# VIII. Best Available Technology Standard-Based Thermal Discharge Limits

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Just as the permittee cross-referenced between its comments regarding the development of CWA §§ 301/304 BAT technology-based effluent discharge limits and its comments regarding the development of the CWA § 316(b) cooling water intake limits, EPA has cross-referenced between its responses to these comments. This is appropriate because the technology that provides the basis for both sets of limits is the same—i.e., conversion/retrofit from open-cycle to closed-cycle cooling using mechanical draft wet cooling towers. As a result, many of the issues raised in each area are also the same. These include points related to cost estimates for technology implementation, engineering considerations, energy effects, and "other" environmental impacts (e.g., noise, aesthetics). Of course, there are also issues particular to each type of technology standard, and such issues are discussed only in the appropriate section of this response to comments.

***1. Comment***
PG&E-NEG stated that EPA Region 1's claim that closed-cycle cooling should be deemed BAT for controlling thermal discharges ignores applicable law and precedent, and that Region 1 has misapplied the CWA by misinterpreting and misapplying the concept of "best available technology" (BAT) set forth in CWA § 301. PG&E-NEG stated that the Draft Permit is based on a fundamental misinterpretation and misapplication of the applicable legal standard for determining BAT to reduce water withdrawals by and thermal discharges from a power plant.

***Response***
EPA disagrees. The Agency has paid careful attention to the law governing application of the BAT standard. See Chapter 4 of EPA's July 22, 2002, Permitting Determinations Document. EPA has addressed PG&E's specific objections regarding EPA's interpretation and application of the BAT standard as it relates to thermal discharges elsewhere in this document. The BAT standard does not apply to water withdrawals; therefore, EPA has not discussed BAT in relation to water withdrawals.

EPA also disagrees that its BAT determination for this permit is inconsistent with applicable precedent. This comment is addressed in detail both in Chapter 4 of EPA's July 22, 2002 Permitting Determinations Document and elsewhere in this response to comments.

***2. Comment***
PG&E-NEG stated that EPA Region 1 has misinterpreted and misapplied the legal standard for determining BAT under CWA § 301, "even though both EPA Headquarters and Region 1 have previously determined what BAT ... for units like [those at BPS] should be." PG&E-NEG states that EPA Headquarters determined in 1974 "and repeatedly since then" that BAT for units the size and age of BPS Units 1, 2, and 3 is open-cycle cooling.

***Response***
EPA disagrees that it has determined that BAT limits for controlling discharges of heat from all units of this size and age should be based on open-cycle cooling.

To begin with, EPA disagrees that the 1974 Effluent Guidelines and Standards for the Steam Electric Power Generating Point Source Category act as either an actual or a *de facto* BAT determination for units such as BPS units 1, 2, and 3 for several reasons. As discussed in § 4.1 of EPA's July 22, 2002,

Permitting Determinations Document, these regulations were judicially remanded back to EPA in 1976 and have not been reissued. Therefore, they plainly do not apply to the current BPS permit. See *In the Matter of Public Service Company of New Hampshire (Seabrook Station, Units 1 & 2)*,1977 WL 22370 (p. 6), 1 E.A.D. 332, 10 ERC 1257 (U.S. EPA, NPDES Permit Application No. NH 0020338, Case No. 76-7, June 17, 1977) (Permit Appeal Decision by Administrator) ("The effect of the remand of the steam electric generation guidelines was, as urged by the Utilities, to require the Agency to determine what is BATEA for existing sources on a case-by-case basis under Section 402(a)(a)(1)"); *Status of the Initial Decision of Regional Administrator Where Appeal is Pending*, EPA GCO 77-1 (Jan. 11, 1977).

Furthermore, in EPA's view, the permittee misinterprets the intent of these proposed regulations by taking them out of context when it argues that the regulations would have established open-cycle cooling as BAT for the four generating units at BPS. The remanded regulations declared that BAT was **closed-cycle** cooling for units placed in operation after January 1, 1974, and units of greater than 500 megawatts capacity commencing operations between January 1, 1970, and January 1, 1974. 39 Fed. Reg. 36187-88 (Oct. 8, 1974). This would have applied to Unit 4 at BPS.[1] EPA also proposed "exempting" older units—i.e., units placed into operation **before** 1970, and units of 500 or more megawatt units placed into operation between January 1, 1970, and January 1, 1974—from the closed-cycle requirement. This was based on a number of practical considerations that EPA thought would apply to such units, rather than any finding that open-cycle cooling was the BAT for such units operating **over the long-term**. Indeed, EPA expressly rejected the suggestion that it exempt all existing units because doing so would allow units under construction in 1974, many of which would be large units, to keep discharging heat "past the year 2000." 39 Fed. Reg. 36188 ("Adopting a 'new source' cutoff would exempt units exceeding 1000 megawatts, some of which will still be operating, and discharging heat, **past the year 2000**") (emphasis added), *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Steam Electric Power Generating Point Source Category*, EPA 440/1-74 029-a, p. 685 (Oct. 1974). The Agency concluded that plants expected to remain in operation, and thus to discharge heat, for decades to come should be subject to thermal control. *Id.* at 685.

EPA's decision to exempt the older units was based on the expectation, since proven incorrect, that units placed into operation before 1970 would have ceased operating, and therefore ceased discharging heat, before now. EPA never intended that units the age of BPS Units 1, 2, and 3, all of which commenced operations before 1970, would be allowed to discharge heat based on open-cycle cooling beyond the millennium. EPA assumed that units operating before 1970 would have significantly fewer remaining years of operation. Correspondingly, EPA also assumed that older units would discharge less heat to the environment on aggregate because of their short remaining lives and because older units typically operated only during periods of higher demand. 39 Fed. Reg. 36188; Development Doc. at 684. (In contrast, BPS's three older units are baseload generators.) EPA also recognized that the cost of retrofitting existing once-through units with closed-cycle cooling was greater than the cost of installing the same technology at new units and that the "capital costs expressed as a function of units of heat removed will be greater for older plants." 39 Fed. Reg. 36188. EPA also reasoned that because of the anticipated relatively short remaining life of the units, the cost of a retrofit would have to be amortized over a shorter period of time, increasing the percentage of the capital cost as compared against each unit of power generated. *Id.* Nevertheless, as stated above, EPA did not exempt all existing plants. Instead, EPA balanced its environmental protection mandate with cost considerations by setting the specified unit age exemptions described above. *Id.* Again, as explained, EPA did not want to exempt units from closed-cycle cooling that would be discharging heat for decades and after the year 2000. *Id.* 39 Fed. Reg. 36188.

[1] The permittee, of course, has never argued that it was bound by these regulations to provide closed-cycle cooling for Unit 4.

Plants that would be expected to operate past the millennium would discharge more heat and could be expected to more reasonably afford to retrofit to closed-cycle cooling.

When EPA looked to the 1974 regulation, as PG&E-NEG suggested, it found the selection of a cooling tower retrofit as BAT for BPS to be completely in accord with the intent and reasoning of the regulation given the history and current plans for the four main generating units at BPS. BPS Units 1, 2, 3, and 4 have all operated for many years longer than EPA anticipated for such units. BPS Units 1 and 2 commenced operations in 1963 and 1964, respectively, while Unit 3 began operations in 1969. Unit 4 actually began operations in 1974 and, therefore, would expressly have been required to meet limits associated with closed-cycle cooling as BAT. Moreover, all four units are expected to continue operating at least another 20 years or more. Furthermore, Units 1, 2, and 3 are baseload units (while Unit 4 runs less frequently). EPA certainly did not intend that any unit, regardless of age or size, that would be authorized to discharge heat based on open-cycle cooling would continue discharging heat for this long. For BPS, the expected life of the units allows adequate time to reasonably amortize the costs of retrofitting.

PG&E-NEG has also contended that EPA has "repeatedly" determined that open-cycle cooling is BAT for units the size and age of BPS Units 1, 2, and 3 since issuing the 1974 regulations. Once again, EPA must disagree. Before addressing this contention, however, the Agency will reiterate the regulatory framework that currently governs (and has since 1976) permitting for thermal discharges from steam electric power plants. The regulations issued by EPA in 1974 were remanded to the Agency in *Appalachian Power Co.* v. *Train*, 545 F.2d 1351 (4th Cir. 1976). EPA never repromulgated these standards. In an opinion concerning the Seabrook power plant in New Hampshire that was issued following *Appalachian Power*, EPA's Office of General Counsel (OGC) concluded that the effluent limitations remanded by *Appalachian Power*, which had clearly applied to the Seabrook facility as an existing source, no longer applied to the facility. *Status of the Initial Decision of Regional Administrator Where Appeal is Pending*, EPA GCO 77-1 (Jan. 11, 1977). In other words, the remanded regulations had no effect unless repromulgated. EPA OGC further found that EPA could either issue permits based on best professional judgment (BPJ), "[i]n the absence of effluent limitations guidelines" or repromulgate the regulations. *Id.* See also *In Re Central Hudson Gas & Electric Corp*., EPA GCO 63 (July 29, 1977) (finding that, because an overturned regulation obviously cannot be applied to a discharger, EPA may issue permits on a case-by-case basis under CWA § 402(a)(1)).[2] Courts have long agreed that CWA § 402(a)(1) authorizes EPA to issue discharge permits on a case-by-case basis using BPJ where effluent limitations guidelines (ELGs) do not exist for either a point source category as a whole or for a particular pollutant not addressed by the ELGs promulgated for the point source category. See, e.g., *NRDC* v. *EPA*, 822 F.2d 104, 111 (D.C. Cir. 1987) ("If no national standards have been promulgated for a particular category of point sources, the permit writer is authorized to use, on a case-by-case basis, 'best professional judgment' to impose 'such conditions as the permit writer determines are necessary to carry out the provisions of [the Clean Water Act].") (citations omitted) (industry and environmental group challenge to 1979 revisions to NPDES regulations); *American Petroleum Inst.* v. *EP*A, 787 F.2d 965, 969 (5th Cir. 1986) ("Where EPA has not promulgated applicable technology-based effluent limitations guidelines, the permits must incorporate, on a case-by-case method, 'such conditions as the Administrator determines are necessary to carry out the provisions of the Act.'") (citations omitted). Because no ELGs exist for thermal discharges from facilities within the steam electric power plant category, EPA must use BPJ on a case-by-case basis to select BAT effluent limits for BPS.

