

Before the Susquehanna River Basin Commission
Notice of Proposed Rulemaking
Modifying 18 CFR Part 801, Review and Approval of Projects

Mr. Jason E. Oyler, Esquire
General Counsel,
Susquehanna River Basin Commission
4423 North Front Street
Harrisburg, PA 17110-1788

I. Introduction.

I am Eric Epstein (“Epstein” or Mr. Epstein”), and I have represented Three Mile Island Alert, Inc. (“TMIA”) either as spokesperson or Chairman since 1984. I am respectfully submitting comments in support of the Susquehanna River Basin’s Commission’s (“SRBC” or “the Commission”) Changes to Proposed to Part 81 § 801.12 Electric power generation.

(d) Project sponsors proposing new or significantly modified power generation plants in the basin shall consider the use of dry cooling technologies and submit to the Commission a rigorous alternatives analysis. This analysis shall include evaluation of the costs, benefits, trade-offs and drawbacks of various cooling and water conservation techniques, and a full evaluation of options for providing effective consumptive use mitigation. (1)

Finally, the Commission proposes the addition of paragraph (d) to § 801.12 related to electric power generation facilities. This new paragraph memorializes and elevates the Use of Dry Cooling Technology for Power Generation and Other Facilities, Commission Resolution Number 2015-02 (Dry Cooling Resolution). The Dry Cooling Resolution has been instrumental in reducing the water consumption of new power plants in the basin. The Commission recognizes that an increasing number of power generation facilities, most recently combined cycle natural gas powered plants, are utilizing dry cooling technology to reduce the environmental footprint in the basin, and are demonstrating overall efficiencies in operations that are equivalent to wet cooling processes. Dry cooling technology significantly reduces the water demand of such facilities and provides increased flexibility in siting facilities in proximity to fuel sources and electrical transmission lines. Use of dry cooling technology reduces impacts to aquatic ecosystems through the reduction of thermal impacts associated with large industrial volume discharges. The proposal would require consideration of dry cooling technologies to any new or significantly modified power generation facilities and an alternatives analysis to continue the consideration of water conservation technologies in an industry that is the largest consumptive user of water in the basin.

1 Federal Register/Volume, 89, Number, 56/Thursday, March 21, 2024/Proposed Rules.

Mr. Epstein and TMI-Alert have clearly defined interests relating to the Susquehanna River. TMIA has actively participated in policy, rule-making, and testimony before the Commission for over 15 years. (2)

TMI-Alert is a safe-energy organization based in Harrisburg, Pennsylvania and founded in 1977 with members throughout central and eastern Pennsylvania. TMIA monitors Peach Bottom, Susquehanna, and Three Mile Island nuclear generating stations. TMIA is the largest and oldest safe-energy group in central Pennsylvania.

TMIA enjoys widespread public and political support in its role as a watchdog of nuclear power production. In the spring of 1987, TMIA was recognized by the Pennsylvania House of Representatives for 10 years of community service. The House, along with the City of Harrisburg, formally applauded TMIA's efforts on behalf of the community at their 20th and 25th anniversaries.

Mr. Epstein is the Chairman of TMI-Alert. He has served as either Spokesperson or Chairman of the organization since 1984. Three Mile Island Alert membership has suffered through the 1979 meltdown at Three Mile Island, the forced shutdown of Peach Bottom in 1987, and rate shock caused by the construction of the Susquehanna Steam Electric Station in the 1980s.

2 Re: "Amazon and Talen Energy," (July 13, 2024.)

Re: "Ownership Data for Water Utilities," (November 2, 2023.)

Re: "Project Sponsor: Constellation Energy Generation, LLC. Project Facility: Three Mile Island Generating Station, Londonderry Township, Dauphin County, Pa. Applications for renewal of groundwater withdrawals approvals based on changes in operating status of the project and revised demand projections," (November 3, 2022.)

Re: Technical Review: Susquehanna River Basin Commission Docket Numbers: Three Mile Island Nuclear Station, Unit 1 - Well A - 2021-054; Three Mile Island Nuclear Station, Unit 1 - Well B - 2021-055; and, Three Mile Island Nuclear Station, Unit 1 - Well C - 2021-056," (January 3, 2022.)

Re: Three Mile Island Station, Unit 1, SRBC Pending Nos. 2021-054, 2021-055, & 2021-0562022.

Re: Three Mile Island, Clean Water Act ("CWA"), Section 401, Water Quality Certification, (February 10, 2021).

Re: "York Haven Hydroelectric Project, (FERC Project Number, 1888) Testimony of Eric J. Epstein for TMI-Alert, February 6, 2020.

Re: Three Mile Island Alert, Inc.'s Comments on the Susquehanna River Basin Commission's Draft Comprehensive Plan for the Water Resources of the Susquehanna River Basin, August 18, 2008.

Re: Eric Joseph Epstein's Administrative Appeal of the Susquehanna River Basin Commission's Approval of the Final Determination of PPL Susquehanna, LLC's Application for Surface Water Withdrawal Request to Modify Application 19950301-EPU-0572 Pursuant to 18 CFR §808.2, (September 15, 2008.)

TMI-Alert has actively intervened and monitored the licensing and operation of the Peach Bottom Atomic Power Station (“Peach Bottom”) since 1984, the Susquehanna Steam Electric Station (“SSES” or “Susquehanna” since 1984, and Three Mile Island Nuclear Generating (“TMI”) since 1977.

TMIA’s membership have legitimate and historic concerns regarding radiological contamination resulting from radiological releases related to normal and abnormal operations that impact the value of its property, and interfere with the organization's rightful ability to conduct operations in an uninterrupted and undisturbed manner.

