

In re Entergy Nuclear Vermont Yankee Discharge Permit 3-1199 (2008-295)

2009 VT 124

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No. 2008-295

In re Entergy Nuclear Vermont Yankee Discharge
Permit 3-1199

Supreme Court

On Appeal from
Environmental Court

September Term, 2009

Merideth Wright, J.

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PRESENT: Reiber, C.J., Johnson, Skoglund and Burgess, JJ., and Wesley, Supr. J.,

Specially Assigned

¶ 1. **JOHNSON, J.** The Connecticut River Watershed Council, Trout Unlimited, and Citizens Awareness Network (collectively CRWC) appeal the Environmental Court’s decision granting in part and denying in part Entergy Nuclear Vermont Yankee’s (Entergy) request for a permit amendment under the National Pollutant Discharge Elimination System (NPDES) of the Clean Water Act. Entergy and the Vermont Agency of Natural Resources (ANR) cross-appeal the decision of the Environmental Court to impose monitoring and additional temperature conditions on the amended permit. We affirm in part and reverse in part.[\[1\]](#)

¶ 2. Entergy operates the Vermont Yankee Nuclear Power Station, a boiling water nuclear reactor located on the western shore of the Connecticut River in Vernon, Vermont. As the facility generates electricity, steam that has passed through the turbines must then be condensed, requiring removal of heat. To remove this heat and cool the station, the facility utilizes a cooling water system in which water drawn from the Connecticut River flows to the plant and removes heat as it travels through a condenser. The facility can discharge this heated water in one of two ways: (1) through closed cycle cooling, in which the heated cooling water is circulated in cooling towers and mechanically cooled or; (2) through a “once through” open cycle cooling, in which the heated cooling water is discharged into the river where it mixes with the river water and dissipates.

¶ 3. Under the federal Clean Water Act (CWA), thermal effluent—such as the cooling water discharged during open cycle cooling—is a pollutant, and facilities wishing to discharge thermal

effluent into a water source must apply for a NPDES permit. 33 U.S.C. § 1342; see also 40 C.F.R. § 122.2 (defining pollutant as including “heat”). Section 316 of the CWA sets forth specific criteria used to evaluate the discharge of heat (as opposed to other pollutants) in the context of a NPDES permit. 33 U.S.C. § 1326. Under this section, a permit applicant may apply for a variance from otherwise applicable thermal discharge limitations (including state water quality standards) if the applicant can demonstrate that it will nonetheless “assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife.” *Id.* § 1326(a).^[2] It is this type of thermal variance request that is the subject of the permit amendment before us.

¶ 4. The statutory scheme of the CWA embraces a cooperative federalism approach to environmental regulation and carves out a joint role for federal and state oversight and enforcement. See *Id.* § 1251(b) (providing that “[i]t is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution, to plan the development and use . . . of land and water resources, and to consult with the Administrator in the exercise of his authority”); 40 C.F.R. § 131.2 (requiring states to put in place water quality standards that designate uses, set criteria necessary to protect those uses, protect water quality through anti-degradation provisions, and “serve the purposes of the [CWA]”). Section 402 of the CWA provides for issuance of permits by either the federal Environmental Protection Agency (EPA) or a state-administered permit program approved by the EPA. 33 U.S.C. § 1342(b). Once a permit program has been approved, states are authorized to issue permits for fixed terms not to exceed five years and are charged with ensuring that issued permits comply with federal and state water quality standards. *Id.* § 1342(b)(1).

¶ 5. In Vermont, the Legislature has charged ANR with the EPA-delegated authority to enforce and implement the CWA and its NPDES permitting program through implementation of 10 V.S.A. § 1259(a), which directs that “[n]o person shall discharge any waste, substance or material into waters of the state . . . without first obtaining a permit for that discharge from the secretary [of ANR].” ANR is directed to issue a permit upon a determination that “the proposed discharge will not reduce the quality of the receiving waters below the classification established for them and will not violate any applicable provisions of state or federal laws or regulations.” 10 V.S.A. § 1263(c). Thus, in Vermont, ANR is the body that addresses either an initial permit application or permit amendment application requesting a thermal variance, like the one at issue here.

¶ 6. The Vermont Yankee nuclear power facility has a long history of such thermal variance requests. In 1978, Entergy’s predecessor-in-interest’s^[3] permit application was approved by ANR, allowing Entergy to discharge heated water into the Connecticut River during the period from October 15 through May 15 (the winter period) so that temperatures at monitoring Station Three (located 1.4 miles below the facility) did not exceed 65° F. During the period from May 16 through October 14 (the summer period) the facility was required to operate in closed cycle mode.

¶ 7. The permit was renewed and amended in 1986, after a successful demonstration project under § 316(a) of the CWA in which Entergy showed that an increase in river temperature during the summer months would not cause any appreciable harm to the plants and wildlife in the

river. Entergy's renewed NPDES permit allowed a new 1° F temperature increase for the summer period. In 1990, Entergy conducted another § 316(a) demonstration project, proposing additional thermal effluent discharge into the Connecticut River during the summer period. The 1991 NPDES permit put in place a new "compliance equation" methodology to calculate the increase in river temperature allowed under the permit and authorized an increase in river temperature of between 2° F and 5° F during the summer period depending on the ambient temperature of the river during this period. In addition, Entergy's permit imposed various monitoring requirements including hourly monitoring of the temperature in the Vernon Dam fishway (a fish ladder allowing fish to pass through the dam) located 0.5 miles upstream from the facility. Entergy was also required to monitor hourly temperatures at Station Seven (located 3.5 miles upstream of the facility and unaffected by the thermal plume) and Station Three (located 1.4 miles downstream of the facility). Entergy's permit was renewed in 1996 and, most recently, in 2001.

¶ 8. In 2003, Entergy sought to amend its permit once again to allow its thermal discharge to increase the temperature of the Connecticut River during the summer period.^[4] Entergy requested that its thermal discharge into the river be allowed to increase the temperature of the river calculated at Station Three by an additional 1° F during the summer period when the ambient river temperatures are between 55° F and 78° F.^[5] In 2004, in support of this amendment to its permit, Entergy submitted another § 316(a) demonstration project. ANR reviewed the proposed amendment, consulted with the Environmental Advisory Committee and other experts, and issued a Draft Amended Permit. After public comment and a public hearing, ANR granted in part and denied in part the amended permit. With regard to the early summer period of May 16 through June 15, ANR denied the temperature increase, finding that Entergy failed to demonstrate the increase would assure the protection and propagation of Atlantic salmon during this time.^[6] ANR granted the temperature increase for the late summer period of June 16 through October 14. ANR also imposed an average hourly temperature cap of 85° F at Station Three during the summer period. Finally, the amended permit required Entergy to include a "time series trend analysis" for each of the nine representative important species used in the 2004 § 316(a) demonstration to better assess the ecological impact of both Entergy's past thermal discharges as well as the discharge at issue in the amended permit.^[7]

¶ 9. CRWC appealed ANR's decision to the Environmental Court. Pursuant to a de novo hearing of ANR decisions, the Environmental Court conducted a nine-day trial in which it heard from experts presented by CRWC, ANR, and Entergy to determine whether Entergy met its burden of showing that the requested permit amendment should be approved. On May 22, 2008, the Environmental Court issued its decision approving in part and denying in part the proposed amendment. The court approved the requested 1° F increase for the period from July 8 through October 14. Apparently concerned about the outmigration of post-spawned adult shad, the court denied the requested amendment for the period of June 16 through July 7 "unless the discharge can be managed so that it results in an actual measured temperature at the fishway sensor not to exceed 76.7° F." The court also ordered a temperature sensor to be installed at the fish conduit and required that the "actual measured temperature" at the fish conduit sensor not exceed 76.7° F during the June 16 through July 7 period. The court upheld the conditions imposed by ANR (requiring a time series trend analysis and setting a temperature cap of 85° F at Station Three).