[2] CWA § 402(a)(1) authorizes EPA to "issue a permit for the discharge of any pollutant, or combination of pollutants ... upon condition that such discharge will meet either (A) all applicable requirements under sections 1311, 1312, 1316, 1317 1318, and 1343 of this title, or (B) prior to the taking of necessary implementing actions relating to all such requirements, such conditions as the Administrator determines are necessary to carry out the provisions of this chapter." 33 U.S.C. § 1342(a)(1). See also 40 C.F.R. § 125.3.

Turning to a factual analysis of PG&E's claim, EPA is unaware of any decisions by EPA headquarters holding that open-cycle cooling is generally considered BAT for units the size and age of BPS Units 1, 2, and 3. PG&E-NEG also failed to cite any such determination by EPA headquarters, Region 1, or any other region. PG&E-NEG referred to a single permit, issued in Region 4 for Florida Power and Light's Cape Canaveral Plant, to argue that EPA rejected closed-cycle cooling on the basis of non-water quality adverse environmental impacts and the age of the unit. See BPS Comments by Foley Hoag, p. 32, n.70. Yet, the decision on the Cape Canaveral permit's thermal discharge limits was expressly issued under CWA § 316(a), rather than under § 304 BAT standards. Moreover, the decision took Endangered Species Act issues into account as well. The grounds for EPA Region 4's decision not to require closed-cycle cooling for the Cape Canaveral plant under CWA § 316(a) plainly have little, if anything, to do with issues relevant to EPA Region 1's determination of BAT technology-based thermal discharge standards for BPS. In the Cape Canaveral decision, EPA did not cite facility age as a reason to reject closed-cycle cooling at this plant; the Agency did not discuss age beyond simply noting the years in which each unit began operating. EPA rejected closed-cycle cooling at the plant largely because the resulting reduction in thermal effluent would have harmed a significant local population of manatees, which are protected under the Endangered Species Act. In the Matter of Indian River Plant, Finding and Determination Under 33 U.S.C. § 1326, NPDES Permit Nos. FL0000680 and FL0001473, pp. 5-6 (July 11, 1983). There are no manatees or other protected species in Mount Hope Bay that will be harmed by a reduction in thermal effluent. The site-specific § 316(a) variance determination for the Cape Canaveral plant was rendered based upon facts very different from those that apply for BPS, and it is not relevant to EPA's BAT determination for BPS.

As is the case with all BPJ-based permits, EPA must select BAT for controlling thermal discharges at BPS based on the technology that is available, economically achievable, and most effective at BPS. As discussed in later responses, EPA is not expected to achieve absolute uniformity in setting effluent standards in BPJ-based permits. Rather, EPA must decide how it will balance the goal of imposing roughly uniform standards on facilities within a particular point source category with the overriding purpose of the CWA to eliminate the discharge of pollutants to the nation's waters. See, e.g., *NRDC* v. *EPA*, 859 F.2d at 199-200 (holding that EPA has discretion to decide the balance between CWA's overall goal of eliminating discharges of pollutants and its subsidiary goal of regulating dischargers in a uniform manner, and that holding some dischargers to a higher standard does not violate the CWA). The BAT provision itself was designed to "use the latest scientific research and technology in setting effluent limits, pushing industries toward the goal of zero discharge as quickly as possible." *Kennecott* v. *U.S. EPA*, 780 F.2d 445, 448 (4th Cir. 1985), citing *A Legislative History of the Water Pollution Control Act Amendments of 1972*, 93d Cong., 1st Sess. (Comm. Print 1973), at 798. Clearly, the purpose of setting BAT-based effluent limits is to make further progress toward eliminating discharges of pollutants—not merely to maintain the status quo. The limits set by prior BPJ-based BAT permits might be a useful reference for EPA's assessment of BAT for a different facility, but they are not binding on its determination for that facility.

Finally, BPS's own permitting history demonstrates that EPA has long expressed concern over the facility's thermal impacts on Mount Hope Bay.[3] The first NPDES permit issued for BPS in 1973 required closed-cycle cooling for Unit 4 and imposed a maximum temperature limit of 90 °F, due at least in part to concerns over thermal discharge impacts. Although these limits were later made less stringent, this was done pursuant to a CWA § 316(a) variance request from the permittee and not as the result of a technology-based determination that open-cycle cooling constituted BAT for BPS. Moreover, many

[3] See Chapter 3 of EPA's July 22, 2002, Permitting Determinations Document for a full discussion of BPS's permitting history.

factors have changed since those earlier variance requests were granted. These issues are discussed in more detail elsewhere in this response to comments and in EPA's July 22, 2002, Permit Determinations Document.

***3. Comment***
PG&E-NEG states that EPA Region 1 has departed from its long-standing practice in the application of CWA § 301(b)(2) (requiring BAT for managing thermal discharges).

***Response***
EPA disagrees that the Agency has departed from any "long-standing practice" in applying § 301(b)(2).[4] As explained above, and in Chapter 4 of EPA's July 22, 2002, Permit Determinations Document, EPA develops BAT-based permit limits for thermal discharges on a case-by-case basis using BPJ. In accordance with CWA § 301(b)(1)(C), the permit's limits must then be set based either on the BAT-based limit or on limits based on State water quality standards, with the more stringent standard governing. Limits based on either technology standards or water quality standards may be set aside, however, if limits based on a CWA § 316(a) variance are determined to be appropriate. EPA may grant such variance-based limits if the less stringent limitations will nevertheless be sufficient to "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife" in and on the receiving waterbody. 33 U.S.C. § 1326(a).

EPA has followed the above-described statutory scheme in developing the thermal discharge limitations for the BPS permit. EPA was unable to determine which CWA requirements would form the basis of the thermal discharge limitation without performing an analysis of technology-based limits, water quality-based limits, and alternative § 316(a) variance-based limits. Therefore, EPA assessed all three bases for discharge limitations, but ultimately based the thermal discharge limits in the permit on a § 316(a) variance. The application of § 316(a) to the new BPS permit is discussed in detail in Chapter 6 of EPA's July 22, 2002, Permit Determinations Document and elsewhere in this response to comments.

EPA did not depart from any "long-standing practice" in using BAT standards to evaluate thermal effluent limitations.[5] It simply continued its practice of assessing each permit on a case-by-case, BPJ basis under CWA § 402(a)(1). The circumstances of each facility and its receiving waters determine whether EPA will base effluent limitations on BAT, water quality standards, or a § 316(a) variance. Differing circumstances from facility to facility will naturally result in different effluent limitations. Nothing in the CWA guarantees that every facility will be required to meet the exact same standard. In fact, such a requirement would defeat the purpose of the CWA to reach zero discharge as quickly as possible. See, e.g., *Kennecott*, 780 F.2d at 448. See also *American Frozen Food Inst.* v. *Train*, 539 F.2d 107, 124 (D.C. Cir. 1976) ("The principal purpose of the [CWA] is to achieve the complete elimination of all discharges of pollutants into the nation's waters...."), *NRDC* v. *U.S. EPA*, 859 F.2d 156, 199-201 (D.C. Cir. 1988) ("although exalting the value of uniformity, the statute simply does not *require* uniformity in all circumstances." (emphasis in original)).

The permittee cites two cases to support its proposition that EPA has impermissibly ignored "established precedent" in previous permits, though the permittee does not specify what it believes that precedent to be. Neither case supports the permittee's position. The first, *Massachusetts Dep't of Educ.* v. *U.S. Dep't*

[4] It is not entirely clear from PG&E's comments what the company believes this "long-standing practice" to be, especially in view of EPA's case-by-case approach to setting BAT technology-based limits for thermal discharges.

[5] Requiring closed-cycle cooling is not a complete departure from precedent at the plant because the first permit ever issued for BPS required closed-cycle cooling for Unit 4.

*of Educ.*, 837 F.2d 536 (1st Cir. 1988), involved a dispute over how Massachusetts had allocated Federal special education funds. The court found that the Department of Education's prior decision dealt with a different type of accounting issue and that, in this case, the Department had properly distinguished its prior decision. *Massachusetts Dep't. of Educ.*, 837 F.2d at 544. Thus, the Agency's decisions did not need to be uniform in every case. In the second case, *Davila-Bardales* v. *INS*, the court remanded a Board of Immigration Appeals decision regarding the admissibility of statements made by an unaccompanied minor because the decision directly conflicted with a previous decision made on the same issue and involving virtually identical facts. *Davila-Bardales* v. *INS*, 27 F.2d 1, 4-5 (1st Cir. 1994). Yet, here the court was also careful to note that

> [t]his is not to say that an agency, once it has announced a precedent, must forever hew to it. Experience is often the best teacher, and agencies retain a substantial measure of freedom to refine, reformulate, and even reverse their precedents in the light of new insights and changed circumstances.

*Id.* at 5 (citations omitted). This case also does not support the permittee's position. EPA has acted consistent with its precedent of making case-by-case, BPJ technology-based determinations in the absence of a National Effluent Limitations Guideline, and EPA has properly explained the basis of its decision in this case.

EPA's permit determination for BPS also presents a distinctly different legal scenario than those presented in the two cases cited by the permittee. Instead of applying a single rule to very similar sets of facts, EPA must determine case-by-case BAT limits for thermal effluent by applying one set of factors to myriad different factual situations. At least one court has specifically distinguished between "conflicting interpretations of the same regulation in almost identical factual situations," and divergent agency determinations based on the application of the same regulation to differing sets of facts. See *McDonnell Douglas Corp.* v. *Nat'l Aeronautics & Space Admin.*, 895 F. Supp. 319, 324 (D.C. Dist. 1995) (*distinguishing Davila-Bardales* v. *INS*, 27 F.2d at 5), *vacated on other grounds by McDonnell Douglas Corp.* v. *Nat'l Aeronautics & Space Admin.*, 88 F.3d 1278 (D.C. Cir. 1996). In *McDonnell Douglas*, the court held that NASA did not act arbitrarily in issuing "inconsistent" decisions regarding the release of information for separate FOIA requests because each request involved "a multitude of variables" that demanded individual consideration. The court concluded that the agency "[did] not overturn a rule or policy" simply because its consideration of the same factors did not lead to the same result in every case. *Id.* Similarly, EPA must consider the same factors in setting BAT limits for each individual permit applicant, but it need not reach the same conclusion for each after taking the facts of each case into account.