Mr. Epstein’s participation may reasonably be expected to assist in developing a sound record. Epstein is well versed and an acknowledged nuclear expert, “...On careful review of the pleadings, we acknowledge Epstein’s expertise in the areas of nuclear decommissioning, nuclear waste isolation, nuclear economics, nuclear safety, universal service, and community investment.” (3)

Mr. Epstein’s advocacy and his responsibility to his membership are undisputed, and have been unbroken Three Mile Island Alert (“TMIA”) Inc. TMIA has numerous members that reside in close proximity to the three nuclear generating stations on the Susquehanna River Valley. These members have concrete and particularized interests that will be directly affected positively by this rule change. Moreover, the Pennsylvania Constitution is clear in Article I, Natural Resources and the Public Estate Section 27, protects all Pennsylvanians.

The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people. (Joint Resolution, Number 3, Section 27.)

TMIA’s history and mission are germane and important to this proceeding. As demonstrated by the above discussion and attached supporting materials, Three Mile Island Alert members are clearly impacted by this proposal. The SRBC’s proposal is timely given the challenges of climate change, drought and water quality. Water conservation and quality, and the equitable distribution of water resource are germane to TMIA’s stated mission.

3 PP&L Base Rate Proceeding, PA PUC Commission, Administrative Law Judge Robert Christianson, Re: Epstein Protest, paragraph, 10.

III. Background: Nuclear Power’s Adverse Impact on the Susquehanna River.

In a boiling water reactor (“BWR”) the primary water system absorbs enough heat from the fission process to boil its water. In contrast to the pressurized water reactor, the BWR uses only two separate water systems as it has no separate steam generator system. This steam and water mixture rises to the top of the reactor and passes through two stages of moisture separation. Water droplets are then removed and steam is allowed to enter the steam line. The steam is directed to the turbine. The turbine begins to turn within the generator and electricity is produced.

The Peach Bottom Atomic Power Station and the Susquehanna Steam Electric Station are boiling water reactors.

In a pressurized water reactor (“PWR”), nuclear fission produces heat inside the reactor. That heat is transferred to water circulating around the uranium fuel in the first of three separate water systems. The water is heated to extremely high temperatures, but doesn’t boil because the water is under pressure. The water within the primary system passes over the reactor core to act as a moderator and coolant but does not flow to the turbine. It is contained in a pressurized piping loop. The hot, pressurized water passes through a series of tubes inside the steam generator.

The Three Mile Island Nuclear Generating is a pressurized water reactor.

Nuclear power generation has a measurable negative impact on the Susquehanna River every day. The environmental hazards include: cooling tower blow down, effluent discharges, fish kills, thermal inversion, and water consumption. Nuclear plants use millions of gallons daily for coolant and to perform normal industrial applications. There are three nuclear power facilities on the Susquehanna River. There are four operating boiling water nuclear generation units. Two plants, with three units, are located on the Lower Susquehanna, and have the capacity to draw in as much as half the flow of a River in a day.

Water use and water consumption have a direct and indirect relationships with nuclear power’s safety related components, plant cooling, and are connected to the health and safety of the Susquehanna River and the regional community. NRC technical specifications are reactor-specific, but all include a limit on water intake temperature.

Nuclear licensees have not addressed the impact of nuclear power generation on aquatic ecosystems, corrosion, entrainment, impingement, groundwater contamination, tritium migration or water consumption and disposal. Licensees had the opportunity during the relicensing of Peach Bottom, Susquehanna, and Three Mile Island to address aquatic and water issues. The relicensing processes did not require a revised Environmental Impact Statement and all three licensees entered outdated and generic information. The reactors were exempted from considering the impact of climate change on the operation of aging plants. The NRC allowed the licensees to grandfather (4) data that ignored climate change, new environmental regulations, and the impacts of aging. The NRC’s relicensing process failed to compel Peach Bottom, the Susquehanna Electric Steam Station, and Three Mile Island from addressing numerous issues that could adversely impact the areas surrounding the plant, i.e., climate change, earthquakes, and severe flooding.

4 The Nuclear Regulatory Commission Notice Renewing Nuclear Power Plant Licenses, Environmental Review, 88 Fed. Reg. 13,329 (March 3, 2023), Generic Environmental Impact Statement for License Renewal of Nuclear Plants.”

The Department of Environmental Protection and the Nuclear Regulatory Commission exempted Peach Bottom Atomic Power Station from preparing a final Environmental Impact Statement. (Please refer to the legal ruling ordering Peach Bottom to conduct an updated Environmental Impact Statement under III. C.) Neither Constellation or the NRC will explain why Peach Bottom is not conducting a site-specific Environmental Impact Statement for grandfathered environmental approvals after the NRC Order. (NRC, Region 1, Annual Assessment, May 24, 202.)

The original Environmental Impact Statements (“EIS”) were conducted by the NRC’s predecessor agency - the Atomic Energy Commission (“AEC”) - in early 1970s for Peach Bottom and Three Mile Island. Susquehanna’s EIS was completed in the early 1980s by the Nuclear Regulatory Commission. All of the licenses were granted approval prior to the Commonwealth of Pennsylvania enactment of aggressive statutes and regulations. Among the legislation passed were the Radiation Act (1984), Chesapeake Bay Commission Agreement Act (1985), Hazardous Site Cleanup Act (1988), Pennsylvania Environmental Stewardship and Water Protection Act (1999) and Act 129 (2008).

The initial EIS for all of the nuclear power plants on the Susquehanna River were issued decades prior to the emergence of the Environmental Protection Agency (“EPA”) Section 316(b) of the Clean Water Act. EPA issued regulations on the design and operation of intake structures in order to minimize adverse environmental impacts. The EPA promulgated regulations in 2001, 2003, 2006 and 2014. The requirements are included in the National Pollutant Discharge Elimination System (“NPDES”) permit regulations, 40 CFR Parts 122 and 125 (Subparts I, J, and N).

