasibility
 - i. What are the limitations or constraints as related to project purpose?
- b. Project logistics
- c. Economic feasibility
 - i. What are the primary costs or any other appropriate figure for comparison purpose?
 - ii. A sensitivity analysis to determine aspect of alternatives that inflate or reduce the primary costs for that alternative.