Even if EPA's determination of BPS's thermal effluent limitations could somehow be interpreted as a break with precedent, and the Agency does not agree that it could be, EPA's actions are wholly within lawful agency discretion. It is a basic principle of administrative law that an Agency must explain a decision that departs from past practice. It is an equally basic principle that an agency has discretion to depart from past practice so long as the agency's explanation shows that the decision is reasonable under the law and facts. *Motor Vehicle Manuf. Assoc.* v. *State Farm*, 463 U.S. 29, 42 (1983) ("an agency must be given ample latitude to 'adapt their rules and policies to the demands of changing circumstances,'" quoting *Permian Basin Area Rate Cases*, 390 U.S. 747, 784 (1968)); *Shaw's Supermarket* v. *NLRB*, 884 F.2d 34, 41 (1st Cir.1989) (an agency is "free to modify or change its rule; to depart from, or to keep within, prior precedent, as long as it focuses upon the issue and explains why change is reasonable"). EPA has carefully considered each of the pertinent issues raised in the BPS permit. The Agency has reviewed and analyzed the voluminous information submitted to it, conducted independent analysis of this information, and sought other information as appropriate. Having reached its decision, EPA exhaustively explained the options it considered, the information upon which it relied, and the reasoning

behind its decision. See Chapter 4 of EPA's July 22, 2002, Permit Determinations Document. EPA believes that it has far surpassed the standard set forth by the Supreme Court when it stated that it would "uphold a decision of less than ideal clarity if the agency's path may be reasonably discerned." *Bowman Transp., Inc.* v. *Arkansas-Best Freight System*, 419 U.S. 281,286 (1974).

***4. Comment***

PG&E-NEG stated that EPA regulations require the Agency to consider not only the individual facility in question, but also the "appropriate standard for the class or category of point sources" to which the individual facility belongs, when applying BPJ to develop a BAT limit.

***Response***

EPA agrees that it must consider "the appropriate technology for the category or class of point sources of which the applicant is a member, based upon all available information" when developing a BPJ-based BAT effluent limit. 40 CFR § 125.3(c)(2)(i). Indeed, EPA has done this. As explained in § 4.2.3a of EPA's July 22, 2002, Permit Determinations Document, BAT is to be based on the "single best performing plant in an industrial field" (citations omitted). EPA Region 1 concluded that retrofitting existing power plants to closed-cycle cooling constitutes BAT for thermal effluent discharges from this category or class of point sources. EPA then went further, however, as the permittee concedes, to assess whether this generally appropriate BAT would in fact be the BAT applicable to BPS, specifically in light of the facts of this case. Again, the Agency concluded that it would be. All of this is detailed in Chapter 4 of EPA's July 22, 2002, Permit Determinations Document and is further discussed in this response to comments.

EPA also notes that although Congress intended for the Agency to apply CWA technology standards in as uniform a manner as is feasible, Congress did **not** intend that EPA sacrifice fulfillment of the CWA's overriding purpose of eliminating the discharge of pollutants into the nation's waters by requiring all BPJ technology-based determinations to hold facilities to exactly the same standard. *American Frozen Food Inst.* v. *Train*, 539 F.2d 107, 124 (D.C. Cir. 1976) ("The principal purpose of the [CWA] is to achieve the complete elimination of all discharges of pollutants into the nation's waters. . ."); *NRDC* v. *U.S. EPA*, 859 F.2d 156, 199-201 (D.C. Cir. 1988) ("although exalting the value of uniformity, the statute simply does not *require* uniformity in all circumstances" (emphasis in original)).[6] The requirement that BAT standards be based on the "single best performing plant in an industrial field" clearly demonstrates that the goal of reducing discharges supercedes the subsidiary goal of applying uniform standards. *CMA* v. *EPA*, 870 F.2d at 239, *citing* 1972 Legislative History at 170. See also *Kennecott* v. *U.S. EPA*, 780 F.2d 445, 448 (4th

[6] PG&E-NEG cites two cases to support its argument that EPA must place a high priority on uniformity. Neither of these cases, however, suggest that uniformity must necessarily supercede limits that would otherwise be set based on the applicable technology standard (in this case BAT) applied on a case-by-case basis. For example, the court in *NRDC* v. *EPA*, 863 F.2d 1420, 1427 (9th Cir. 1988), concluded that EPA had reasonably exercised *its discretion* not to require a particular technology as BAT in a BPJ general permit for a particular small group of facilities because the Agency was working on national standards that it believed might be less stringent than the proposed BPJ BAT standard and that would otherwise apply to the facilities in question. In the instant case, however, EPA is not working on any national standards for thermal discharges at this time. Moreover, although the court agreed that EPA acted reasonably in NRDC, it did not suggest that EPA **had to** exercise its discretion in this manner, and it certainly did not conclude that the goal of uniformity prohibits EPA from requiring an individual plant to spend more than others as the result of a BPJ-based technology standard. In *E.I. duPont de Nemours & Co.* v. *Train*, 430 U.S. 112, 129-30 (1977), the court discussed the goal of uniformity in the context of setting BPT limits, stating that the balancing test between total cost and effluent reduction benefits is intended to maintain uniformity within a class and category of point sources subject to effluent limitations. This discussion, however, was focused on the significance of the goal of uniformity in determining national BPT standards under CWA § 304(b)(1)(B), not the significance of uniformity in setting case-by-case BPJ-based BAT limits.

Cir. 1985), citing A Legislative History of the Water Pollution Control Act Amendments of 1972, 93d Cong., 1st Sess. (Comm. Print 1973), at 798 ("The BAT standard reflects the intention of Congress to use the latest scientific research and technology in setting effluent limits, pushing industries toward the goal of zero discharge as quickly as possible").

***5. Comment***

PG&E-NEG stated that in 1976 the Fourth Circuit Court of Appeals set aside EPA's 1974 proposed regulation establishing retrofits to closed-cycle cooling as BAT for a small subset of the newest, largest generating units. According to PG&E, the Fourth Circuit struck down the EPA regulation as too stringent and stated that "EPA had improperly failed to compare the costs and benefits of its retrofit requirement to the costs and benefits of other available technologies" (citing to *Appalachian Power* v. *Train*, 545 F.2d 1351, 1366 (4th Cir. 1976)).

***Response***

First, it should be underscored that to the extent that *Appalachian Power* can be read to support an argument that a comparative cost-benefit analysis is required in setting BAT limits, the case is no longer good law. Subsequent court decisions, including a decision by the United States Supreme Court, have made clear that a cost-benefit comparison is **not** required in this context. See, e.g., *EPA* v. *Nat'l Crushed Stone Assoc'n*, 449 U.S. 64, 71-72 (1980) ("Similar directions [to those for assessing BPT under CWA § 304(b)(1)(B)] are given the Administrator for determining effluent reductions attainable from the BAT except that in assessing BAT total cost is no longer to be considered in comparison to effluent reduction benefits."); *Texas Oil & Gas Ass'n* v. *U.S. EPA*, 161 F.3d 923, 936 (5th Cir. 1998) ("In applying the BAT standard, the EPA is not obligated to evaluate the reasonableness of the relationship between costs and benefits"); *Reynolds Metals Co.* v. *U.S. EPA*, 760 F.2d 549, 565 (4th Cir. 1985) ("as regards BAT... no balancing is required—only that costs be considered along with the other factors [in CWA § 304(b)(2)(B)]"); *Association of Pacific Fisheries* v. *EPA*, 615 F.2d 794, 818 (9th Cir. 1980) ("the conspicuous absence [from CWA § 304(b)(2)(B)] of the comparative language [regarding costs and benefits] contained in section 304(b)(1)(B) leads us to the conclusion that Congress did not intend the Agency or this court to engage in marginal cost-benefit comparisons"). See also § 4.2.3b of EPA's July 22, 2002, Permitting Determinations Document.

Second, EPA disagrees with PG&E's characterization of the *Appalachian Power* decision. The court in *Appalachian Power* set aside EPA's regulations requiring certain existing facilities to "backfit" closed-cycle cooling **not** because the requirements were too stringent, but rather because EPA had not adequately supported its conclusions on the record. See 545 F.2d at 1365-66 (generally noting that EPA's conclusion that backfitting cooling devices on existing equipment would be required based on size and age of generators seemed reasonable, but remanding because EPA had not provided sufficient evidence in the record to support its result). On remand, therefore, the court required EPA to explain the benefits or expected benefits, especially to aquatic life, of the various alternatives considered and the scientific opinion it relied upon. 545 F.2d at 1365. Notably, the court expressly rejected the industry's contention that the benefits of the regulations needed to be quantified in monetary terms. *Id.* at 1361 ("such benefits often cannot be reduced to dollars and cents"). In explaining EPA's statutory mandate, the court stated that EPA must "consider the benefits derived from the application of its effluent reduction requirements in relation to the associated costs" to determine whether its regulations would achieve "reasonable further progress toward the national goal of eliminating the discharge of all pollutants" consistent with BAT. *Id.* The court found that EPA had failed to do enough in evaluating the benefits to support a determination of whether "a particular [thermal discharge] reduction level is, in fact, reasonable," and that to judge that reasonableness "EPA must compare the cost of achieving that level of reduction . . . and the ecological benefits to be derived therefrom . . ." *Id.* at 1364. At the same time, the court noted that whether a

particular reduction was reasonable or not was "ultimately a matter within the sound discretion of EPA itself." *Id.*

It is important to note the court's statement that the "remand here is very narrow in scope since we do not disapprove the general principle of requiring installation of cooling devices on a part of the planned and existing electrical generators in the country." *Id.* at 1365. The court also noted that the fact that the costs of meeting thermal reduction requirements could be burdensome for a permittee does not mean that they are unreasonable. *Id.* at 1365 n. 32 ("the mere fact that these regulations will bring added pressure to bear is not a sufficient basis upon which this court may conclude that EPA has acted arbitrarily"). Furthermore, the court observed that the record was "replete" with references to the adverse effects of heat on aquatic life, including references provided by experts on both sides of the case. *Id.* at 1363-64.

Thus, even assuming that *Appalachian Power* is good law, the case does not support the permittee's position. *Appalachian Power* held that EPA must consider costs in relation to benefits as a way to determine whether thermal discharge limitations would result in "reasonable progress" towards the goal of eliminating the discharge of pollutants into the nation's waters. The case did **not** reject backfitting existing facilities to closed cycle cooling as BAT, nor did it establish a strict comparison of monetized benefits against costs as the appropriate economic test under the BAT standard. In any case, as discussed above, subsequent court decisions have rejected the economic test for BAT pronounced by the *Appalachian Power* court and made clear that a cost-benefit analysis is not required for the development of BAT limits.