The AEC was abolished by the Energy Reorganization Act of 1974, which assigned its functions to two new agencies: the Energy Research and Development Administration and the Nuclear Regulatory Commission. This year the NRC was reconstituted under the Advance Act. The makeover “purports to preserve the Nuclear Regulatory Commission’s existing mission of protecting public health, safety and the environment, the act contradicts that mission by mandating the NRC to promote nuclear energy and to “fast track” nuclear licensing regulations. This double mission of protection and promotion is paradoxical and illogical. This conflict is why, in 1974 the U.S. dissolved the Atomic Energy Commission and created the NRC as an independent agency to regulate commercial nuclear power, with oversight of public health, safety and the environment. Nuclear promotion and advancement was delegated to the Department of Energy. These conflicting missions were unacceptable in 1974 and are still unacceptable today.” (5)

The Nuclear Regulatory Commission has made a coordinated effort to ignore the air, land, and water impacts of nuclear power production. This retreat from safety was captured in last month’s passage of the Advance Act ward impact of nuclear. Edwin Lyman, nuclear power safety director of the Union of Concerned Scientists, declared: “Make no mistake. This is not about making the reactor licensing process more efficient, but about weakening safety and security oversight across the board, a longstanding industry goal. The change to the NRC’s mission effectively directs the agency to enforce only the bare minimum level of regulation at every facility it oversees across the United States.” (6)

5 Counterpunch, “The ADVANCE Act: A Bipartisan Surrender to the Nuclear Lobby,” by Mays T. Smithwick and Jacqui Drechsler, Jul 26, 2024.

6 Statement by Edwin Lyman, Nuclear Power Safety Director, Union of Concerned Scientists, Published on June 17, 2024

The Susquehanna River Basin Commission had been at the forefront of environmental stewardship. The SRBC identified climate change and water use management in 2008.

The [SRBC] Committee has identified finalizing accurate water supply and demand projections to improve the capability to plan for the social, economic, environmental and recreational needs of the Lower Susquehanna region as a leading priority. This information serves as the basis for identifying and analyzing Critical Water Planning Areas, and for better preparation in advance of extreme flood and drought conditions. Collection and dissemination of sound water budget data is a broad goal shared by other regions of the state, but it is especially important for this region because some well-known critical water needs and unique regional features influence how water resource plans in the region are designed and implemented. (7)

Climate change, drought and flooding were anticipated over 20 years ago by the Susquehanna River Basin Commission. At that time TMIA argued: “We do not take issue with the Committee’s identified priorities, we only ask that you expand your priorities to include the two nuclear power plants on the Lower Susquehanna River - Peach Bottom and Three Mile Island. These three units have been uprated and are likely to have license extensions for another two decades.” (8)

However, the Nuclear Energy Institute and the Nuclear Regulatory Commission continue to resist examining the threat of climate change to nuclear generating stations. On April 2, 2024, the US Government Accountability Office (“GAO”) publicly released an extensive report, “Nuclear Power Plants Should Take Actions to Fully Consider the Potential Effects of Climate Change” (GAO-24-106326). The report thoroughly examined how climate change is expected to adversely affect nuclear power plants, and what actions the Nuclear Regulatory Commission has taken to address the risks to nuclear power plants. The GAO conducted extensive interviews with officials from the Department of Energy, the National Oceanic and Atmospheric Administration, and the Nuclear Regulatory Commissions. The GAO recommend that the NRC needed to do more than look at the reactor operation impacts on climate change: NRC needs to begin analyzing the adverse impacts climate change on nuclear power plant operations.

7 The Lower Susquehanna Regional Resources Committee, Draft Priorities, May 18, 2028.

8 “Three Mile Island Alert, Inc.’s Comments on the Water Resources Planning Act Lower Susquehanna Regional Resources Committee Meeting,” Public Meeting, and Hearing, September 15, 2008.

A. Groundwater Leaks at Nuclear Reactors.

Unmonitored leaks of radioactive materials offsite are violations of NRC regulations. Leaks of radioactive contaminated liquid into the ground from buried components at American nuclear reactors have occurred with increased frequency. Many of these leaks were initially undetected and remained undetected for many years. In at least one case, the leak was not detected until after an underground plume of several million gallons of contaminated water traveled beyond the nuclear facility's site into drinking wells. In most cases, the leak was finally detected more by happenstance than by rigorous monitoring. In all cases, a small leak undetected for an extended period of time permitted large amounts of contaminated water to enter the ground around the facilities.

A list of tritium leaks compiled in 2006 include: Arizona: Palo Verde; Connecticut: Connecticut Yankee (Haddam Neck); Delaware: Salem; Georgia: Hatch; Kansas: Wolf Creek; Illinois: Braidwood, Byron, Dresden; Massachusetts: Pilgrim and Rowe; Missouri: Callaway; New Hampshire: Seabrook New Jersey: Oyster Creek; New York: Indian Point); Ohio: Perry; Pennsylvania: Peach Bottom and Three Mile Island; Tennessee: Watts Bar Vermont: Vermont Yankee; and Wisconsin: Point Beach. Most nuclear facilities experience leakages of contaminated water. It seems entirely possible, if not highly likely, that more nuclear facilities have an ongoing leak that has yet to be detected. (9)

Barak Obama was a senator from Illinois at the time tritium leaked merged as a public health and safety issue. He stated that, "(w)hile it's encouraging that the nuclear industry recognizes it has a special responsibility to keep communities informed of tritium leaks, the voluntary guidelines recommended by the Nuclear Energy Institute would still allow tritium leaks to occur without the public ever finding out about it," he said. "The nuclear industry already has a voluntary policy, and it hasn't worked." (10)

Three Mile Island-1 found elevated tritium levels onsite during the fall of 2005. (11) The elevated levels were due to leak at one well traced to a sump from an auxiliary boiler in the turbine building (East Side). TMI's data, which was reviewed by the DEP, found tritium levels to be about 19,000 pCi/liter. The contaminated water did not commingle with onsite groundwater or breach the site boundary. TMI had announced that they may drill two additional wells. (12)

The Nuclear Regulatory Commission apologized for public reassurances from its staff that a major leak of radioactive tritium from Xcel Energy's Monticello nuclear reactor had not reached the Mississippi River, drinking water source for 20 million people including the Minneapolis/St. Paul metro area.