¶ 10. Following some confusion about the court's added temperature and monitoring conditions, CRWC, ANR and Entergy all requested clarification of aspects of the decision and order. Entergy asked for correction of what it deemed to be "a stenographic error" in the choice of 76.7° F for the June 16 through July 7 period. Entergy also requested clarification as to whether it was allowed to use an alternate monitor in the event that the monitors cited in the court's May 22 order were temporarily out-of-commission. Entergy and ANR also requested clarification as to whether the monitoring requirement and discharge limitation applied only when the fish ladder at Vernon Dam was in operation. ANR requested clarification as to whether the court intended the fish conduit temperature sensor to be installed regardless of whether Entergy actually increased the temperature by 1° F. ANR also requested clarification as to whether the 76.7° F cap was a measure of actual temperature or plant-induced temperature. Finally, CRWC filed a motion requesting that the court direct ANR to submit the May 22 decision and order to the EPA for review, that ANR provide for public notice and comment on the permit amendment, and that the court stay the decision during this time.

¶ 11. In a decision and order dated June 30, 2008, the Environmental Court affirmed its choice of 76.7° F as a cap on ambient temperature as measured at the fishway and fish conduit and clarified that the imposition of this number was based on its rejection of an 86° F avoidance temperature for all life stages of shad (this avoidance temperature was proffered by Entergy experts and appeared to be the basis for ANR's decision to impose an 85° F temperature cap). The court clarified that its reason for imposing the lower temperature cap for the June 16 through July 7 period was to protect shad during their upstream adult migration. The court further clarified that the 76.7° F cap is an "actual measured temperature" and not a "plant-induced temperature."

¶ 12. With regard to the monitoring conditions, the court clarified that it intended the temperature sensor to be installed at the downstream fish conduit at all times and stated that the temperature sensor shall be installed at the fish conduit and monitored when the fish conduit is in operation during both the summer and winter periods of operation. The court, however, noted that only limited evidence was presented at trial regarding the actual locations of the fish ladder, fish conduit, and fish pipe and of the exact location of the current temperature sensor, and the court advised Entergy and ANR to bring any concerns with regard to monitoring to the Environmental Advisory Committee during proceedings for the renewal permit that will supersede the Environmental Court's May 2008 decision. Finally, the Environmental Court denied CRWC's motion for remand to ANR, its request for EPA review of the amended permit, and its request for another public notice and comment period for the amended permit.

¶ 13. CRWC appealed the Environmental Court's decision granting the amendment to this Court, arguing that: (1) the court misapplied various aspects of the Clean Water Act; (2) the court failed to properly apply the Vermont Water Quality Standards; and (3) the court exceeded the scope of its authority by including substantive conditions to the amended permit instead of denying the application and remanding to ANR. CRWC further argues that the court failed to support its conclusions with specific findings.

¶ 14. ANR and Entergy cross-appealed the new substantive conditions imposed by the Environmental Court. ANR maintains that the Environmental Court exceeded the scope of its

authority, even under a de novo proceeding, and that the court should have given deference to the specialized expertise of ANR. ANR argues that “[o]nce the environmental court determined that Entergy’s permit amendment application did not satisfy the applicable legal standards for the period of June 16–July 7, the court should have denied the application for that period.” Finally, Entergy also cross-appeals the Environmental Court’s imposition of substantive conditions for the June 16 through July 7 period, arguing that the court lacked the legal authority to impose such conditions, that the court failed to give necessary deference to ANR’s expertise, and that the imposition of the conditions was clearly erroneous because it was based on questionable evidence.

¶ 15. We begin by setting forth the standard of review. Decisions of the Environmental Court are reviewed deferentially. See In re Route 103 Quarry, 2008 VT 88, ¶ 4, 184 Vt. 283, 958 A.2d 694 (noting that review of Environmental Court’s decision is “limited” and that appellants “must overcome a deferential standard of review to prevail on their challenge to the findings and conclusions underlying the court’s decision”). Further, the Environmental Court “determines the credibility of witnesses and weighs the persuasive effect of evidence” and we will not overturn its factual findings “unless, taking them in the light most favorable to the prevailing party, they are clearly erroneous.” Id. (citation omitted). Thus, the Environmental Court’s factual findings “will not be disturbed merely because they are contradicted by substantial evidence,” and we will overturn these findings only where the appellant shows “that there is no credible evidence to support them.” In re Miller Subdivision Final Plan, 2008 VT 74, ¶ 13, 184 Vt. 188, 955 A.2d 1200.

I. The Clean Water Act

¶ 16. On appeal, CRWC argues that the Environmental Court erred in its application of § 316(a) of the Clean Water Act. CRWC contends that the Environmental Court erred in failing to: analyze the appropriate “body of water”; require the necessary demonstration under § 316(a); consider “cumulative effects” of the discharge; require Entergy to demonstrate that prior discharges have not caused “prior appreciable harm” to the ecosystem; and consider appropriate representative important species. CRWC also contends that the Environmental Court failed to articulate specific findings and to support its conclusion that Entergy had met its burden with adequate findings. Finally, CRWC contends that the Environmental Court erred in not holding Entergy to the requisite burden of proof on a permit amendment application.

¶ 17. We address each of CRWC’s arguments in turn. CRWC first contends that the river segment analysis in Entergy’s 2004 § 316(a) demonstration used a flawed definition of “body of water” that did not reflect the entire area affected by Vermont Yankee’s thermal plume. Entergy’s nuclear power station is located on the western shore of the Connecticut River, 0.75 miles north of Vernon Dam, where most of the monitoring Entergy is required to undertake takes place. The station is approximately twenty miles north of Turners Falls Dam and fifty miles north of Holyoke Dam. CRWC argues that the hydrothermal model Entergy used in its 2004 § 316(a) demonstration did not include analysis of conditions below Vernon Dam. We conclude that the Environmental Court’s reliance on data provided by Entergy experts about the reach of the thermal plume was not clearly erroneous.

¶ 18. Though “body of water” is not explicitly defined within the federal laws and regulations regarding thermal effluents, there is repeated reference to “the body of water into which the discharge is to be made.” See 33 U.S.C. § 1326(a) (providing that thermal variance is allowable only if applicant can demonstrate that ecosystem will be protected “in and on the body of water into which the discharge is to be made”); 40 C.F.R. § 125.71(b) (defining “resident important species” in terms of the community of shellfish, fish, and wildlife “in the body of water into which the discharge of heat is made”); *id.* § 125.73 (describing criteria for qualifying for a thermal variance to assure protection and propagation of ecosystem “in and on the body of water into which the discharge is made”).

¶ 19. Given the statutory and regulatory language set forth in the CWA, the applicable body of water is only that which is affected by Entergy’s thermal plume. The Environmental Court heard testimony from Dr. Mark Mattson and Dr. Craig Swanson, who put forward data and testimony that Entergy’s thermal plume could not be detected at Turners Falls Dam. Because the plume could not be detected at Turners Falls Dam, there was no reason for Entergy’s § 316(a) demonstration to analyze potential impact even further downstream at the Holyoke Dam. Though CRWC points to a dye study conducted in 1978 indicating that temperature effects were observed as far away as the Holyoke Dam, Dr. Mattson testified that this dye study was irrelevant because it was based on a study of the winter plume. Where Entergy experts presented credible evidence to support both the body of water used in the 2004 § 316(a) demonstration and their theory of the extent of the thermal plume, the Environmental Court did not err in finding the hydrothermal model used was “accurate and reliable.” See In re Clyde River Hydroelectric Project, 2006 VT 11, ¶ 10, 179 Vt. 606, 895 A.2d 736 (mem.) (“Where the [Environmental] Board’s findings are supported they may not be disturbed, even if the record contains conflicting evidence.”).