***6. Comment***

PG&E-NEG stated that EPA has never reissued the BAT standard that was remanded in 1976, that there is no evidence that EPA has used a BPJ-based BAT determination to require any other existing plant to retrofit to closed-cycle cooling (i.e., to set a thermal discharge limit based on closed-cycle cooling as BAT), and that "[o]n a national basis, EPA's prolonged silence since 1976 indicates that it still considers open-cycle cooling or once-through cooling to be BAT for such power plants."

***Response***

EPA disagrees that either any BPJ-based permits for other plants or "silence" regarding reissuance of a national BAT standard for power plants in any way indicates that the Agency regards open-cycle cooling to be BAT for BPS or power plants like it. EPA's remanded regulations are not now in effect and did not, in any event, intend that open-cycle cooling was BAT for units such as those at BPS. In the absence of national guidelines, EPA makes case-by-case BAT determinations. See, e.g., *American Mining Congress* v. *U.S. EPA*, 965 F.2d 759, 767 (9th Cir. 1992) (addressing EPA's regulation of discharges from inactive mines) ("EPA's decision not to promulgate effluent guidelines for a category of sources does not mean that those sources are exempt from permitting requirements . . .[it] means only that permits for such discharges are issued on an individual basis.") Furthermore, the permittee did not cite any cases where EPA set BPJ-based BAT limits based on open-cycle cooling. The fact that limits less stringent than what could be achieved by closed-cycle cooling might have been set based on variances under CWA § 316(a)—as has been done in this case—does not determine what BAT limits would require. Moreover, EPA points out that EPA's proposed thermal effluent guidelines would have required BPS Unit 4 to operate in a closed-cycle manner, but neither the permittee nor EPA has argued that this was required once the regulations were withdrawn.

***7. Comment***

PG&E-NEG stated that there is no support for the position that closed-cycle cooling is BAT for steam generating units the size and age of those at BPS.

***Response***
EPA disagrees. The Agency has provided ample support for its case-by-case BPJ determination of BAT limits for BPS in Chapter 4 of EPA's July 22, 2002, Permit Determinations Document. Additional support is further provided in this response to comments. As the courts have stated, ". . . BPJ limitations are as correct and as statutorily supported as permit limits based upon an effluent limitations guideline." *NRDC* v. *EPA*, 859 F.2d at 199. Also, setting a BPJ-based technology standard for a specific facility does not require development of a nationally applicable standard for all similar facilities.

EPA has offered ample evidence to support its determination that closed-cycle cooling is BAT for the units at BPS. EPA evaluated a number of technologies available for reducing thermal discharges from steam electric power plants, including wet and dry cooling towers, hybrid towers, mechanical- and natural-draft cooling towers, helper cooling towers, piggyback cooling, and generation curtailment. EPA considered how each of these options might be implemented (i.e., retrofitted) at BPS and assessed their likely effectiveness in controlling thermal discharge. Part of this assessment involved examining the BPS facility and the engineering aspects of implementing unit-specific and multi-mode cooling tower options at BPS. EPA then conducted a detailed analysis to estimate the potential costs of these options. EPA not only considered PG&E's cost estimates, but also performed independent analyses to fully and accurately assess the costs involved. Finally, EPA also considered non-water quality environmental impacts and other relevant impacts (such as traffic safety, noise, energy effects) consistent with the CWA. In addition, EPA has made certain revisions to its analyses in response to comments. These matters are discussed in detail elsewhere in this response to comments.

The majority of PG&E's objections to the closed-cycle cooling BAT standard at BPS appear to rest on the assertion that a closed-cycle cooling retrofit has not been undertaken at a station identical to BPS. Yet, EPA believes it has provided a number of appropriate examples of cooling towers being retrofitted to large existing power plants to convert them from open-cycle to closed-cycle cooling. (The permittee's comments about these examples are discussed elsewhere in this response to comments.) Moreover, as we discussed in Chapter 4 of EPA's July 22, 2002, Permit Determinations Document, a technology need not necessarily have been implemented at a full scale facility in order to qualify as an "available" technology. See, e.g., *Ass'n of Pacific Fisheries*, 615 F.2d at 816-17, *quoting* 1972 Leg. Hist. at 170.

PG&E-NEG has failed to offer any specific, substantive reason why closed-cycle cooling would not be BAT at BPS. The fact that retrofitting might be expensive and difficult does not, as PG&E-NEG has suggested, place it beyond the realm of BAT. Congress was aware that BAT standards would often be expensive and difficult for dischargers to implement and chose to strike a regulatory balance in favor of pushing for progress toward eliminating the discharge of pollutants. See, e.g., *American Iron and Steel Inst.* v. *EPA*, 526 F.2d 1027, 1052 (3rd Cir. 1975) ("while it is clear that the Administrator must consider cost, some amount of economic disruption was contemplated as a necessary price to pay in the effort to clean up the nation's waters, and the Administrator was given considerable discretion in weighing costs"). The information available to EPA, both from the applicant and from other sources, demonstrates that closed-cycle cooling is effective for reducing pollutant discharges, and is technologically and economically achievable at BPS.

***8. Comment***
PG&E-NEG stated that EPA's statement that wet, dry, and wet/dry cooling tower technologies are generally available "for use at power plants" is conclusory and does not establish that these technologies are considered BAT on a national basis.

***Response***

EPA's conclusions regarding the general availability of these technologies were not conclusory. These conclusions were based on proper consideration of relevant facts and law. In addition, EPA did not purport to establish that these technologies constitute BAT on a national basis.

EPA has conducted a case-by-case BPJ determination of BAT for the BPS permit. The question of whether a technology is generally "available" for a plant or industry is one part of determining whether the technology might constitute BAT. By examining the "availability" of cooling tower technologies, EPA never suggested that these technologies necessarily constituted BAT for the steam electric power plant category as a whole. EPA also noted that while available, "[n]one of these technologies is automatically considered BAT [for BPS] under the current case-by-case approach to reducing thermal discharge from new or existing steam electric power plants." EPA's July 22, 2002, Permit Determinations Document, p. 4-23. EPA simply noted that these technologies perform best for reducing the discharge of thermal effluent and are **available** for use at power plants and, therefore, are appropriate technologies for EPA to examine when selecting BAT for BPS.

The CWA does not define "available" as used in the BAT standard. However, consistent with the legislative history, the courts have interpreted the term to refer to any existing technology that has been either implemented successfully at one or more plants in the same industrial category, implemented successfully in a different industrial category from which the technology could be transferred, or demonstrated by scientific research to be effective in reducing a particular pollutant. See, e.g., *CMA* v. *EPA*, 870 F.2d at 239, 240 (a technology may be considered "available" if at least one discharger within the relevant category demonstrates the technology's effectiveness); *American Petroleum Inst.* v. *U.S. EPA*, 858 F.2d 261, 265 (5th Cir. 1988) (under certain circumstances "a process is deemed 'available' even if it is not in use at all") (citing *Association of Pac. Fisheries* v. *EPA*, 615 F.2d 794, 816 (9th Cir. 1980)); *Kennecott* v. *U.S. EPA*, 780 F.2d 445, 453 (4th Cir. 1985), citing *Reynolds Metals Co.* v. *EPA*, 760 F.2d 549, 562 (4th Cir. 1985) (holding that EPA did not act arbitrarily in selecting sulfide precipitation as BAT for the primary base metals industry, though the conditions at the model plants EPA pointed to as examples of availability were different) ("Congress contemplated that EPA might use technology from other industries to establish the BAT. Progress would be slowed if EPA was invariably limited to treatment schemes already in force at the plants which are the subject of the rulemaking." (internal citations omitted)). See § 4.2.3a of EPA's July 22, 2002, Permit Determinations Document.

Under these tests, EPA properly determined that wet, dry, and wet/dry cooling tower technologies are generally "available" for power plants. EPA reviewed Agency technology studies, consulted with engineers at a number of steam electric power plants, and reviewed EPA's prior research on the technologies used for thermal effluent reduction. See *Id.* at § 4.3.2. Having found that all three cooling tower technologies were already in use at steam electric power plants around the nation, EPA properly determined that the technologies were generally available and should be assessed for use at BPS. EPA also found that a number of large existing power plants had been retrofitted with wet mechanical-draft cooling towers in the process of converting from open-cycle to closed-cycle cooling. Thus, whether looking at the specific industry category (i.e., existing power plants) or at another category for "transfer technology" (e.g., new power plants), EPA had a sound basis for concluding that wet mechanical draft cooling towers represented available technology to consider for BPS. Upon more detailed consideration, EPA decided that it was unclear whether dry cooling was feasible for a retrofit at BPS since no cases of such a retrofit were found and the option posed other difficulties as well. Therefore, EPA did not base BAT limits for BPS on dry cooling.

***9. Comment***

PG&E-NEG stated that EPA has improperly failed to compare the costs and benefits of alternative heat reduction technologies.

***Response***

EPA disagrees with the permittee's characterization of the cost consideration required for developing BAT limits. The Agency also disagrees with the assertion that EPA has not properly considered costs in setting BAT limits for the BPS permit. EPA has discussed the legal issues raised by this comment in detail in Chapter 4 of EPA's July 22, 2002, Permit Determinations Document. EPA provides a brief discussion here.

EPA must consider half a dozen factors when developing BAT standards, including the cost of achieving effluent reduction. CWA § 304(b)(2)(B), 33 U.S.C. §§ 1314(b)(2)(B)[7] and 1342(a(1)(B), 40 CFR § 125.3(d)(3). Notably, however, the CWA does **not** require any sort of comparison between, or balancing of, costs and benefits of BAT limits. See, e.g., *Reynolds Metals Co.* v. *U.S. EPA*, 760 F.2d 549, 565 (4th Cir. 1985)("as regards BAT. . . no balancing is required—only that costs be considered"). The statutory language is clear on this point. Congress only required EPA to "take into account" the costs associated with BAT. In contrast, Congress specified that development of best practicable control technology (BPT) standards must include a "consideration of the total cost of application of technology *in relation to* the effluent reduction benefits to be achieved from such application . . ." CWA § 304(b)(1)(B), 33 U.S.C. § 1314(b)(1)(B) (emphasis added). Based on the "conspicuous absence" of this sort of comparative language in the BAT provision, it is clear that "Congress did not intend the Agency . . . to engage in marginal cost-benefit comparisons." *Association of Pacific Fisheries* v. *EPA*, 615 F.2d 794, 818 (9th Cir. 1980); *accord EPA* v. *Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 71 (1980)("in assessing BAT total cost is no longer to be considered in comparison to effluent reduction benefits"), *Texas Oil & Gas Ass'n* v. *U.S. EPA*, 161 F.3d 923, 936 (5th Cir. 1998) ("In applying the BAT standard, the EPA is not obligated to evaluate the reasonableness of the relationship between costs and benefits").