9 "Tritium leaks a problem at many nuclear plants," Burlington Free Press, Sam Hemingway, January 10, 2010.

10 Hal Dardick, "Obama Still to Press Spill Bill Despite Nuclear Industry Plan," Chicago Tribune, May 10, 2006.

11 The EPA tritium limit for safe drinking water is 20,000 picocuries per liter.

12 David Beaulieu, NRC Senior Resident Inspector, October 25, 1990.

13 NRC Senior Environmental Project Manager Stephen S. Koenick, May 15, 2024.

B. Pipe failures. (14)

Pipes at nuclear power plants carry cooling water to the reactor vessel and spent fuel pool, transport steam to the main turbine, provide hydrogen gas to cool the main generators, supply fuel and lubricating oil to the emergency diesel generators, maintain the fire sprinklers ready to extinguish fires, and numerous other vital functions. Given so many pipes, a success rate of 99.99%—remarkably similar to a failure rate of one broken pipe out of ten thousand pipes—would result in lots of piping failures.

The Electric Power Research Institute’s report revealed lots of piping failures at U.S. nuclear power plants between 1961 and 1997 (Figure, 1). The non-leaking failures are identified by inspections indicating that safety margins had been compromised, forcing the pipes to be replaced before they leak. The leaking failures are identified by puddles on the floor or other obvious signs, again forcing pipes to be replaced.

Type of Failure	Number of Events
Total Non-Leaking Failures	1816
IGSCC	1330
Wall Thinning	483
Delamination	2
Too Thin	1
Total Leaking Failures	2247
Small Leak	1999
Large Leak (Failed)	65
Rupture/Severed*	179
Separation	4
TOTAL	4064**

* Includes 1 event that was classified as puncture failure

** Includes 1 event where the type of failure was not given

Figure, 1 (Source: [Electrical Power Research Institute.](#))

14 Union of Concerned Scientists, “Nuclear Pipe Nightmare,” Dave Lochbaum. (October 27, 2015.)

The Electric Power Research Institute’s report identified numerous reasons why pipes break (Figure, 2). MIC under corrosion stands for microbiologically induced corrosion—tiny little bugs that eat metal. Pipes can be designed wrong, installed wrong, or weakened via an array of methods during installation.

Failure Mechanism Categories	
Category Title Level 1 Mechanism Level 2 Mechanism Level 3 Mechanism	Category Title Level 1 Mechanism Level 2 Mechanism Level 3 Mechanism
Aging 1. Aging	Erosion, Flow-Assisted Corrosion 1. Erosion, Flow-Assisted Corrosion 2. Cavitation 2. Single Phase Erosion-Corrosion 2. Slurry Erosion 2. Wet Steam Erosion
Corrosion 1. Corrosion 2. Acid Corrosion 2. Galvanic Corrosion 2. MIC 3. Dealloying 2. Pitting Corrosion 2. Saltwater Corrosion	
Construction/Fabrication Defect/Error 1. Construction/Fabrication Defect/Error 2. Damage 3. Lamination 3. Wrong Material 2. Error 3. Installation Error 2. Weld Defect 3. Lack of Fusion 3. Porosity 3. Slag 3. Slag/Porosity	Fatigue 1. Fatigue 2. Corrosion Fatigue 2. Thermal Fatigue 2. Vibratory Fatigue
	Stress Corrosion 1. Stress Corrosion 2. Chloride Stress Corrosion 3. IGSCC 3. TGSCC
	Mechanical Damage 1. Mechanical Damage 2. Fracture 3. Frozen Line 2. Deformation
Design Error 1. Design Error 2. Dynamic Load 2. Improper Support 2. Material Weakness	Wear 1. Wear 2. Corrosion Wear
	Water Hammer 1. Water Hammer
	Not Specified 1. Not Specified

C: Peach Bottom Atomic Power Station's Environmental Impacts on the Susquehanna River Basin.

Peach Bottom does not use a closed-cooling system. The Peach Bottom Atomic Power Station uses and treats potable water from the Susquehanna River. The average daily usage is anywhere from 280,000 to 360,000 gallons per day.

The station does not currently use evaporative cooling towers for cooling needs, but evaporates up to 28 million gallons daily ("mgd") through heat transfer via once-through cooling with water withdrawn from Conowingo Pond. The Peach Bottom Atomic Power Station, located on the west bank of the Conowingo Pond in York County, Pennsylvania, and 36 miles from downtown Baltimore- is a two-unit nuclear generating facility that uses water from the Conowingo Pond for cooling purposes.

Water shortages on the Lower Susquehanna reached critical levels in the summer of 2002. For the month of August 2002, 66 of 67 Pennsylvania counties had below normal precipitation. On August 9th, 2002, Governor Schweiker extended the drought emergency for 14 counties across Southcentral and Southeast Pennsylvania. Precipitation deficits at or exceeding 10.0 inches were recorded in several counties, included Dauphin County. The greatest deficit of 14.6 inches was in Lancaster County, and departures from normal precipitation range included 0.0 inches in York County. Peach Bottom is located in Lancaster and York Counties while Three Mile Island is situated in Dauphin and Lancaster Counties. (Pennsylvania Department of Environmental Protection, "Drought Report and Drought Conditions Summary," August to September, 2002.)

Ten years later in April 2012, the Susquehanna River reached record seasonal lows matching drought conditions of 1910 and 1946. U.S. Geological Survey analysis showed stream flows at hydrological emergency levels in 42 of the state's 67 counties. Another 10 counties were at warning levels, and another 12 at watch level. Only three were normal or above. Groundwater levels are at emergency levels in 13 counties. The SRBC began issuing temporary orders to cease water withdrawals in February, 2012.