¶ 20. CRWC next argues that the Environmental Court erred in accepting a § 316(a) demonstration that failed to demonstrate no prior appreciable harm to the relevant ecosystem. CRWC contends that, in contravention of the CWA, federal regulations, and EPA guidance, the Environmental Court failed to consider Entergy’s “entire history” when granting the permit amendment, and thus, the Environmental Court’s conclusion that the relevant ecosystem would be adequately protected was not supported by the evidence presented. CRWC bases its argument, in part, on its assertion that Entergy’s 2004 § 316(a) demonstration was inadequate because it focused on showing that the proposed discharge would cause no future harm, while neglecting to show that Entergy’s past history of thermal discharge had not already degraded the Connecticut River. CRWC emphasizes the court’s rejection of its theory that the dramatic decrease in the abundance of shad is attributable to Entergy’s thermal discharge regime and argues that this rejection was not adequately supported. We cannot agree with this characterization of either the evidence presented before the Environmental Court or of the court’s analysis of that evidence.

¶ 21. Whether or not a thermal variance is appropriate turns on whether a “balanced, indigenous population” (BIP) of fish, shellfish, and wildlife can be adequately protected and propagated. 33 U.S.C. § 1326(a). Federal regulations define BIP as:

a biotic community typically characterized by diversity, the capacity to sustain itself through cyclic seasonal changes, presence of necessary food chain species and by a lack of domination by pollution tolerant species. . . . [S]uch a community . . . may not include species whose presence or abundance is attributable to alternative effluent limitations imposed pursuant to Section 316(a).

40 C.F.R. § 125.71(c). To demonstrate that the thermal discharge will assure protection and propagation of a BIP, an applicant for a thermal variance must put forward a comprehensive demonstration project meeting the criteria set forth in federal regulations. Id. § 125.70.

¶ 22. An applicant may conduct this demonstration in one of three ways. First, an applicant may use predictive studies to demonstrate that a thermal variance will assure protection and propagation of the BIP. The EPA has characterized this type of predictive demonstration as a “Type II” demonstration. According to the EPA, a Type II demonstration will first identify the “Resident Important Species” (RIS) for the relevant area. Indus. Permits Branch, U.S. Envtl. Prot. Agency, Interagency 316(a) Technical Guidance Manual Draft § 3.5.2.1 (1977), available at <http://www.epa.gov/npdes/pubs/owm0001.pdf> [hereinafter 1977 EPA Guidance]. The applicant then develops engineering and hydrological data that it will use to analyze any effects that the proposed discharge will have on the identified RIS. Id. § 3.2.2(16)-(17).

¶ 23. As an alternative to a Type II predictive demonstration, regulations also allow applicants to demonstrate that the BIP will be adequately protected through a retrospective demonstration showing “the absence of prior appreciable harm.” 40 C.F.R. § 125.73(c)(1). This is referred to in the EPA Guidance as a “Type I” demonstration. 1977 EPA Guidance § 3.9. A Type I demonstration must show the following:

(i) That no appreciable harm has resulted from the normal component of the discharge taking into account the interaction of such thermal component with other pollutants and the additive effect of other thermal sources to a balanced, indigenous community . . . ; or

(ii) That despite the occurrence of such previous harm, the desired alternative effluent limitations . . . will nevertheless assure the protection and propagation of a balanced, indigenous community. . . .

40 C.F.R. § 125.73(c)(1)(i)-(ii). Thus, a showing of no prior appreciable harm is a showing

necessary only in a Type I demonstration.[\[8\]](#)

¶ 24. Finally, though not explicitly laid out in 40 C.F.R. § 125.73, there is a third “Type III” showing available to an applicant, which amounts to a hybrid of a Type I and Type II demonstration. 1977 EPA Guidance § 3.7. This third showing is arguably more open-ended than the first two and allows for “the submittal of any information which the Regional Administrator/Director believes may be necessary or appropriate to facilitate evaluation of a particular discharge . . . [and] submittal of any additional information which the applicant may wish to have considered.” Id.

¶ 25. Here, Entergy used a hybrid Type III § 316(a) demonstration in support of its permit amendment application. The preface to the 2004 § 316(a) demonstration report states that Entergy used a “combination of predictive and empirical assessment methods and data” to analyze the impact of the proposed thermal variance. The principal author of Entergy’s 2004 § 316(a) demonstration, Dr. Mark Mattson, testified at trial that the demonstration submitted was a Type III demonstration “because it used a combination of both predictive and retrospective evaluations to interpret the biological effects, if any, of the predicted thermal regime.” ANR also construed the demonstration proffered by Entergy as a Type III showing. In pre-filed testimony presented to the Environmental Court, Doug Burnham, ANR’s Biomonitoring and Aquatic Studies Section Chief for the Water Quality Division, testified that ANR determined that the appropriate § 316(a) demonstration “should involve aspects of both Type I and Type II demonstrations (possibly classified as a Type III demonstration).” Thus, ANR evaluated both predictive and retrospective data proffered by Entergy in its § 316(a) demonstration.

¶ 26. This type of hybrid demonstration is consistent with both the language of 40 C.F.R. § 125.73 and the 1977 EPA Guidance. CRWC contends that the 1977 EPA Guidance is meant to be a “starting point” for discussions between the applicant and the permit authority, and that the circumstances surrounding the particular permit application at issue, including a past history of thermal discharge increases, should be taken into account. While this is true, it does not follow that because Entergy failed to put forward a Type I demonstration, that it did not put forward adequate data regarding the effect of past discharges.

¶ 27. The important point is that, notwithstanding the type of demonstration an applicant puts forward, the CWA and its regulations require analysis of the proposed thermal variance in the context of past discharges. 33 U.S.C. § 1326(a) (requiring effluent limitation be imposed after “taking into account the interaction of such thermal component with other pollutants”); 40 C.F.R. § 125.71 (defining balanced indigenous community as explicitly not including “species whose presence or abundance is attributable to the introduction of pollutants that will be eliminated by compliance” with provisions of the CWA); 40 C.F.R. § 125.73(a) (requiring demonstration show that “considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected,” the proposed variance will assure the protection and propagation of a balanced indigenous community). The need for this type of showing stems from a public policy objective to keep permit holders from degrading a body of water over time, and then using the new degraded ecosystem as a baseline to demonstrate that each renewal

permit will nonetheless assure this new degraded BIP. Brayton Point, 12 E.A.D. at 557 (remand order recognizing that “[b]y requiring a showing that the BIP has not been harmed by the existing discharger’s prior discharges [federal regulations] implicitly suggest[] that the population under consideration is not necessarily just the population currently inhabiting the water body but a population that may have been present but for the appreciable harm”). Thus, even if an applicant chooses to put forward a Type II or Type III demonstration, a showing of no prior appreciable harm is relevant to demonstrate a baseline BIP.