Thus, while cost-benefit balancing is not required, costs must be "considered" in setting BAT limits. Costs are not, however, to be a consideration of "primary importance" in setting BAT limits. See, e.g., *American Iron and Steel Inst.* v. *EPA*, 526 F.2d 1027, 1051-52 and n. 51 (3rd Cir. 1975)("it is clear that for [BAT] standards, cost was to be less important than for the [BPT] standards, and that for even [BPT] standards cost was not to be given primary importance"); *FMC Corp.* v. *Train*, 539 F.2d 973, 978-79 (4th Cir. 1976). The courts have also recognized that the cost of effluent reduction must be considered within the context of the CWA's basic goal of restoring and maintaining the chemical and biological integrity of the nation's waters. See 33 U.S.C. § 1251(a).

> The Act's overriding objective of eliminating ... the discharge of pollution into the waters of our Nation indicates that Congress, in its legislative wisdom, has determined that the many intangible benefits of clean water justify vesting [EPA] with broad discretion, just short of being arbitrary or capricious, in his consideration of the cost of pollution abatement.

*FMC Corp.* v. *Train*, 539 F.2d 973, 978-79 (4th Cir. 1976), as quoted in *Reynolds Metals Co.* v. *U.S. EPA*, 760 F.2d 549, 566 (4th Cir. 1985)(discussing BPT cost analysis). Furthermore, EPA must keep in mind the purpose of the BAT provision itself when assessing costs associated with BAT. "The BAT standard reflects the intention of Congress to use the latest scientific research and technology in setting effluent limits, pushing industries toward the goal of zero discharge as quickly as possible." *Kennecott* v.

[7] Specifically, the CWA § 304(b)(2)(B), 33 U.S.C. § 1314(b)(2)(B), requires that "[f]actors relating to the assessment of best available technology shall take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate."

*U.S. EPA*, 780 F.2d 445, 448 (4th Cir. 1985), citing *A Legislative History of the Water Pollution Control Act Amendments of 1972*, 93d Cong., 1st Sess. (Comm. Print 1973), at 798.

Courts have made it clear that EPA has considerable discretion in how to consider and weigh costs. See, e.g., *Texas Oil & Gas Ass'n* v. *U.S. EPA*, 161 F.3d 923, 928 (5th Cir. 1998) (EPA has "considerable discretion in evaluating the relevant factors and determining the weight to be accorded to each in reaching its ultimate BAT determination.") With respect to factors that Congress only requires EPA to "consider," such as cost of the development of BAT standards, one court explained that

> Congress did not mandate any particular structure or weight for the many consideration factors. Rather, it left EPA with the discretion to decide how to account for the consideration factors, and how much weight to give each factor.

*Weyerhaueser Co.* v. *Costle*, 590 F.2d 1011, 1045 (D.C. Cir. 1978). Thus, the permittee is incorrect to suggest that EPA must give particular emphasis to cost considerations in its assessment of BAT.

Of course, although EPA has "considerable discretion" in deciding the importance of cost in its ultimate BAT determination, most courts have also agreed that EPA must be reasonable in its consideration of costs. The legislative history of the CWA sets out this standard:

> While cost should be a factor in the Administrator's judgment, no balancing test will be required. The Administrator will be bound by a test of reasonableness. In this case, the reasonableness of what is 'economically achievable' should reflect an evaluation of what needs to be done to move toward the elimination of the discharge of pollutants and what is achievable through the application of available technology without regard to cost.

Congressional Research Service, A Legislative History of the Water Pollution Control Act Amendments of 1972 at 170 (1973), as quoted in *Association of Pacific Fisheries* v. *EPA*, 615 F.2d at 817.

EPA has clearly considered costs in a reasonable manner in this case. EPA evaluated the costs of different available technological options, and considered these costs in terms of what is "economically achievable" and the degree of progress each option could make toward the statutory goal of "the elimination of the discharge of pollutants" (in this case, heat).

While upholding the "reasonableness" standard for evaluating costs, courts generally have not defined the bounds of "reasonable" costs. At most, some courts have suggested that a BAT requirement that would result in "extremely costly more refined treatment" and only "a de minimis effect on the receiving waters" would be unreasonable. *Association of Pacific Fisheries* v. *EPA*, 615 F.2d 794, 818 (9th Cir. 1980). See also *Appalachian Power*, 545 F.2d at 1365 (suggesting that an environmentally inconsequential 10-Btu reduction costing $5 billion would not be reasonable, but that an additional 10 percent reduction in thermal pollution costing $3 billion could be "entirely reasonable" if it yielded sufficient environmental benefit). Short of such an extreme disparity in costs and environmental benefits, EPA has broad discretion to determine BAT and required reduction levels in light of the factors listed in § 304(b)(2)(B), including cost.

In the instant case, EPA has considered both the cost and the thermal effluent reduction capabilities of various technological options as well as the thermal effluent reductions they could achieve and the degree to which they would represent the BAT in terms of making progress toward eliminating the discharge of pollutants, as directed by Congress. EPA did not engage in a more detailed benefits assessment for the

BAT determination and none is required. However, in the context of its CWA § 316(a) analysis, EPA concluded that there were substantial and important environmental benefits to be obtained from the greater thermal reductions proposed by EPA as compared to the much smaller thermal discharge reductions proposed by the permittee. Therefore, even if such an analysis were needed, EPA's decision would be justified. EPA engaged in a detailed cost analysis of various alternatives and also considered the level of thermal discharge reduction that would be achieved by each technological option. In any case, the Final Permit's limits were not based on BAT; they were based on a § 316(a) variance.

While PG&E-NEG has suggested that *Appalachian Power* requires EPA to conduct a cost-benefit analysis, to the extent that *Appalachian Power* can be read to support an argument that a comparative cost/benefit analysis is required in setting BAT limits, the case is no longer good law. As discussed elsewhere in this response to comments, subsequent court decisions, including a decision by the United States Supreme Court, have made clear that comparative cost-benefit analysis is **not** required in setting BAT limits. See *EPA v. Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 71-72 (1980),

***10. Comment***
PG&E-NEG stated that *Appalachian Power* is the "most relevant judicial interpretation of BAT specifically for thermal discharges from power plants," and that EPA Region 1 agrees that it "remains good law." PG&E-NEG stated that the analysis required under *Appalachian Power* is to compare the cost and ecological benefits of achieving a particular level of heat reduction with the costs and benefits associated with alternative levels of heat reduction.

***Response***
As stated above, EPA Region 1 does not agree that *Appalachian Power* is good law insofar as it suggests that costs and benefits must be compared to each other in developing BAT effluent limits. EPA has discussed the negative treatment of *Appalachian Power* by subsequent courts and EPA's interpretation of relevant portions of the case elsewhere in this response to comments.

***11. Comment***
PG&E-NEG stated that EPA Region 1 did not discuss the required cost-benefit analysis in the Permit Determinations Document even though both PG&E-NEG and EPA's consultant, Abt Associates, Inc., prepared cost-effectiveness analyses.

***Response***
As discussed above, the analysis suggested by the permittee is **not** required for a BAT determination. EPA provided the type of evaluation that is required.

***12. Comment***
PG&E-NEG stated that EPA Region 1's analysis shows that closed-cycle cooling costs 2100 percent more than PG&E-NEG's enhanced multi-mode technology per unit of reduction in flow and temperatures, and that EPA Region 1 should have considered this "gross disparity in the cost-effectiveness of the options."

***Response***
EPA does not agree that this type of analysis is required in developing the BAT limits in this case. The Agency also notes that the proposed metric ignores the substantially greater thermal discharge reduction achieved by the closed-cycle all units option versus the permittee's "enhanced multi-mode" proposal (94 percent vs. 33 percent). Moreover, the cost per unit of reduction in temperature and flow does not indicate the **environmental** effectiveness of the technology in its day-to-day operations. The entire point of setting BAT-based effluent limits is to require application of the best available technology economically achievable that will achieve reasonable further progress toward the national goal of eliminating the

discharge of all pollutants. PG&E-NEG has not presented any evidence to indicate that cooling towers are not feasible or not economically achievable at BPS.

***13. Comment***

PG&E-NEG stated that a full-station retrofit with closed-cycle cooling has never been undertaken at a power plant the size and age of BPS that uses saltwater for cooling.

***13.* A.** ***Comment.*** PG&E-NEG stated that EPA's conclusion that closed-cycle cooling is available for retrofitting at BPS, because such retrofitting has been done at five other power plants, is inadequate and misleading because EPA did not (1) gather any "detailed comparative information" about those plants, relying instead on brief summaries contained in the EPA Technical Permit Determinations Document for the proposed Phase II §316(b) rule, and telephone conversations by an EPA attorney with personnel at some of the plants; (2) analyze the specific configuration of any of those plants, or how the retrofits were accomplished, or at what cost; or (3) determine which of those plants was an appropriate model for BPS.

***Response***

EPA's research revealed that other large power plants have converted from open-cycle to closed-cycle cooling by retrofitting wet mechanical draft cooling towers to their formerly once-through cooling systems. These conversions represent the best performing facilities in terms of achieving thermal discharge (and intake flow) reductions at **existing** power plants. This technology is also widely in use at new power plants. The research that EPA has engaged in and the information it has provided is more than adequate for the purpose at hand. The permittee stated that EPA relied only on brief summaries from the CWA § 316(b) rulemaking process and conversations between an EPA attorney and power plant personnel. While such information would be sufficient if it provided the necessary information, the permittee's statements in this regard are incorrect. As the Administrative Record clearly reveals, EPA Region 1 conducted additional research beyond that suggested by the permittee. EPA further notes that the information on the successful retrofits did indicate why the retrofits were performed, how they were performed, and at what costs.

EPA believes that its findings regarding these other plants are adequate to demonstrate that retrofitting wet mechanical draft cooling towers to an existing power plant is generally feasible and that plants that have undertaken such conversions constitute the best performing facilities with respect to reducing thermal discharges. While the permittee pointed to alleged distinctions between BPS and the case study facilities, it is not necessary that the other facilities match the permittee's facility in every respect for BAT purposes. Different plants in an industry are necessarily distinct. Yet, the distinctions that the permittee pointed to regarding the plants that have undergone cooling tower retrofits do not suggest that comparison to BPS is incorrect or that the conversion could not be done at BPS.