The Lower Susquehanna River is impacted abnormal weather conditions. For example, "periods of drought or extended periods of low flow can adversely affect the ability of the dam to meet minimum flow and summertime pond level minimums. In addition, due to high ambient water temperatures and low flow, maintaining the minimum dissolved oxygen requirement is also challenging. These situations can further be compounded if the flows coming into the pond as measured at the Marietta gage do not equal the flow outfalls. This not only affects the dam, but also the water supply companies and Peach Bottom Atomic Power Station due to the loss of pond level. Additionally, recreational boating and marina operation becomes severely hampered due to low water levels. ("Conowingo Pond Management Plan," Publication Number,242, June 2006, p. 71.)

The Susquehanna River Basin is flood prone. "Since record-keeping began 200 years ago, the Susquehanna River has proven one of the most flood-prone watersheds in the nation. The watershed encompasses 27,510 square miles and extends from New York to Pennsylvania to the Chesapeake Bay in Maryland – where nearly 4 million people live...Of the 1,400 communities in the river basin, 1,160 have residents who live in flood-prone areas." ("7th Annual Susquehanna River Symposium," Bucknell University, October 12-13, 2012.)

Unlike other consumptive user in the summer of 2002, Peach Bottom, did not “conserve” water until the plant was forced to close to address a massive fish kill. On August 30, 2002, high differential pressures on the circulating water intake screens forced the manual shut down of Peach Bottom. “The problem was caused by a sudden surge in the amount of fish (Gizzard Shad) that entered the intake canal and clogged the screens. Unit 3 power was returned to 100 percent following cleaning of the circulating water screens and restating of the 3’A’ circulating water pump.” (Nuclear Regulatory Commission, IR-50-277/02-05; 50-278/02-05).

Five years later in the summer of 2007, Peach Bottom was detected returning water to the Susquehanna River at temperatures in excess of 110 degrees. Communities and ecosystems that depend on limited water resources are adversely affected by “normal operating conditions” at nuclear stations.

The Conowingo Pond also plays a cortical role in Peach Bottom's water intake. “Declining pond levels threaten Peach Bottom’s cooling water intake, recreational use of the Conowingo pond, shore habitat levels, and downstream flows. As drought conditions continue, the operators continue to generate hydroelectricity as much as possible using the water available to them, but it becomes a secondary concern. The primary concern becomes the depletion of storage in the pond and safeguarding the ability of the pond to continue to make adequate releases during low flow events of extended duration.”

The Conowingo pond provides a mixed warm water recreational fishery for largemouth and small mouth bass, channel catfish, white crappie, bluegill, and to lesser degrees, striped bass, walleye and carp. The most abundant fish in the Conowingo pond is the gizzard shad. Bass fishing tournaments are commonplace during the open season. Steep, wooded slopes and railroad postings limit shoreline and boat access. The heated effluent from Peach Bottom Atomic Power Station attracts game fish during the winter and extends the open-water fishing season. (15)

Fish kills have become an acceptable part of nuclear generation at Peach Bottom

Millions of fish (game and consumable), fish eggs, shellfish and other organisms are sucked out of the Lower Susquehanna River and killed by nuclear power plants annually. It is hard to know just what the impact on fisheries is, because cool water intakes have been under the radar screen compared to some types of pollution, said Pennsylvania Fish and Boat Commission aquatics resources chief Leroy Young.” (Ad Crable, “Intelligencer Journal,” January 15, 2005).

A former Peach Bottom nuclear plant employee said he was "sickened" by the large numbers of sport fish he saw sucked out of the Susquehanna. "When the water comes in, fish would swim in through tunnels and swim into wire baskets," said the man who lives in southern Lancaster County and asked that his name not be used. "There were hundreds and hundreds of fish killed each day. Stripers and bass and walleye and gizzard shad and all kinds of fish. It took a forklift to carry them out," (Intelligencer Journal, January 15, 2005).

Peach Bottom’s request to extend the operating licenses for Peach Bottom hit a wall at the Nuclear Regulatory Commission. The NRC ruled that Constellation would have to conduct a revised environmental study. Subsequent License Renewal applications will not be able to rely on the 2013 Generic Environmental Impact Statement. Applicants will be able to rely on the updated GEIS that is in development once it is finalized. In other words, there will not be a site-specific Environmental Impact Statement to license Peach Bottom for an additional 80 years.

In considering the pending motions of Beyond Nuclear, Inc. for leave to file a new contention and to reopen the record, we have the opportunity to reconsider the Commission’s decision in CLI-20-11, which applied the reasoning in CLI-20-03 in the Turkey Point proceeding to this case. Today, we reversed CLI-20-03-, which held that C.F.R. § 51.53.(c)(3) applied to a subsequent license renewal applicant’s preparation of an environmental report, and now reverse the portion of CLI-20-11 related to Contention A, in which Beyond Nuclear claimed that the environmental report failed to address accident risks posed by aging reactor equipment during a second license renewal term.

In today’s related decision in the *Turkey Point* proceeding, CLI 22-04, we held that 10 C.F.R. § 5153(c)(3) only applies to an initial license renewal applicant’s preparation of an environmental report and that the Generic Environmental Impact Statement for License Renewal of Nuclear Plants did not address subsequent license renewal. For the reasons explained in CLI--, we conclude that the Staff did not conduct an adequate NEPA analysis before issuing Exelon licenses for the subsequent license renewal period for Peach Bottom. As we have motions pending before us and the proceeding remains open, we can modify, suspend, or revoke Exelon’s licenses, as appropriate. (16)

Neither Constellation or the NRC will explain why Peach Bottom is not conducting a site-specific Environmental Impact Statement for grandfathered environmental approvals. (17) (NRC, Region 1, Annual Assessment, May 24, 2024.)

16 The United States Nuclear Regulatory Commission, In the Matter of Exelon Generation Company, LLC, Peach Bottom Atomic Power Station, Units and 50-277 Docket Nos. SLR 50-277-SLR, 50-278-SLR, Memorandum and Order, (February 24, 2022.)