¶ 28. Despite CRWC’s argument to the contrary, the Environmental Court did take into account cumulative effects of the discharge “together with all other significant impacts on the species affected.” 40 C.F.R. § 125.73(a). The court accepted evidence presented by the authors of Entergy’s § 316(a) demonstration analyzing the relevant BIP and concluded that the protection and propagation of the BIP (and particularly, the sensitive species of Atlantic salmon and American shad) would be adequately assured. With regard to salmon, the court concluded that “[b]ecause the present amendment application seeks an increase applicable only to the period of time after the salmon smolt outmigration, it is beyond the time period that a salmon life stage uses the portion of the river affected by the Vermont Yankee thermal discharge.” With regard to shad, the court stated that the relevant habitat was “currently considered to be suitable for spawning and egg/larval development, as it exists under the present summer thermal regime” and concluded that the proposed discharge would assure “the protection of spawning of American shad and therefore of their propagation within the balanced indigenous community.” Moreover, the court’s conclusion that protection and propagation of the BIP would be assured is supported by the evidence.

¶ 29. The Environmental Court heard extensive testimony from Dr. Mark Mattson, the author of the 2004 § 316(a) demonstration, who testified that he took into consideration thirty-three years worth of data on the portions of the Connecticut River affected by Vermont Yankee’s thermal plume, including sampling in lower Vernon pool and upper Turners Falls pool. Dr. Mattson concluded both that Entergy’s previous discharges had not degraded the river and that the proposed amendment would not harm the relevant BIP. Dr. Coutant, a fishery biologist who testified on behalf of Entergy at the Environmental Court hearing, reviewed Entergy’s § 316(a) demonstration and concluded that the demonstration adequately took into consideration the cumulative effects of past discharges on the relevant BIP. Based on this analysis, Dr. Coutant concluded that Atlantic salmon would not be harmed by the proposed discharge. Similarly, Mr. Burnham testified that he considered both prior appreciable harm as well as cumulative effects of past discharges during his review of Entergy’s permit amendment proposal. Mr. Burnham testified that the best measure of cumulative impact is an “in situ analysis” of the affected area:

We have always put a high value on biological monitoring under the presumption and understanding that the condition of the biological community represents the sum total of the cumulative effects of all stressors being applied to that community. A lot of states rely on chemical monitoring, habitat monitoring, different sorts of predictive analyses We’ve always found that although there is quite a bit of variation in biological communities,

that the assessment of the community itself is the best measure of cumulative effects.

¶ 30. The Environmental Court did not err in accepting this analysis as the basis for determining the relevant BIP and determining whether the BIP would be adequately protected under the proposed discharge. Indeed, this type of analysis was accepted by the Environmental Appeals Board in In re Public Service Co. of N.H. (Seabrook Station Units 1 & 2), 1 E.A.D. 332 (Envtl. App. Bd. 1977) [hereinafter Seabrook]. In that appeal, the court considered a thermal variance application under § 316(a) and concluded that “the applicant must persuade the [Regional Administrator] that the incremental effects of the thermal discharge will not cause the aggregate of all relevant stresses (including entrainment and entrapment by the intake structure) to exceed the § 316(a) threshold.” Id. In a similar decision, the Board concluded that a ten-year study, commencing when the plant at issue first started operating, analyzing the effects of thermal discharge on the Wabash River “would necessarily reflect the effects of the intake structures even though [the scientist conducting the studies] made no specific effort to isolate them.” Wabash, 1 E.A.D. 590. Similarly, the comprehensive in situ analysis proffered by Entergy and accepted by Mr. Burnham necessarily took into consideration cumulative effects of past discharges.

¶ 31. Though CRWC contends otherwise, the type of in situ analysis relied on by the Environmental Court in this case was not an analysis that considered “just the population currently inhabiting the water body,” an analysis the Environmental Appeals Board has rejected. Brayton Point, 12 E.A.D. at 556 (noting that the population to be considered must be one that regulations envision “a consideration of more than the population of organisms currently inhabiting the water body”); Wabash, 1 E.A.D. 590. If the analysis done was simply a snapshot of the river’s current biological make-up (including any prior degradation resulting from Entergy’s thirty years of thermal discharge), then CRWC may well be correct in arguing that this type of analysis fails to take into consideration either cumulative effects or an adequate BIP. That, however, is not the case. The analysis proffered in the § 316(a) demonstration project and accepted by Mr. Burnham took into account statistical analysis dating from the start of Entergy’s summer thermal discharge regime as well as analysis found in the prior § 316(a) demonstrations.

¶ 32. At the heart of CRWC’s argument regarding the effects of Entergy’s past thermal discharges is the plight of the American shad and what CRWC views as the Environmental Court’s failure to adequately explain its reasoning for accepting Entergy’s testimony that the proposed discharge has not and will not contribute to the decline of shad in the Connecticut River. Expert testimony revealed that in 1991, there were over 37,000 shad that passed through Vernon Dam. As of 2005, however, the number of shad that passed through Vernon Dam measured just in the tens or hundreds. At trial, CRWC and Entergy put forward differing theories explaining the precipitous decline in the American shad in the Connecticut River between 1991 and 2005. The Environmental Court credited Entergy’s theory, and there was ample evidence to support its doing so.

¶ 33. Entergy relied on testimony from Dr. Laurence Barnthouse, who evaluated four competing theories for the shad decline: (1) Entergy's thermal discharge; (2) harvesting (fishing/overfishing); (3) striped bass predation; and (4) dam passage (particularly Turners Falls Dam). With regard to the first hypothesis, Dr. Barnthouse evaluated data from continuous thermal measurements taken during the period when shad pass through the Vernon dam fish ladder to look at the relationship between shad counts going through the fishway and temperature of the water to see if counts were lower during times when there was a thermal discharge. Dr. Barnthouse testified that "in looking at this data we found that there is no relationship at all between measured temperatures in the fish ladder and numbers of fish passing." Dr. Barnthouse also analyzed data from years in which Entergy was allowed to emit thermal discharges as part of experimental studies, including 1984, 1985, and 1988. Again, Dr. Barnthouse testified that these experimental thermal regimes had no effect on the number of shad reaching Vernon Dam. With regard to the summer month thermal discharge beginning in 1991, Dr. Barnthouse found that in 1991, shad counts were at their peak. In 1995, however, shad counts were still quite high. The shad counts did not start declining until the plant had been operating under a summer month thermal discharge regime for five years. Dr. Barnthouse also testified that based on the predicted temperature changes in the Vernon pool under the proposed discharge, the temperature will not exceed either the lethal tolerance limit or the avoidance limit for American shad.

¶ 34. Dr. Barnthouse testified that there was data to support the theory that striped bass predation was at least partly to blame for the decline in American shad; however, Dr. Barnthouse concluded that the chief culprit in the decline was the Turners Falls Dam. Based on analysis of the data, Dr. Barnthouse determined that American shad were simply not able to negotiate the fishway at Turners Falls Dam and were thus not able to reach the Vernon Dam.

¶ 35. Relying on this testimony, the Environmental Court considered the potential impact of the discharge on shad during its various migratory stages. Turning to the impact of the fish passage facilities at the Turners Falls dam on the migration patterns of shad, the court noted that it was persuaded by the studies presented that indicated that the modifications to the passage made it more difficult for shad to navigate their way upstream. The court concluded that "[t]he decline in the percentage of [shad] counted as passing the Holyoke Dam that also pass the Turners Falls Dam is not likely to be due to the added heat in the river from the current summer thermal regime at Vermont Yankee." The court further concluded that "Vermont Yankee is not responsible for impediments to fish migration caused by dams or the design of fish passage facilities." Based on the testimony referenced above, we cannot find that the court's conclusions were clearly erroneous.