EPA understands that for this case-by-case BPJ application of BAT, it must determine whether retrofitting cooling towers is feasible at BPS. EPA has concluded that it is. Moreover, BPS's own consultants submitted engineering and cost information to EPA that showed that retrofitting all four units at BPS with mechanical draft cooling towers was feasible at BPS. No comments have been received that establish otherwise.

EPA also notes that since issuance of the Draft Permit, EPA has learned of at least one other conversion of an open-cycle cooling system to a closed-cycle system as a result of retrofitting wet mechanical draft cooling towers to an existing fossil-fuel fired facility. The Yates Plant, owned by Georgia Power, began converting from once-through cooling to closed-cycle cooling in May 2001, and the conversion is expected to be completed in early 2004. Georgia Power also has plans to convert its McDonough Plant

from once-through cooling to closed-cycle cooling using fiberglass mechanical draft cooling towers. In addition, EPA learned that a similar conversion is planned for the Wateree Station in South Carolina.

**13. B.** ***Comment.*** PG&E-NEG stated that each of the five plants can be distinguished from BPS.

i. Four of the five plants use freshwater, not saltwater.

***Response***
EPA believes this distinction is insignificant. Saltwater cooling towers are feasible, and one of these plants uses saltwater for cooling as BPS does. EPA's analysis for BPS takes into account the use of saltwater for cooling.

ii. Three of the plants were originally designed with the possibility of closed-cycle cooling in mind.

***Response***
The commenter did not make clear what having closed-cycle cooling "in mind" means with respect to the design and/or the conversion of a power plant cooling system from open-cycle to closed-cycle. The permittee also did not explain why this factor would create a significant distinction between the feasibility of converting cooling systems at these facilities as compared to doing so at BPS. EPA points out that even if three of the examples of existing plants that have retrofitted their cooling systems "had closed-cycle cooling in mind," not all of the retrofit plants did so. Moreover, EPA notes that at least one of the units at BPS was originally designed and operated with closed-cycle cooling (using a cooling canal rather than mechanical draft cooling towers), though it was later converted to open-cycle cooling.

iii. Of the remaining two plants, neither is one-third the size of BPS.

***Response***
The comment is misleading. Although BPS is a large generating facility, it is composed of four individual units totaling 1,600 megawatts (Unit 1 is 250 megawatts, Unit 2 is 250 megawatts, Unit 3 is 650 megawatts, and Unit 4 is 450 megawatts). The conversion of BPS will be broken down unit by unit, and therefore the total generating capacity of the facility is not determinative here. That is, the conversion of one unit is not dependent on the conversion of any other unit. The case studies provide information about converted units of similar size to some of BPS's units and in some cases are bigger than BPS's units. EPA recognizes that the number and capacity of the units will affect the magnitude of the cooling tower installation needed, which will have implications for space needs, cost, and environmental effects. These are site-specific considerations, however, that EPA has properly evaluated on a site-specific basis.

iv. The Army Corps paid for the retrofit at one of these plants, and another staged the retrofit over 20 years to spread out the costs.

***Response***
EPA believes that who paid for the retrofits is irrelevant. Although one of the retrofits might have been staged over 20 years, others have been considerably faster. EPA notes that BPS's schedule for retrofitting the station is staged over an approximately 4-year period.

v. The only plant in the same size range as BPS uses freshwater and "already had closed-cycle capability: it just added helper towers to a cooling pond system."

***Response***
The issues of size and salinity of the water are addressed above. EPA agrees that using helper towers is not the same as converting a plant's cooling system entirely to closed-cycle cooling but points out that the

use of helper towers demonstrates the feasibility of retrofitting an electric generating facility with a type of mechanical draft cooling towers for cooling purposes. Only one of the retrofit examples identified by EPA involved helper towers.

***14. Comment***
PG&E-NEG stated that EPA's analysis of capital costs is flawed.

**14. A.** ***Comment.*** PG&E-NEG stated that its consultants, Stone & Webster and Bechtel, estimated the total capital costs of converting BPS to closed-cycle cooling to be "on the order of $177 million."

***Response***
EPA has reviewed and considered the capital cost estimates and Draft Permit comments produced by Stone & Webster for the permittee. The permittee's other consultant, Bechtel, did not produce an independent capital cost estimate. Instead, it largely reviewed Stone & Webster's estimate and essentially concluded that it was reasonable. EPA has also reviewed and considered Bechtel's comments. In addition, EPA conducted independent capital cost estimates using two separate methods. EPA has discussed these estimates in detail elsewhere in this response to comments and will not repeat that discussion here. EPA will note here only that its cost estimates were lower than the permittee's estimates and that the Agency has concluded that its estimates are reasonable and appropriate.

**14. B**. ***Comment.*** PG&E-NEG stated that there is no dispute that it would incur other costs as well, including the cost of energy to run the additional fans and pumps needed, and the costs of lost energy production due to the inherently lower efficiency of closed-cycle cooling, construction outages, and the need to shut down BPS when fogging or icing is a possibility.

***Response***
EPA agrees that the use of cooling towers will result in some auxiliary energy and efficiency penalty costs. It also agrees that converting to closed-cycle cooling will result in costs to the permittee as a result of lost generation associated with unit outages during construction. EPA has accounted for these items in its cost estimates. At the same time, EPA notes that it concludes that these effects are not significant from a regional energy supply perspective. EPA also notes, and the permittee has agreed, that the permittee will gain some economic benefits from being able to generate **more** electricity during peak-demand, hot-weather periods as a result of using cooling towers. This benefit occurs because the facility will be able to meet its maximum temperature discharge limit without reducing generation as it now must do at times. This so-called "avoided load loss" benefit was also accounted for in the analyses of both EPA and the permittee. EPA concludes that this could offer an important marginal benefit to the regional energy supply during peak demand, hot-weather periods when the regional supply is most strained.

Finally, EPA does not agree that BPS will **have** to shut down generating units as a result of the risk of cooling tower fogging or icing. As discussed in detail elsewhere in this document, EPA believes the permittee has overstated the risk of this problem. Moreover, as is also discussed in detail elsewhere in this response to comments and in EPA's July 22, 2002, Permit Determinations Document, EPA believes there are several alternative methods that could be used, alone or in combination, to adequately deal with any threat from fog or ice and that would not require, or at least would greatly reduce, any generating unit shutdowns. Such methods evaluated by EPA include, for example, plume abatement cooling towers, enhanced traffic safety programs, and equipping cooling towers for occasional "bypassing." (EPA acknowledges that it has added a limitation precluding once-through cooling operations during the winter flounder spawning season (February through May), as discussed elsewhere, that will partially limit use of the authorized 122 hours per year of cooling tower "bypassing.") EPA also evaluated and developed costs

for these approaches to managing any fog or ice issues, including the permittee's suggestion of unit shutdowns. Even including these costs, EPA's analysis shows that the costs of complying with the permit's limits will be affordable. Under CWA § 316(b), EPA also found that the costs of such compliance were not wholly disproportionate to its benefits.

**14. C.** ***Comment.*** PG&E-NEG stated that EPA's cost estimate fails to account for the fact that plumes from the 72-cell towers required for a full retrofit of BPS to closed-cycle cooling could cause fogging and icing, which would pose a safety hazard to nearby roads, including Interstate 195; that although EPA proposed a modification that would allow the retrofitted towers to operate in open-cycle mode, the "irrationally low heat limit" in the Draft Permit would limit implementation of this modification so that the towers could only operate in open-cycle mode for 122 hours per year, which is not enough to control the risk posed by fogging and icing; and that as a result, the proposed EPA retrofit will require either implementation of visible plume control (i.e., plume abatement), which would be at a cost that EPA estimated at more than $100 million, and which might be difficult or impossible to implement, or "frequent outages to avoid creating plumes when fogging and icing is a concern."

***Response***

EPA disagrees with these comments. The concerns expressed are responded to above and elsewhere in this response to comments. EPA adds here only that the thermal discharge limits suggested in the Agency's BAT review were clearly not "irrational;" they were properly based on BAT. Of course, the permit's thermal discharge limits were ultimately based on a CWA § 316(a) variance.

**14. D.** ***Comment.*** PG&E-NEG stated that Stone & Webster has long-time site-specific experience at BPS and based its estimates on a detailed conceptual design of the modifications that would be needed to convert BPS to closed-cycle cooling; and that after receipt of the Draft Permit, Bechtel's independent review of Stone & Webster's conclusions "verified Stone & Webster's overall cost and engineering approach," although it also "identified certain areas where Stone & Webster's estimates could be modified."

***Response***

EPA has discussed these issues in detail elsewhere in this response to comments. EPA only notes here its conclusion that Stone & Webster had provided a preliminary engineering design with an associated cost estimate, and that Bechtel confirmed that Stone & Webster had provided only an "order of magnitude" estimate with an error range of plus or minus 25 percent.

**14. E.** ***Comment.*** PG&E-NEG stated that EPA recognized that the costs estimated by BPS would make retrofitting the entire station to closed-cycle cooling economically unachievable and therefore sought an independent review of PG&E's estimates.

***Response***

PG&E-NEG suggests that EPA sought an independent review of BPS's experts' estimates because the Agency believed that these estimates demonstrated that a full-station retrofit could not be achieved economically. This claim is incorrect, unsupported, and unsupportable. EPA undertook the independent review as a matter of meeting its statutory responsibilities with reasonable and appropriate thoroughness. EPA's obligation to consider costs in developing BAT effluent limits includes independently assessing whether the costs asserted by the applicant are reasonable and appropriate figures to use in its evaluation. In this case, EPA's independent evaluation suggests that the permittee has overestimated the costs of complying with the proposed permit limits. See discussion of costs elsewhere in this response to comments and in § 4.4.3 of EPA's July 22, 2002, Permit Determinations Document. Moreover, even the costs estimated by the permittee appear to be economically achievable. The economic practicability of

permit compliance is discussed in more detail elsewhere in this response to comments. Finally, EPA independently analyzed both technological and economic achievability in order to obtain a comprehensive view of costs, engineering aspects, processes employed, and other factors EPA must consider under CWA § 304(b)(2)(B). Only by assessing these factors together could EPA determine whether the costs predicted for each BAT option were "reasonable."

**14. F.** ***Comment.*** PG&E-NEG stated that to review the cost estimates of BPS's experts, EPA hired a consultant, SAIC, that has never designed or constructed "even a single, simple electric generating station, never mind a full-station retrofit of the complexity and magnitude of the case at hand"; that SAIC's cost estimate is divorced from the site-specific realities at BPS; and that SAIC never visited BPS.