Please refer to Exhibit, #1. Beyond Nuclear, Inc.’s Motion for Leave to File New Contention Based on Draft Supplement to Generic Environmental Impact Statement for Subsequent License Renewal of Peach Bottom Operating License (September 3, 2019); corrected September 5, 2019); Beyond Nuclear, Inc.’s Motion to Reopen the Record For Purposes of Considering and Admitting a New Contention Based on Draft Supplement to Generic Environmental Impact Statement For Subsequent License Renewal of Peach Bottom Operating License and Request For Consideration of Some Elements of the Motion Out of Time (September 23, 2009); CLI-20-11, 92 NRC 335(2020); Florida Power & Light Co. (Turkey Point Nuclear Generating Units and), CLI-20-03, 91 NRC 133 (2020).

The Nuclear Regulatory Commission Notice Renewing Nuclear Power Plant Licenses, Environmental Review, 88 Fed. Reg. 13,329 (March 3, 2023), Generic Environmental Impact Statement for License Renewal of Nuclear Plants.”

D: The Susquehanna Electric Steam Station's Environmental Impact on the Susquehanna River Basin.

The magnitude of water used at nuclear power plant is readily evidenced at the Susquehanna Steam Electric Station, which is a two-unit nuclear power plant located on the Susquehanna every day SSES loses 14.93 million gallons of water as evaporative cooling tower water vapor from each of its two units. Each day 11 million gallons of contaminated cooling tower basin blowdown water is returned to the Susquehanna River.

All hyperbolic or forced-air cooling towers also create dirty water called blow down water that is returned back to the river with contaminants concentrated within it. Make-up water is also used to replace blow down water." "The dirty water released from the cooling towers back into the Susquehanna River as blow down will be approximately 25% of the amount of water that is withdrawn. For every four gallons the plant withdraws, it sends back one gallon of blow down." The blow down is a pollutant for three reasons:

Three out of every four gallons of withdrawn evaporate water (consumptive use water) that will be initially drawn from the Susquehanna River will be returned to the river as blow down with four times more concentration of pollutants and minerals than when that water was withdrawn. In addition to concentrating contaminants and minerals that already existed in the river, the blow down contains biocides and algaecides used within the cooling towers to prevent them from becoming clogged with mold and mildew. Along with chemical contamination and highly concentrated minerals, the dirty blowdown water will be approximately 20 degrees hotter than the river water to which it is being returned. (17)

The SSES takes an average of 29.86 million gallons of water per day from the Susquehanna River that is not returned. The Extended Power Uprate doubled the amount of water that was needed with an upper limit of 65.4 million gallons per day, totaling almost 24 billion gallons of Susquehanna River Water per year.

...will withdraw an average of 60.9 gallons per day (mgd) (230 million L/d) of water from the Susquehanna River for cooling tower evaporative losses and other plant needs, with a maximum daily water withdraw estimate of 65.4 mgd (248 million L/d). This represents a 4.5 and 12.2 percent increase, respectively, in intake water withdrawn from the Susquehanna River from the pre-EPU conditions (NRC 2007a). Some of this water would be returned to the river as cooling tower blowdown, with the difference equaling the amount of the consumptive water use by SSES. Consumptive water use due to evaporation and drift of cooling water through the SSES cooling towers is expected to increase from 38 mgd (144 million L/d) to 44 mgd (166 million L/d). Based on the Susquehanna River's annual mean flow rate, an average annual loss of 0.5 percent of river water at the SSES location would result. During low-flow conditions, which usually occur in late August, the average evaporative loss at SSES could approach 1 percent of the river flow (PPL 2006b). (18)

17 Expert Witness Report of Arnold Gundersen, Re: Bell Bend Nuclear Power Plant Application for Groundwater Withdrawal Application for Consumptive Use, BNP-2009-073, Susquehanna River Basin Commission, January 5, 2010.

18 US NRC, Environmental Impacts of Operation, Draft NUREG-1437, Supplement 35, 4-15, April 2008.

E: The Three Mile Island Nuclear Generating Station's Environmental Impact on the Susquehanna River Basin.

Please refer to Exhibit, #2: Technical Review: Susquehanna River Basin Commission Docket Numbers: Three Mile Island Nuclear Station, Unit 1 - Well A - 2021-054; Three Mile Island Nuclear Station, Unit 1 - Well B - 2021-055; and, Three Mile Island Nuclear Station, Unit 1 - Well C - 2021-056. (January 3, 2022.)

IV. Consumptive Use and Nuclear Power.

There have been several reports completed raising concerns about consumptive use on the Susquehanna River Consumptive Use Mitigation Plan – SRBC, 2008, Ecosystem Flow Recommendations for the Susquehanna River Basin – The Nature Conservancy 2010, and the draft Susquehanna River Management Plan – PA Fish and Boat Commission 2011. All three reports include sections on consumptive use. All three reports make statements that the existing requirement for the mitigation of the Q7-10 flow rates are not adequate to protect the ecosystems of the Susquehanna River. The following paragraphs from the Susquehanna River Management Plan draft best expresses the concerns about the future consumptive use increases in the Susquehanna River Basin:

A potentially significant threat to aquatic communities in the Susquehanna River Basin is increased consumptive use (CU) of water to meet expanding societal demands for water. CU is defined by SRBC as water that is used in a way it is not returned to the basin, including through evaporation, irrigation, use in products and diversions out of the Susquehanna watershed. Consumptive water use regulation, adopted by the SRBC in 1976 and most recently updated in November 2010, requires project sponsors to provide mitigation, either through providing compensatory water or fees, for their water use during low flow events. The maximum current use potential in the basin is estimated to be 882.5 million gallons per day (mgd) and is projected to increase to 1,202.2 mgd by 2025 of which, mitigation is required for 116.7 mgd and 390.3 mgd, respectively. Historically, actual usage falls somewhat below the actual permitted usage, but management based on permitted values allows for more conservative estimates for resource protection. (19)