¶ 36. CRWC offered testimony to rebut the hypothesis that the shad decline was a result of problems at the Turners Falls Dam, including testimony from Dr. Ross Jones, an expert in evolutionary ecology. Dr. Jones testified that he observed no changes in Turners Falls Dam that would explain the decrease in shad passage and that more studies needed to be done to look at the effect of thermal discharge on American shad. Though CRWC's theory may be plausible, we find that there was ample evidence presented to support Entergy's alternative theory. Moreover, a trial court's finding will not be overturned "merely because it is contradicted by substantial evidence; rather, an appellant must show there is no credible evidence

to support the finding.” Highgate Assocs., Ltd. v. Merryfield, 157 Vt. 313, 315, 597 A.2d 1280, 1281 (1991). Rather, “[w]here the trial court has applied the proper legal standard, we will uphold its conclusions of law if reasonably supported by its findings.” Id. at 315-16, 597 A.2d at 1281-82. The court determined that there was no evidence that Entergy’s prior discharges had caused appreciable harm to the relevant ecosystem, and we find this conclusion was not clearly erroneous.^[9]

¶ 37. In a related argument, CRWC contends that the Environmental Court erred in adopting Entergy’s flawed determination of “representative important species.” Specifically, CRWC contends that the Environmental Court erred by relying on a determination of RIS that was weighted in favor of thermally tolerant species. Such a determination, CRWC argues, will indicate a lesser impact of any thermal variance than if the RIS is weighted toward more sensitive species. We find that the Environmental Court was guided by federal laws, regulations, and EPA guidance in accepting the proffered RIS and that its reliance on the data and testimony submitted by Entergy experts in picking the nine species that made up the RIS was not clearly erroneous.

¶ 38. The 1977 EPA Guidance recommends the selection of between five and twelve species and further provides that “[t]he most thermally sensitive species . . . in the local area should be identified and their importance should be given special consideration.” 1977 EPA Guidance § 3.5.2.1(1)(D). Federal regulations define the RIS as “species which are representative, in terms of their biological needs, of a balanced, indigenous community of shellfish, fish and wildlife in the body of water into which a discharge of heat is made.” 40 C.F.R. § 125.71(b).

¶ 39. In selecting the RIS, the NPDES administrator considers a number of factors, including: applicable state water quality standards, consultation with fisheries and marine experts, special consideration of the presence of threatened or endangered species, and special consideration of the most thermally sensitive species. 1977 EPA Guidance § 3.5.2.1. Once the RIS is selected, laboratory and literary studies should be completed for each RIS to determine what the effects of thermal changes will be. Id. § 3.5.2.2. This research includes analysis of each RIS at various life cycle stages and will include information on high temperature survival, thermal shock tolerance, optimum temperature for performance, development and growth, normal spawning dates and temperatures, and temperature requirements for reproduction. Id. In addition, a predictive study should necessarily include engineering and hydrologic data, mapping the expected effects of the plant’s thermal plume. Id. § 3.5.3.1.

¶ 40. The 2004 § 316(a) demonstration project submitted by Entergy identified nine “Representative Important Species”: (1) Atlantic salmon; (2) American shad; (3) walleye; (4) yellow perch; (5) fallfish; (6) white sucker; (7) largemouth bass; (8) smallmouth bass; and (9) spottail shiner. Of these nine species, the Atlantic salmon is the sole cold water species. The walleye, yellow perch, and fallfish are classified as cool water species and the American shad, largemouth bass, smallmouth bass, and spottail shiner are warm water species. For each RIS chosen, Entergy submitted substantial literature and data. Relying on this data and testimony, the Environmental Court concluded that even though the group of RIS included more species adapted to warm water, the “selection of species is adequately representative of the complete balanced indigenous community that uses the areas of the Connecticut River affected or

potentially affected by the thermal discharge from Vermont Yankee, as it includes species representative of the range of thermal sensitivity and other ecological requirements of that community.”

¶ 41. CRWC nonetheless contends that despite the mandate of the statute to pay special attention to the most thermally sensitive species, the RIS favored warm water species at the expense of the more sensitive cold water species. We find this argument to be without merit. The Environmental Court explained that though CRWC experts had argued that cold water species of brook trout, brown trout, and rainbow trout should have been included in the RIS, these species “do not conduct their life cycle in the main stem of the Connecticut River, and do not pass through the main stem of the Connecticut River.” This conclusion is consistent with evidence presented by Entergy’s experts at trial. Moreover, the Environmental Court took great care in discussing the potential impact of the thermal discharge on Atlantic salmon, the most sensitive of the species included in the RIS. The court heard from Entergy’s expert, Dr. Charles Coutant, who testified as to the life cycle of Atlantic salmon and concluded that salmon smolts are simply not in the river during the time that the summer discharges are occurring. The court’s conclusion that because the proposed amendment “seeks an increase applicable only to the period of time after the salmon smolt outmigration, it is beyond the time period that a salmon life stage uses the portion of the river affected by the Vermont Yankee thermal discharge” is consistent with the evidence presented. See, e.g., Mirant Kendall Station, NPDES Permit No. MA0004898, at 55 (EPA Region One June 8, 2004), available at <http://www.epa.gov/ne/npdes/mirantkendall/> (follow to “MKS 316(a) and (b) Determination Document”) [hereinafter Mirant Kendall] (focusing on yellow perch as the most sensitive species affected by the proposed discharge).

¶ 42. Finally, CRWC argues that the Environmental Court erred in not holding Entergy to its burden of proof of demonstrating that the thermal variance would adequately protect the relevant ecosystem. CRWC contends that despite the language of § 316(a) requiring the owner of any point source seeking an alternative effluent limitation to demonstrate that the current limitations are “more stringent than necessary” to assure the protection and propagation of the BIP, the Environmental Court “failed to define the burden on Entergy at all.” See 33 U.S.C. § 1326(a). We fail to see any evidence in the record or Environmental Court decision indicating such an impermissible shift in the burden of proof.

¶ 43. The burden of making the necessary showing under § 316(a) is necessarily on the applicant. See Brayton Point I, 12 E.A.D. at 552 (noting that § 1326(a) and the regulations “clearly impose the burden of proving that the . . . thermal effluent limitations are too stringent on the discharger seeking the variance, not on the Agency”). Though federal decisions applying § 316(a) have determined that the burden is “stringent,” the “EPA has not . . . interpreted [the statute] to require absolute certainty before a variance [can] be granted.” Mirant Kendall, at 34.

¶ 44. In its decision, the Environmental Court assessed Entergy’s proffered demonstration and made a determination about whether comprehensive technical reports, hydrothermal modeling data, and expert testimony met the requirements of the CWA and applicable state water quality standards. The Environmental Court stated that because of the de novo nature of the proceeding, it “must apply the substantive standards that were applicable before the

ANR.” These standards necessarily include the appropriate burden of proof. The court set out that burden as requiring a permit amendment applicant to demonstrate that the proposed thermal variance will assure the protection and propagation of the BIP, thus placing the burden of proof squarely on Entergy.

II. Vermont Water Quality Standards

¶ 45. Next, CRWC argues that under the joint federal and state regulatory scheme for enforcement of the CWA, the Environmental Court was required to apply the Vermont Water Quality Standards (VWQS) to the proposed permit amendment, and that it failed to do so. CRWC argues that: (1) the VWQS require a separate analysis for determining whether a discharge is allowable than that required under the CWA and that the Environmental Court failed to conduct this analysis; (2) the Environmental Court erred in describing the Connecticut River as a “transient habitat” because the river is designated as a coldwater habitat by VWQS § 3-05 and subsequently erred in failing to apply the relevant standards; and (3) the Environmental Court failed to determine whether the proposed discharge would comply with the anti-degradation provision of the VWQS. For reasons discussed below, we agree with CRWC that the VWQS are applicable to a thermal variance application, but we conclude that the Environmental Court correctly applied these standards.