***Response***
These comments are addressed elsewhere in this response to comments. EPA only reiterates here that its consultant, SAIC, has suitable experience for the analysis conducted; that the cost estimates were, in fact, based on site-specific factors at BPS; and that SAIC did conduct a site visit to BPS as part of considering, and developing responses to, comments on the Draft Permit. Although the capital cost estimates went up somewhat due to certain changes in response to comments, the final estimates remain lower than the permittee's and EPA's BAT determination remains unchanged.

**14. G.** ***Comment.*** PG&E-NEG stated that EPA understates the capital costs of converting the entire station to closed-cycle cooling through "two different, but equally flawed" methods (i.e., the so-called "line-by-line method" and the "316(b) method").

***Response***
EPA disagrees with the comment that EPA's cost-estimating methods were flawed. This comment is addressed in detail elsewhere in this response to comments.

**14. H.** ***Comment.*** PG&E-NEG stated that SAIC used a generic construction cost database to estimate the capital costs of a full-station retrofit; that SAIC could not correlate most of the line items making up Stone & Webster's capital cost estimate with line items in the generic database because a full-station retrofit would be a highly specialized, unique project; that SAIC nonetheless assumed that the cost ratio for the matched line items would apply to the retrofit as a whole; and that this approach is fundamentally flawed because of SAIC's "inability to match the vast majority of tasks."

***Response***
EPA disagrees that the comments identify flaws in the "line-by-line method" analysis. EPA responds in detail to these comments elsewhere in this response to comments, including in memoranda prepared by the Agency's consultant, SAIC, which are incorporated herein by reference.

**14. I.** ***Comment.*** PG&E-NEG stated that EPA incorrectly asserts that "virtually all of the difference" between the Stone & Webster and SAIC capital cost estimates is due to two "errors": the use of an "inflated" labor rate and an "overestimate" of labor hours.

***Response***
EPA disagrees with this comment. What EPA actually said was that "most of the [capital cost] difference [between EPA's 'line-by-line method' estimate and the permittee's spreadsheet estimate] appears to be attributable to differences in labor rates and man hours." In any event, EPA conducted two separate, independent estimates using two different, reasonable approaches. EPA's two estimates came in close to each other, but both are significantly lower than the permittee's estimate. As discussed in detail elsewhere in this document, EPA concludes that its estimates are reasonable and appropriate.

**14. J.** ***Comment.*** PG&E-NEG stated that SAIC erroneously used the bare craft labor rate, while Stone & Webster used a labor rate that reflects the "fully burdened costs that BPS would need to pay (i.e., labor costs that include insurance, taxes, supervision, profit, and a host of other costs that a contractor will actually pass on to BPS)"; and that if SAIC's cost estimates properly reflected these "unavoidable and mandatory costs," its assumed labor rates would be similar to the rates used by Stone & Webster.

***Response***
This comment is responded to elsewhere in this response to comments. Although EPA has made some adjustments to the labor rates used in its analysis in response to this comment, the overall capital costs remain significantly lower than the Stone & Webster estimate and require no change in the BAT discharge limits.

**14. K.** ***Comment.*** PG&E-NEG stated that, according to Bechtel, even the labor rates projected by Stone & Webster are "on the low end of the achievable range."

***Response***
EPA disagrees. The labor rate issue is discussed in more detail elsewhere in this response to comments. EPA also notes that it learned during a site visit to BPS that the average labor rate in the current contract for the upcoming installation of air pollution control equipment at the power plant is approximately $75 per hour. See SAIC trip report in Appendices.

**14. L.** ***Comment.*** PG&E-NEG stated that SAIC misconstrued hourly labor rates by its incorrect use of the generic construction-cost database.

***Response***
Again, the labor rate issue is responded to in detail elsewhere in this response to comments.

**14. M.** ***Comment.*** PG&E-NEG stated that if SAIC were to correct these two errors, its analysis would show "virtually no difference" from Stone & Webster's capital cost estimate and would verify PG&E's original calculations.

***Response***
EPA disagrees. This comment is addressed in detail elsewhere in this response to comments.

**14. N.** ***Comment.*** PG&E-NEG stated that the § 316(b) Rule-Based Analysis presented in the Permit Determinations Document is flawed.

***Response***
EPA disagrees. Comments regarding application of the 316(b) method for estimating the costs of converting BPS's cooling system from open-cycle to closed-cycle cooling using cooling towers are responded to in detail elsewhere in this response to comments.

**14. O.** ***Comment.*** PG&E-NEG stated that SAIC used a costing method proposed by EPA Headquarters in its draft § 316(b) rule for existing facilities; and that this method has "systematic problems that render it useless as a tool to predict the specific costs of a full-station retrofit at BPS."

***Response***
First, as discussed in detail above, and in § 4.2 of EPA's July 22, 2002, Permit Determinations Document, the CWA gives EPA broad discretion in selecting analytical methods and, furthermore, does not require EPA to make a precise estimate of the costs of effluent reduction. Second, EPA ended up principally relying on the cost estimates from its line-by-line method for this Final Permit. The Agency did so to be

conservative because the line-by-line method estimate was somewhat higher than the § 316(b) method estimate, after improvements were made to the analyses in response to comments. That being said, however, the two estimates were still relatively close together. Third, EPA concludes that its use of the § 316(b) method in the context of this individual NPDES permit for developing BPJ limits was reasonable and appropriate. Moreover, use of the § 316(b) method in this context included certain adjustments thereto in order to more closely tailor it to the specifics of the BPS case. Comments concerning the § 316(b) method are discussed in detail elsewhere in this response to comments.

**14. P.** ***Comment.*** PG&E-NEG stated that in commenting on the draft § 316(b) rule for existing facilities, a significant number of commenters criticized this costing method, and that until EPA has considered these comments and determined whether to use the costing method, it is improper to rely on this method for making permit decisions.

***Response***
As discussed elsewhere in this response to comments, EPA does not believe it is required in this individual NPDES permit proceeding to respond to comments by the permittee (and others) submitted to EPA Headquarters on the Agency's proposed CWA § 316(b) Phase II regulations. This rulemaking effort by EPA is still in process. The Agency believes it is required to respond only to comments on the specific permit development at issue here. In any event, EPA has responded to comments on the § 316(b) method and its results elsewhere in this response to comments.

**14. Q.** ***Comment.*** PG&E-NEG stated that even if use of the draft 316(b) rule costing method were proper, the costing method was designed to estimate generic, nationwide aggregate costs, not plant-specific costs, as EPA Region 1 must do here.

***Response***
EPA concludes that its use of the § 316(b) method for this permit was reasonable and appropriate to meet its obligations under CWA §§ 301 and 304 in developing a BAT thermal effluent discharge limit. This comment is further responded to elsewhere in this response to comments.

**14. R.** ***Comment.*** PG&E-NEG stated that Stone & Webster's estimates show that the generic retrofit costs in this costing method significantly understate the actual capital costs for a full-station retrofit at BPS.

***Response***
EPA disagrees with this comment. First, EPA notes that the comment **assumes** that the Stone & Webster estimates are accurate. EPA disagrees with this assumption. Second, EPA believes that the § 316(b) method estimate is reasonable. It has discussed this method, and responded to comments about it, in detail elsewhere in this response to comments. Third, EPA's separate and independent line-by-line method analysis produced an estimate relatively close to the § 316(b) method analysis. These results tend to support the reasonableness of these two estimates. Finally, as discussed in detail elsewhere in this response to comments, other information also supports the reasonableness of the EPA estimates and the likely overestimation of the permittee's estimates (e.g., fewer cooling tower cells likely needed, likely overstatement of vapor plume issues).

**14. S.** ***Comment.*** PG&E-NEG stated that the capital cost estimate SAIC derived using the draft § 316(b) rule costing method is different from EPA Headquarters' conclusion, presented in documents supporting the draft § 316(b) rule, that "capital costs for individual high-flow plants to convert to wet towers generally ranged from $130 to $200 million dollars, with annual operating costs in the range of 4 to 20 million dollars"; and that the Administrative Record for the Draft Permit does not explain the inconsistency between the EPA Headquarters cost range (which includes Stone &

Webster's $177 million estimate) and SAIC's $81 million estimate. PG&E-NEG also states that the costs estimated by Stone & Webster are consistent with EPA Headquarters' conclusion.

***Response***
EPA disagrees with this comment. EPA Region 1's estimate for BPS using the § 316(b) method is, in fact, consistent with the general estimates for different sized plants that EPA Headquarters produced for the CWA § 316(b) rulemaking using the § 316(b) method. The permittee has misinterpreted the information from the CWA § 316(b) rulemaking record. This comment is addressed in more detail elsewhere in this response to comments.

**14. T.** ***Comment.*** PG&E-NEG stated that EPA Region 1's analysis also contains the following errors: (1) it improperly and arbitrarily applied a 6 percent "economy of scale" factor, (2) it arbitrarily shortened unit outage times, (3) it arbitrarily assumed all unit outages would occur in the last year of construction, and (4) it irrationally assumed that the contractor would wait until the end of the multiyear construction contract to begin getting paid.

***Response***
EPA disagrees with these comments suggesting that EPA's cost-estimation efforts were arbitrary or irrational for the stated reasons. Nevertheless, in some cases, EPA made adjustments to its analysis in response to these comments. For example, whereas the permittee had unreasonably assumed that it would pay the full costs of the construction project at the beginning of the project, EPA adopted an alternative approach of assuming the costs would be paid at the end of the project. In response to the permittee's comment, EPA has concluded that a more reasonable, realistic approach would be that the permittee would pay portions of the costs at the beginning, during, and at the end of the construction. Therefore, EPA has adopted a payment schedule extending over the life of the project. EPA has addressed this issue, and all the other comments noted above, in detail elsewhere in this response to comments.

**14. U.** ***Comment.*** PG&E-NEG stated that all of these errors have a profound effect on EPA's estimates of the capital costs of a full-station retrofit; and that if EPA Region 1 were to correct these errors, its estimate of the present value cost over the life of that technology would increase by $119 million, or 143 percent.

***Response***
EPA disagrees with this comment and has responded to comments regarding the Agency's cost estimates in detail elsewhere in this response to comments.

***15. Comment***
PG&E-NEG stated that EPA's consultant, Abt Associates, Inc., which used SAIC's capital cost estimates as part of the basis for a financial cost analysis similar to the financial cost analysis performed by its own consultant Robert Stavins, contained errors in addition to SAIC's errors that further distort EPA's estimates of the costs of a full-station retrofit to closed-cycle cooling.