Three years later the Pennsylvania Fish and Boat Commission Bureau of Fisheries published a report and concluded:

The most recent CU mitigation plan has recognized the need for revised mitigation thresholds from the historic Q7-10 threshold to be more responsive to demonstrated aquatic and riparian resource needs, potentially including recently observed disease-related mortality of smallmouth bass and largemouth bass in the Susquehanna River and major tributaries. The 2008 Plan quantifies the need to secure more storage to achieve mitigation flows at the permitted levels, and the SRBC is currently working with partners to develop and acquire innovative storage options in order to set more protective/responsive CU mitigation goals. (20)

The lower Susquehanna River is one of the most vulnerable sections of the river during low flows. Release of the mitigation flows upstream of the consumptive use does provide enhanced stream flows upstream of the consumptive use, but any analysis of mitigation (pooled or otherwise) should also include documentation that during drought conditions a release from an upstream asset provides the total mitigation assumed at the point of consumption.

19 The Susquehanna River Basin Commission, The Draft Susquehanna River Management Plan, (2008).

20 Pennsylvania Fish and Boat Commission, “The Susquehanna River Management Plan, A Management Plan Focusing on the Large River Habitats of the West Branch Susquehanna and Susquehanna Rivers of Pennsylvania, p. 38, (2011).

There is no doubt that a cooperative pooled asset program for consumptive use mitigation is an invaluable tool. However there are limits, which makes it essential to implement dry cooling in the Susquehanna River Basin without exemptions for data centers or gas and nuclear power generating stations

Regional water coordination was clearly recognized by the Department of Environmental Protection (“DEP”) on June 16, 2007 when the DEP advertised that the Susquehanna River Basin Commission was proposing comprehensive revisions to its regulations governing water withdrawal and consumptive use projects. (Proposed Rules [Federal Register: October 1, 2007 (Volume 72, Number 189) [Page 55711-55712] PART 808.)

Federal and statewide statutes cannot be unilaterally exempted or ignored by Constellation, Talen Energy or TMI-2 Solutions. The Nuclear Regulatory Commission has no authority to deal with water use consumption and withdrawal. NRC technical specifications are reactor-specific, but all include a limit on water intake temperature.

The regional changes include a reduction in the duration of consumptive use and withdrawal approvals from 25 years to 15; ending the recognition of “pre-compact” or “grandfathered” consumptive uses or withdrawals upon a change of ownership, and no longer allowing the transfer of project approvals when a change of ownership occurs; and a require that sponsors of consumptive use projects involving ground or surface water withdrawals request approvals for the consumptive use and the withdrawals. The SRBC stated,

If additional releases are made from new or existing sources, they will need to be accounted in the monitoring data at the Marietta gage. It will be important to understand how operations of Conowingo Dam will be affected and how existing CU [Consumptive Use] mitigation agreements for Peach Bottom Atomic Power Station and the City of Baltimore could be impacted. Operations of Conowingo Dam are driven by flows at Marietta, as are existing mitigation agreements for the Peach Bottom Atomic Power Station and the City of Baltimore. It will be necessary to specify that those agreements remain in force despite upstream mitigation, and to resolve methodologies for implementing the agreements in instances when upstream mitigation releases are distorting the flow measurements at Marietta. Regardless, Exelon and Baltimore will still be required to mitigate the CU of their projects. (21)

The SRBC Plan also acknowledges that the existing Q7-10 flow requirements do not protect the stream/river ecosystems nor do they provide FREC flows to the Conowingo pond in times of low flow. The SRBC Plan also states that final mitigation strategy is likely to incorporate aspects of both local and basin wide implementation.

It is timely and vital critical that the Susquehanna River Basin Commission enact polices that help manage consumptive use. The rule proposal making dry cooling a priority is absolutely necessary. “Project sponsors proposing new or significantly modified power generation plants in the basin shall consider the use of dry cooling technologies and submit to the Commission a rigorous alternatives analysis.”

21 “Consumptive Use Mitigation Plan,” Publication Number, 253, March 2008, p. 29.

V. Nuclear Power and Review and Approval of Projects in 18 CFR 801.12(d) and

The nuclear power industry has been studying dry cooling dating back to 1974. The difference today is that the issue of economics has been eliminated as a factor. “The Inflation Reduction Act created a production tax credit (Internal Revenue Code (IRC) section 45U) for existing nuclear plants, giving them more economic security to keep operating.” (22) It is time to deploy dry cooling as a climate change tool, and an indispensable resource to manage consumptive water use. This policy will only be effective if data centers, gas facilities and nuclear generating stations are not exempted. The next step is implementation, of the Changes to Proposed to Part 81 § 801.12 Electric power generation.

The Energy Research and Development Administration commissioned dry-cooling feasibility study with Catalytic Incorporated. Study of Dry-Type Cooling Towers and Their Application to Large Nuclear Power Plants,” Catalytic, Incorporated Charlotte, North Carolina, 1974.

As the requirement for more power plants grows, the number of available water-rich sites continues to decline. Construction of new power plants is steadily using up a portion of the available water-rich sites, and environmental legislation is further reducing the use of available water-rich sites. The power industry is facing a serious problem that can only be solved by the re-use of available cooling water or by the use of dry-type cooling systems.

In water-short areas, wet cooling becomes a problem because of the quantity of make-up water required. Dry-type cooling systems can be used in solving this type of problem and will possibly be used more as water becomes scarce. (23)

An “Assessment of Requirements for Dry Towers” was commissioned by the Energy Development and Research Administration. Hanford Engineering Laboratory studied and made a insightful prediction for the Mid-Atlantic Region.

Fresh water streamflow is generally inadequate in this region under low flow conditions to satisfy the consumptive requirements of projected growth of steam electric plants coupled to wet towers. Essentially no capacity remains in the Delaware and Potomac Rivers. Water supplies are physically available in the Susquehanna for further development; however, there have been indications from regulatory bodies that additional consumptive use of water from the river may be prohibited. (24)

22 “Fact Sheet: Biden-Harris Administration Announces New Steps to Bolster Domestic Nuclear Industry and Advance America’s Clean Energy Future,” The White House,” May 2024.