¶ 46. In Vermont, ANR is charged with the dual role of implementing state water quality laws and applying federal water quality laws through administration of the state NPDES program. See WaterKeepers N. Cal. v. State Water Res. Control Bd., 126 Cal. Rptr. 2d 389, 391 (Ct. App. 2002) (characterizing state water agencies’ duties as “implementing state law relating to water quality and carrying out a delegated administrative responsibility over the more precise and far-reaching system of federal law”). In keeping with this emphasis on the role of states in promoting the goals of the CWA, the CWA directs states to develop water quality standards, subject to EPA approval. 33 U.S.C. § 1313(a). States must: develop standards that designate a use for each body of water; establish water quality criteria sufficient to protect each use; and develop an “anti-degradation policy.” *Id.* § 1313(c). Federal requirements for the content of state water quality standards represent a floor; state standards may, therefore, be stricter. *Id.* § 1370; 40 C.F.R. § 131.4(a); see also In re Town of Sherburne, 154 Vt. 596, 601 n.6, 581 A.2d 274, 277 n.6 (1990) (noting that “[b]ecause state regulations may impose more rigorous standards than the federal counterparts, state agencies should first look to the state regulations for guidance”); Natural Res. Def. Council, Inc. v. EPA, 859 F.2d 156, 174 (D.C. Cir. 1988) (noting that “[i]n fashioning its guidelines . . . EPA endeavored to reconcile the competing objectives of regulatory uniformity and state autonomy by establishing a floor for . . . state enforcement authority, while ensuring that states have the maximum possible independence”). In developing these standards, states must also consider the goals of the CWA, specifically the “use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes.” *Id.*; see also Islander East Pipeline Co., LLC v. Conn. Dep’t of Env’tl. Protection, 482 F.3d 79, 90 n.9 (2nd Cir. 2006) (same). The CWA elaborates on the interaction of state water quality standards with the standards set out in federal law, providing that “[w]ater quality standards relating to heat shall be consistent with the requirements [regarding effluent limitations] of section 1326 of this title.” 33 U.S.C. § 1313(g).

¶ 47. The VWQS, promulgated pursuant to the CWA, provide specific water quality criteria applicable to any body of water designated a “cold water fish habitat,” as the Connecticut River currently is. See VWQS § 3-01(B). These criteria require that “[t]he total increase from the ambient temperature due to all discharges and activities shall not exceed 1.0° F except as provided for in paragraph (d).” *Id.* § 3-01(B)(1)(b). Subsection (d) of § 3-01(B)(1) provides for a variance from its temperature criteria when an applicant demonstrates that:

(1) The discharge will comply with all other applicable provisions of these rules;

(2) A mixing zone of 200 feet in length is not adequate to provide for assimilation of the thermal waste; and

(3) After taking into account the interaction of thermal effects and other wastes, that change or rate of change in temperature will not result in thermal shock or prevent the full support of uses of the receiving waters.

¶ 48. Despite Entergy’s arguments to the contrary, we do not interpret the CWA’s provisions regarding thermal discharge variances as completely obliterating the standards set forth in the VWQS. Such an interpretation would effectively render the VWQS a nullity. The Environmental Appeals Board, which hears appeals from NPDES permits issued by EPA Regional Administrators, adopts an analysis of § 316(a) thermal variances in line with this view and explicitly addresses applicable state water quality standards:

(1) the Agency must determine what the applicable technology and WQS-based limitations should be for a given permit; (2) the applicant must demonstrate that these otherwise applicable effluent limitations are more stringent than necessary to assure the protection and propagation of the BIP; (3) the applicant must demonstrate that its proposed variance will assure the protection and propagation of the BIP; and (4) in those cases where the applicant meets step 2 but not step 3, the Agency may impose a variance it concludes does assure the protection and propagation of the BIP.

Brayton Point, 12 E.A.D. at 557. Moreover, the regulations promulgated under 33 U.S.C. § 1326(a) make explicit reference to the applicable state thermal effluent standards, thus incorporating those standards into the analysis. 40 C.F.R. § 125.73(a) (“Thermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations . . .”). The applicable standards in this case are the VWQS.

¶ 49. CRWC argues that despite the applicability of the VWQS, the Environmental Court erred in not applying these standards. We find no merit to this argument. Though the Environmental Court appears to have analyzed the federal and Vermont laws and regulations concerning thermal variance in tandem, we do not find that this type of analysis was in error—indeed, the federal law itself contemplates construction “consistent” with state water quality standards. See 33 U.S.C. § 1313(g). The Environmental Court noted that the “Vermont equivalent” to § 1326(a) is found in the VWQS § 3-01(B)(1)(d). The court prefaced its discussion of this standard by noting that the Connecticut River has been designated a “cold water” fish habitat, and because of this designation, to heat the river more than 1° F, a permit applicant had to meet the requirements of both 33 U.S.C. § 1326(a) and VWQS § 3-01(B)(1)(d). CRWC makes much of the fact that the Environmental Court considered testimony proffered by Entergy that despite the Connecticut River’s cold water designation, it is in actuality home to a variety of warm water aquatic life. Because the Environmental Court applied the VWQS standard with regard to cold water habitat, we fail to see how consideration of this information was error.

¶ 50. The first requirement of VWQS § 3-01(B)(1)(d)—that the discharge comply with all other applicable provisions—is undoubtedly met here, as the only amendment Entergy requested to its pre-existing permit involved thermal effluent limitations. The second requirement—that the applicant demonstrate that a mixing zone of 200 feet is not adequate to assimilate the thermal waste—was decided in the first instance by ANR in the issuance of the pre-existing permit. If a mixing zone of 200 feet was not adequate to assimilate thermal effluent issued under the permit without the proposed temperature increase, it goes without saying that such a mixing zone is inadequate to assimilate thermal effluent issued under the amended permit. The provisions of the pre-existing permit were not before the Environmental Court, and we will not address them here. See In re Unified Buddhist Church, Inc., 2006 VT 50, ¶ 13, 180 Vt. 515, 904 A.2d 1139 (mem.). Finally, the last provision of VWQS § 3-01(B)(1)(d)—requiring demonstration of the protection and propagation of the BIP—is essentially identical to the standard under 33 U.S.C. § 1326(a). Because we find that the Environmental Court applied the correct standard to determine whether the thermal variance assured the protection and propagation of the BIP, we find that this last criterion of the VWQS was also correctly applied.[\[10\]](#)

III. The Environmental Court’s Permit Conditions

¶ 51. We next turn to the conditions imposed on the amended permit by the Environmental Court. The conditions at issue consist of two added requirements: (1) that a temperature sensor be installed at the fish conduit to monitor and record data when the fish conduit is in operation, during both the summer and winter periods; and (2) that during the period from June 16 through July 7, the discharge be managed so that it results in an actual measured temperature at the fishway and fish conduit sensors not to exceed 76.7° F. CRWC, Entergy, and ANR all argue that the Environmental Court exceeded its authority in attaching these conditions. Entergy also argues that the conditions were not adequately supported by the evidence. We agree that the imposition of conditions was impermissible here. Because we conclude that the Environmental Court failed to adequately support the conditions it imposed, we do not address the scope of authority the court generally has in fashioning NPDES permit conditions.

¶ 52. Much of the arguments by all three parties involve the appropriate standard of review for the Environmental Court in reviewing ANR decisions. In their cross-appeals, both Entergy and ANR argue that the Environmental Court lacks the authority to impose permit conditions like the ones at issue here. They both contend that even under a de novo hearing standard of review, the Environmental Court should have given proper deference to ANR's initial determinations. ANR recognizes the ability of the Environmental Court to append conditions to permits, but contends that in the highly technical permit application at issue here, the Environmental Court "does not have the institutional expertise and resources to craft detailed and technical conditions to address matters like effluent limits and other issues involved in CWA permit applications." Finally, Entergy contends that even if the Environmental Court had the authority to impose conditions, the conditions it imposed here were not supported by the record.

¶ 53. The Environmental Court is necessarily a specialized court with particular expertise in environmental law. See Sec'y, Vt. Agency of Natural Res. v. Handy Family Enters., 163 Vt. 476, 482, 660 A.2d 309, 313 (1995) (noting that in putting in place specialized environmental court, "[t]he Legislature expected that the environmental judge would develop expertise in environmental enforcement and ensure consistent interpretations of the law"). The Legislature has set out the appropriate standard of review to be employed by the Environmental Court reviewing actions of ANR in proceedings outside of Act 250: "The environmental court, applying the substantive standards that were applicable before the tribunal appealed from, shall hold a de novo hearing on those issues which have been appealed" 10 V.S.A. § 8504(h). The Rules promulgated for the Environmental Court also lay out the appropriate standard of review:

In an appeal by trial de novo, all questions of law or fact as to which review is available shall be tried to the court, which shall apply the substantive standards that were applicable before the tribunal appealed from.

V.R.E.C.P. 5(g).

¶ 54. Our case law interpreting this statutory framework supports the view that the Environmental Court is granted broad discretion in reviewing ANR determinations. See In re Poole, 136 Vt. 242, 245, 388 A.2d 422, 424 (1978) (noting that in a de novo trial court proceeding "the case is heard as though no action whatever had been held prior thereto. All of the evidence is heard anew, and the probative effect [is] determined by the appellate tribunal . . . as though no decision had been previously rendered"). This discretion necessarily includes the ability to impose permit conditions. See Route 103 Quarry, 2008 VT 88, ¶¶ 1-3 (upholding Environmental Court's grant of an amended Act 250 permit that imposed several new conditions and rejected other conditions that had been imposed by the district commission); In re Appeal of Lorentz, 2003 VT 40, ¶ 7, 175 Vt. 522, 824 A.2d 598 (mem.) (upholding Environmental Court's imposition of conditions under relevant zoning ordinances where such conditions were not clearly erroneous); In re Boardman, No. 2001-392, 2002 WL 34423543, *1

(Vt. April 17, 2002) (unpublished mem.), [available at, http://www.vermontjudiciary.org/d-upco/upeo.aspx](http://www.vermontjudiciary.org/d-upco/upeo.aspx) (upholding Environmental Court’s imposition of ten conditions on a zoning permit where the challenging party failed to demonstrate that the decision was clearly erroneous).

¶ 55. The Environmental Court has used this statutory backdrop and our case law to justify its imposition of the conditions at issue here. Though we do not delve into the exact parameters of the Environmental Court’s authority in this regard, at a minimum, any conditions must still be supported by the record.^[11] See Sec’y, Vt. Agency of Natural Res. v. Irish, 169 Vt. 407, 419, 738 A.2d 571, 580 (1999) (noting that “[t]he trial court has a fundamental duty to make all findings necessary to support its conclusions, resolve the issues before it, and provide an adequate basis for appellate review”); In re Torres, 154 Vt. 233, 235, 575 A.2d 193, 195 (1990) (noting that in context of de novo hearing, “[t]he reach of the superior court . . . is as broad as the powers of a zoning board . . . , but it is not broader”); Chioffi v. Winooski Zoning Bd., 151 Vt. 9, 13, 556 A.2d 103, 106 (1989) (noting that function of court “is not to set policy for the municipalities” and that “the court must resist the impulse to view itself as a super planning commission”).^[12]

¶ 56. We addressed a similar factual situation to the one before us now in our decision in In re LiCausi, 2008 VT 59, 184 Vt. 75, 955 A.2d 1177. In that case, we addressed an appeal regarding the Environmental Court’s appendage of conditions to an air-pollution permit awarded by ANR. We determined that the condition appended to the permit—requiring the applicant to collect local surface meteorological data for six months—was unsupported by any findings of the court. Id. ¶ 9. Instead, the court voiced only “abstract concerns [that] never evolved past the point of speculation.” Id. Because the concerns the Environmental Court cited in justifying the imposition of the condition were not supported by the findings, we struck the condition from the permit. Id.

¶ 57. We turn now to the permit conditions at issue here. The court prefaced its imposition of a 76.7° F temperature cap for the period from June 16 through July 7 and imposition of additional monitoring requirements by rejecting the 86° F avoidance temperature for shad identified by Entergy experts:

However, the Court does not find the evidence credible to support the assumption that an 86° F avoidance temperature is applicable to all shad life stages. That avoidance temperature was derived from a study of the behavior of juvenile shad rather than adults. . . . [J]uvenile shad tolerate or even thrive at higher temperatures than adults, and even the tested juveniles were more likely to survive if acclimated to a higher ambient temperature rather than when encountering rapid changes to a high temperature.

¶ 58. The Environmental Court seems to suggest that Entergy did not meet its burden in showing that, despite the temperature increase, the shad would be adequately protected at all life stages; however, the language used by the court on this point is somewhat confusing (ruling that the requested 1° F increase for the period from June 16 through July 7 “is denied, unless the discharge can be managed so that it results in an actual measured temperature at the fishway sensor not to exceed 76.7° F”). Even if we read this language as a denial of this portion of the permit, the denial is unmoored to adequate findings justifying it. Indeed, the court explicitly rejected CRWC’s proffered theory that Entergy’s past thermal discharges had caused a decline in shad. Once that theory had been rejected, Entergy was left to prove an upper limit water temperature that would support shad and other aquatic life. Entergy put forward biological and hydrothermal experts proffering 86° F as the appropriate limit; and though CRWC experts offered testimony suggesting that more studies could be done to better measure the effects of temperature change on shad, CRWC did not offer an alternative temperature. The Environmental Court cites no reason for its rejection of the 86° F avoidance temperature proffered by numerous Entergy experts other than a vague concern over a disparity between the avoidance temperature for juvenile as opposed to adult shad.

¶ 59. Similarly, the court points to no evidence in the record connecting 76.7° F to an upper limit for the safe outmigration of American shad at any life stage. We find only one reference to this temperature in the literally thousands of pages of testimony and exhibits before the Environmental Court. In an exhibit attached to the 2004 § 316(a) demonstration, analysis of shad behavior in the vicinity of Vernon Dam found that between 1991-2001, 76.7° F was the highest temperature observed at the fishway on the last day a shad was observed there. Though this may be true, there is still no evidence connecting that temperature to safe shad outmigration.

¶ 60. The Environmental Court appears to have based its imposition of the monitoring requirements on the same speculative concerns regarding the post-spawning shad outmigration. The court, however, does not point to any proffered data or facts supporting the necessity of additional monitoring, and no party or expert appears to have advocated the imposition of such monitoring. Again, though the court may have been uncomfortable with the avoidance temperature proffered by Entergy experts and accepted by ANR, mere discomfort is simply not enough to justify the imposition of monitoring or other conditions. See LiCausi, 2008 VT 59, ¶ 9. The permit, therefore, must be upheld without these added restrictions.

¶ 61. We note that the situation before us stands in contrast to cases we have remanded to ANR to undertake an appropriate analysis. See In re Stormwater NPDES Petition, 2006 VT 91, ¶¶ 29-30, 180 Vt. 261, 910 A.2d 824. In Stormwater NPDES Petition, we determined that “the Agency erred in summarily denying the petition rather than undertaking the requisite fact-specific analysis under its residual designation authority to determine whether NPDES permits were necessary for the discharges in question.” Id. ¶ 29. Where the requisite analysis was not conducted by ANR in the first instance, it was appropriate to allow ANR the opportunity to undertake that analysis on remand. Id. ¶ 30. In contrast to that situation, here, ANR has conducted the requisite analysis under § 316(a) of the CWA as well as applicable state water quality standards. Thus, we strike the restrictions added by the Environmental Court and conclude that there is no need to remand to ANR.