23 “Dry-Type Cooling Towers and Their Application to Large Nuclear Power Plants,” Energy Research and Development Administration, Catalytic, Incorporated Charlotte, North Carolina, 1974.

24 “Assessment of Requirements for Dry Towers,” Energy Development and Research Administration,” D. E. Peterson and J.C. Sonnichsen, Hanford Engineering Laboratory. September, 1976.

In 1979 dry cooling was considered as a cooling option at Indian Point-3. The Final Environmental Statement (“FES”) was also looking at cooling options at a nuclear plant due to the potential impact of brackish water.

This FES presents an evaluation and analysis of several closed cycle cooling systems from an economic and environmental standpoint: cooling ponds and lakes; spray ponds and spray canals; dry cooling towers wet-dry mechanical draft cooling towers; and wet cooling towers. Major factors entering into selection of tower type were noise, drift, and aesthetics. (24)

Argonne National Lab announced it was exploring dry cooling for nuclear reactors, “because climate change threatens to disrupt the traditional method of cooling reactors, which relies on nearby bodies of water.” The Argonne National Laboratory, through Gateway for Accelerated Innovation in Nuclear (GAIN) funding, will explore “Plan B” options for cooling nuclear reactors, in an effort to future-proof new reactors in the face of a changing climate.”

The practicality of dry cooling on the Susquehanna River was established in the testimony of Expert Witness Arnold Gundersen in his report regarding “Consumptive Water Use of the Susquehanna River by the Proposed Bell Bend Nuclear Power Plant.” Mr. Gundersen stated: (25)

38. Whereas, in an air-cooled condenser design, the steam that leaves the turbine passes directly to a dry cooling tower thus using no river water. The air-cooled condenser sits at the base of a dry cooling tower.

38.1. This design has the unique advantage of not having a secondary loop of additional river water required to cool the steam.

38.2 In the air-cooled condenser design, steam heat from the power plant passes through a tube directly into the air.

38.3. Also, in the air-cooled condenser design, steam is directly condensed by the air and then sent back into the power plant.

39. No intermediate river water is ever used in the air-cooled condenser design. Dry cooling and an air-cooled condenser have several key advantages:

24 The Final Environmental Statement related to the selection of a Preferred Closed Cycle Cooling System at Indian Point Unit 3 NUREG 0574 Docket, November, 50-286, December, 1979.

In Appendix G of the FES for Unit Number, 3, a description of the extensive research involving environmental effects of dry and wet cooling towers using fresh and salt water as makeup is outlined. 1-5 Specific analysis can be found under 2.1 Dry Cooling.

25 In the Matter of Bell Bend Nuclear Power Plant, Application for Groundwater Withdrawal Application for Consumptive Use, BNP-2009-073), Susquehanna River basin Commission, January 5, 2010, pp. 12-13. Mr. Gundersen has qualified as an expert witness before the Nuclear Regulatory Commission (NRC) Atomic Safety and Licensing Board (ASLB) and Advisory Committee on Reactor Safeguards (ACRS), in Federal Court, the State of Vermont Public Service Board, the State of Vermont Environmental Court, and the Florida Public Service Commission.

39.1. The first advantage of dry cooling and an air-cooled condenser is that there is no consumption of river water.

39.2. The second advantage is that without dirty water (or blow down) being sent back into the river, contamination to the river is lessened.

39.3. The third advantage is that there is no cloud of hot moist air leaving the tower, so these towers never produce a cloud of water vapor that has so many additional negative meteorological, environmental, and esthetic impacts.

Mr. Gunderson noted there are two drawbacks with air cooled design:

40.1. The first drawback to the air-cooled design is that this design lowers the efficiency of the power plant slightly by increasing the backpressure on the turbine thus providing less electricity to generate and less income for the power plant owner. However, for most of the year, when temperatures are lower than 70 degrees, the efficiency of the air-cooled design is quite comparable to other cooling techniques.

40.2. The second disadvantage of the air-cooled design is that, because it is less effective at removing the heat from steam than wet evaporative cooling, the air-cooled towers are more expensive to operate than either the hyperbolic or forced air-cooling towers.

41. While installing an air-cooled condenser is slightly more expensive than the approach chosen by PPL to use on the Bell Bend project, air cooled condensers would completely eliminate the significant problem of consumptive water use of the Susquehanna River. If PPL equipped its proposed Bell Bend project with air-cooled condensers, then the Susquehanna River Watershed area would not be facing the negative environmental burden of the Bell Bend nuclear power plant's evaporative losses, including:

41.1. A withdrawal of 31 million gallons per day of water of *make-up* water being drawn from the Susquehanna River to cool plant, or

41.2. Any dirty water (*blowdown water*) being returned to the Susquehanna River.

Mr. Gundersen's conclusion:

45. Moreover, changing to an air-cooled condenser and air-cooled towers will not impact any aspect of the nuclear design that has already been approved by the Nuclear Regulatory Commission.

VI. Conclusion.

The Susquehanna River Basin Commission's Notice of Proposed Rulemaking Modifying 18 CFR Part 801, Review and Approval of Projects, is a necessary and invaluable tool in managing and preserving water in the Susquehanna River Basin. The rule strikes the right balance between commerce and conservation, and provides a down payment for future water use.

In order for the full force of this policy to have a maximum impact, there should be no exemptions for large consumptive use facilities; including, but not limited to data centers, fracking facilities, and nuclear generating stations.

Three Mile Island Alert urge the Commission to approve and memorialize this proposed rule at the next business meeting scheduled for September 12, 2024

Respectfully submitted,

Eric Epstein,
Three Mile Island Alert
4100 Hillsdale Road
Harrisburg, PA 17112