Affirmed in part and reversed in part.

FOR THE COURT:

Associate Justice

[1] We uphold Entergy's amended permit for the summer period of June 16 through October 14 without the conditions added by the Environmental Court for the early summer period of June 16 through July 7. The permit conditions attached by ANR remain in place.

[2] The relevant provisions pertaining to a thermal variance are as follows:

With respect to any point source otherwise subject to provisions of . . . this title, whenever the owner or operator of any such source, after opportunity for public hearing, can demonstrate to the satisfaction of the Administrator (or, if appropriate, the State) that any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or, if appropriate, the State) may impose an effluent limitation . . . with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water.

33 U.S.C § 1326(a).

[3] Entergy Nuclear Vermont Yankee purchased the facility from Vermont Yankee Nuclear Power Corporation in 2002.

[4] Though Entergy's permit expired in 2006, it has been operating under the terms of the 2001 permit pursuant to 3 V.S.A. § 814(b). Entergy filed its application for a new permit on September 30, 2005 and the proceedings over that permit have not yet concluded. Given that Entergy's new permit application will involve an even broader inquiry into the impact of the proposed discharge on the Connecticut River ecosystem, it is unclear why the Environmental Court denied CRWC's request to stay the appeal of the permit amendment to allow ANR to first take up the permit renewal.

[5] The following graph represents the changes Entergy sought to its permit:

Existing Thermal Effluent Limitations for Summer Period

Station 7 Temp.	Increase in Temp. above Ambient at Station 3
Above 63° F	2° F
>59° F, ≤63° F	3° F
≥55° F, ≤59° F	4° F
Below 55° F	5° F

Requested Thermal Effluent Limitations for Summer Period

Station 7 Temp.	Increase in Temp. above Ambient at Station 3
Above 78° F	2° F
>63° F, ≤78° F	3° F
>59° F, ≤63° F	4° F
≤59° F	5° F

[6] Entergy initially cross-appealed the denial of the temperature increase for the May 16 through June 15 period to the Environmental Court, but later withdrew that appeal.

[7] This type of time series trend analysis with respect to the collection of fish and macroinvertebrates was used in Entergy's 2004 § 316(a) demonstration and was added as a new requirement in Entergy's amended permit for future analyses to be consistent with the trend analysis used in the demonstration.

[8] This type of showing was likely more common in the early days of the Clean Water Act when facilities were moving from a non-regulated existence to immediate imposition of thermal regulations of the Clean Water Act. Under that circumstance, if a facility could demonstrate that no harm had come to the ecosystem under its current mode of operation, that was enough to satisfy the provisions of the CWA allowing for a certain amount of thermal effluent to be discharged into a body of water. See In re Pub. Serv. Co. of Ind., Inc. Wabash River Generating Station, 1 E.A.D. 590 (Envtl. App. Bd. 1979) [hereinafter Wabash] (analyzing Type I demonstration when permit applicant had to demonstrate that continuation of thermal discharges would nevertheless assure protection of a BIP and noting that, if successful, applicant would be allowed to maintain current level of discharges); In re Dominion Energy Brayton Point, LLC, 12 E.A.D. 490, 553 (Envtl. App. Bd. 2006) [hereinafter Brayton Point] (noting that discharger can support variance request either by employing retrospective demonstration showing no prior appreciable harm or through prospective demonstration).

[9] CRWC bases much of its argument concerning the Environmental Court's decision to credit Entergy's proffered explanation for the decline in shad over CRWC's explanation found in the excluded piece of evidence, the so-called "Conte Lab Letter." The Environmental Court excluded this letter because of CRWC's failure to timely supplement its discovery request, and because the letter did not come under a hearsay exception as it was not an official position of a government agency. We apply a deferential standard of review to the trial court's evidentiary rulings, and we will reverse the trial court's decision "only when there has been an abuse of discretion that resulted in prejudice." State v. Desautels, 2006 VT 84, ¶ 12, 180 Vt. 189, 908 A.2d 463. The applicable hearsay exception is Vermont Rule of Evidence 803(8), allowing for the admission of "records, reports, statements, or data compilations in any form of a public office or agency setting forth its regularly conducted and regularly recorded activities, or matters observed pursuant to duty imposed by law." The Environmental Court concluded that because the Conte Lab Letter did not represent the official position of the Department of the Interior, it lacked the indicia of reliability needed to fall under the exception of Rule 803(8). The court determined that this lack of reliability combined with the fact that the letter was introduced after the discovery period resulted in its ultimate inadmissibility. We conclude that the Environmental Court did not abuse its discretion in determining that the Conte Lab Letter was inadmissible. Moreover, because CRWC's expert was permitted to read parts of the letter into evidence, we fail to see how the exclusion of the letter resulted in any prejudice. See State v. Oscarson, 2004 VT 4, ¶ 13, 176 Vt. 176, 845 A.2d 337 ("The trial court has great discretion in

admitting or excluding evidence . . . and we will not reverse such decisions unless there has been an abuse of discretion resulting in prejudice.”).

[\[10\]](#) CRWC’s argument that the Environmental Court failed to apply the anti-degradation policy of the VWQS meets a similar fate. The relevant provision is as follows:

Existing uses of waters and the level of water quality necessary to protect those existing uses shall be maintained and protected regardless of the water’s classification. . . . In making a determination of the existing uses to be protected . . . , the Secretary shall consider at least the following factors:

- a. Aquatic biota and wildlife that utilize or are present in the waters;
- b. Habitat that supports existing aquatic biota, wildlife, or plant life;
- c. The use of the waters for recreation or fishing;
- d. The use of the water for water supply, or commercial activity that depends directly on the preservation of an existing high level of water quality; and
- e. [W]ith regard[] to the factors considered under paragraphs (a) and (b) above, evidence of the use’s ecological significance in the functioning of the ecosystem or evidence of the use’s rarity.

VWQS § 1-03(B)(1).

Though the Environmental Court did not make specific reference to this provision, we fail to see how the analysis done under VWQS § 3-01 and 33 U.S.C. § 1326(a) did not take the broad goals of the anti-degradation policy into account.

[\[11\]](#) We note, however, that the statutory scheme before us now differs from the statutory scheme at issue in the cases cited by Entergy and ANR in one important respect: within the statutes governing appeals of ANR actions, unlike Act 250 in which the Legislature explicitly carved out deference to ANR by the Environmental Court reviewing permit determinations, there is no such legislatively mandated deference with regard to review of NPDES permits. See 10 V.S.A. § 8504(i) (stating that “technical determinations of the secretary shall be accorded the same deference as they are accorded by a district commission under subsection 6086(d) of this title,” i.e., “substantial deference”). Though there may be prudential reasons for the Environmental Court to defer to the technical determinations of ANR, the statutory scheme governing appeals to that court precludes us from mandating such deference here. Whether this distinction between review of Act 250 permit decisions and all other ANR decisions is

necessarily the best course is not for us to decide. Because the Legislature has explicitly made this distinction in the statutory scheme governing appeals to the Environmental Court, we are bound by it.

[12] Other states with analogous environmental review boards or courts have come to similar conclusions. See, e.g., Port of Seattle v. Pollution Control Hearings Bd., 90 P.3d 659, 672 (Wash. 2004) (noting that even in de novo hearing, state pollution control hearing board “cannot add conditions simply because it feels such conditions would make the certification more protective of water quality”).