***Response***
EPA disagrees with this general comment. EPA has responded to the permittee's detailed comments regarding the overall financial cost analysis prepared for EPA by Abt Associates, Inc., elsewhere in this response to comments. EPA/Abt did make some adjustments to its analysis—just as the permittee made some adjustments to its own analysis in response to points noted in the EPA/Abt analysis for the Draft Permit. But EPA's estimates remain lower than the permittee's, and EPA concludes that the analyses are reasonable and appropriate for use in this permit analysis.

**15. A.** ***Comment.*** PG&E-NEG stated that the most significant of Abt's errors was its use of an unrealistic estimate of the rate at which BPS could borrow money to finance this type of capital

project and thereby "completely ignoring the current financial position of the electric generation industry as a whole and the specific financial circumstances of BPS's owner," both of which affect the interest rates available to BPS's owner.

***Response***
EPA disagrees with this comment. EPA believes that the discount rate used in Abt's analysis was reasonable and appropriate and that sound support for the figure was provided. That being said, Abt conducted a new analysis in response to comments, to take into account changed economic conditions since the first analysis, that could influence the cost of capital to the permittee and other firms operating in the merchant power industry. As a result of this updated analysis, Abt has conservatively adjusted the discount rate upward, but still to a level less than the discount rate(s) posited by the permittee. EPA believes the discount rate used by Abt is reasonable and appropriate for use in this permit development. The discount rate issue is discussed in greater detail elsewhere in these comments, including in memoranda by Abt Associates, Inc., which are incorporated by reference herein.

**15. B.** ***Comment.*** PG&E-NEG stated that Abt also made other errors, including "significantly overstating one of the financial benefits of the cooling technologies—the ability to generate electricity when warm water temperatures currently require curtailment—by assuming an unreasonably high price for the power that could be sold."

***Response***
EPA disagrees that Abt made "other errors" that render its cost estimates unreasonable. EPA disagrees with the specific suggestion that Abt "significantly overstated" the financial benefit that would be provided to the permittee as a result of cooling towers enabling **more** electricity to be generated during peak demand, hot weather periods. EPA believes Abt's analysis is reasonable and adequately explained, including the basis for its estimate of the prices for the additional power to be sold. This issue is discussed in more detail elsewhere in this response to comments, including memoranda by Abt that are incorporated herein by reference.

**15. C.** ***Comment.*** PG&E-NEG stated that given EPA's failure to take the specific circumstances at BPS into account, as is required by EPA regulations, in developing its cost estimates, EPA has failed to provide a credible response to the detailed, site-specific information in BPS's permit application; and that EPA's cost estimates, which are about 75 percent lower than BPS's estimates, do not represent the "actual cost" of the full-station retrofit to closed-cycle cooling that the Draft Permit requires.

***Response***
EPA disagrees that it has failed to consider the specific circumstances at BPS to the extent required by the CWA. EPA also disagrees that it must come up with a precise "actual" cost prediction for the implementation of the closed-cycle BAT standard. EPA is required only to establish a reasonable estimate within the context of "considering costs" under the BAT standard and has done so. While it is necessary to consider site-specific issues in developing a reasonable cost estimate for a case-by-case BPJ limit, as EPA has done, there is nothing that requires a more **precise** estimate for a site-specific BAT limit than for a national BAT effluent guideline. The BAT standard is the same in either case. EPA also notes, as discussed elsewhere herein, that the permittee also did not develop "actual" costs, but rather only an order-of-magnitude estimate of costs that according to its terms has a range of error of approximately plus or minus 25 percent. Comments addressing the details of EPA's cost estimates are addressed in detail elsewhere in this response to comments.

***16. Comment***
PG&E-NEG stated that EPA Region 1's evaluation of the environmental, aesthetic, and safety impacts of a full-station retrofit to closed-cycle cooling is based on speculation and uninformed personal observations.

***Response***
EPA disagrees. The Agency's analysis was based on factual research, empirical observation, and appropriate analysis. The Agency has also augmented its work on these topics in response to comments. These issues and this comment are responded to in detail elsewhere in this response to comments.

**16. A.** ***Comment.*** PG&E-NEG stated that analyses by Stone & Webster and TRC Environmental indicate that retrofitting the entire BPS station to closed-cycle cooling by installing a 72-cell cooling tower array would create noise, visual, plume, and safety impacts that "could prove expensive to mitigate"; and that EPA did not independently evaluate these impacts or make any attempt to quantify likely high costs of mitigating them.

***Response***
EPA disagrees with this comment. For the Draft Permit, EPA did consider all these issues and evaluated them independently, as well as by considering material submitted by the permittee. Indeed, EPA's analysis for some of these issues was more detailed than that provided by the permittee. EPA's analysis also considered methods and costs for mitigating these concerns, if necessary or desirable (e.g., the water vapor plume issue). In response to comments, EPA's analysis for the Final Permit includes additional analyses of these issues (e.g., vapor plume, noise), including the costs of mitigation. EPA's assessment of these issues, and potential related costs, is more than reasonable and certainly satisfies the BAT-related provisions of CWA §§ 301 and 304. These issues are discussed in detail elsewhere in this response to comments. EPA also notes that information provided by the permittee to support its comments on some of these issues was unclear or lacked adequate documentation to explain or justify the conclusions presented.

**16. B.** ***Comment.*** PG&E-NEG stated that noise would be a significant problem because cooling towers operate 24 hours a day, including at night when ambient noise is low.

***Response***
EPA has responded to the comments concerning noise by the permittee (and others) elsewhere in this response to comments. The Agency only reiterates here that it concludes that noise can be adequately managed at BPS and any mitigation requirements will be determined in the state permitting process.

**16. C.** ***Comment.*** PG&E-NEG stated that BPS's design already assumes the use of the low-noise fans that EPA has suggested.

***Response***
Unfortunately, it is unclear from the conflicting information submitted by the permittee what sort of low-noise fans or other noise mitigation it included in its design. To the extent that this comment is true, EPA has also considered the costs of such low-noise fans because since SAIC's cost estimates for EPA adopted the Stone & Webster capital cost estimate for cooling tower equipment. In any event, EPA has further investigated noise mitigation, including low noise fans **and** other measures, and has considered the costs of such measures in its evaluation. The issues of noise, noise mitigation, and related costs are addressed elsewhere in the response to comments.

**16. D.** ***Comment.*** PG&E-NEG stated that physical constraints at the site preclude following EPA's suggestion that cooling towers be moved farther from sensitive receptors.

***Response***
EPA remains unconvinced that some or all of the cooling towers could not be relocated at the site, essentially for the reasons discussed in EPA's July 22, 2002, Permit Determinations Document. Nevertheless, EPA's conclusion that noise or other issues can be suitably managed is not based on moving the cooling towers to another part of the site. EPA expects that the permittee will, however, consider available areas across the entire site as it develops its optimal approach to permit compliance at BPS. EPA acknowledges the fact that space is needed at the site for new air emissions control equipment. Moreover, it also points out that **since** issuance of the Draft Permit, a new proposal recently emerged involving the potential location of a liquid natural gas terminal on a southern portion of the BPS site.

**16. E.** ***Comment.*** PG&E-NEG stated that EPA Region 1's conclusion that visible vapor plumes would not present an aesthetic problem is unfounded and incorrect. BPS consultant EarthTech's plume modeling indicates that a 20-cell tower would produce a visible plume of greater than 1,000 meters for almost 3,000 hours per year, and that the visible plumes from a 72-cell tower would be much larger.

***Response***
EPA has considered the permittee's comment but finds that the company submitted little analytical information to justify or indicate how it reached its specific conclusions regarding the visible plume issue. EPA also notes that it does not believe a water vapor plume should provide a major aesthetic problem when considered relative to the existing aesthetic environment at the site, including its existing plumes from facility air emissions. This is further discussed in Chapters 4 and 7 of EPA's July 22, 2002, Permit Determinations Document. EPA has also explained, as discussed elsewhere herein, that its analysis leads to the conclusion that the permittee has overstated the vapor plume issue and the number of cooling tower cells that would be needed at the plant. Finally, EPA also points out that it has evaluated cooling towers with plume-abatement technology and concluded that this technology is feasible and affordable for retrofitting at BPS. Therefore, if the visible plume(s) is a major aesthetic concern to the permittee, it could use plume-abatement technology for all or some of its cooling towers to mitigate the issue. The vapor plume is discussed in more detail elsewhere in this response to comments.

**16. F.** ***Comment.*** PG&E-NEG stated that EPA Region 1's conclusion that a full-station retrofit to closed-cycle cooling will not affect traffic safety lacks any reasonable basis, and that EPA Region 1 has not justified the "various 'solutions' it offers as effective or economically reasonable."

***Response***
EPA disagrees with this comment. EPA provided a reasonable basis for its conclusions on this issue in EPA's July 22, 2002, Permit Determinations Document. It also explained why the suggested approaches would be both effective and economically reasonable. EPA has also conducted additional analyses on this issue in response to comments and continues to conclude that there are several possible ways to effectively manage any vapor plume-related traffic safety issues that the permittee concludes might be present. These types of issues have been appropriately managed at many cooling tower installations and can be managed at BPS as well. In addition, EPA concludes from its analysis that the permittee overstates the extent of any vapor plume issue. These issues are addressed in more detail elsewhere in this response to comments.

**16. G.** ***Comment.*** PG&E-NEG stated that EPA Region 1's principal "solution" of installing technology that would allow for the cooling towers to be bypassed has a high cost and might not be feasible at all; and that, regardless, the Draft Permit's low thermal discharge limits would not allow for open-cycle operation enough to mitigate the fogging and icing that would occur.

***Response***
EPA disagrees and has responded to all aspects of this comment elsewhere in this response to comments. EPA also notes that the permittee has not provided comments demonstrating that the bypass approach would be infeasible. EPA also notes, however, that it has limited the use of any once-through cooling operations during the winter flounder spawning season (February through May), so that cooling tower bypassing would not be an option at that time. It also points out that these issues can also be eliminated by using hybrid cooling towers.

**16. H.** ***Comment.*** PG&E-NEG stated that while EPA Region 1 has suggested an "early warning system," the Massachusetts Highway Department is unconvinced that such a system would work, and notes that sensors installed in the Braga Bridge quickly became nonfunctional and have remained so for at least a decade.

***Response***
EPA continues to believe that some traffic control measures (such as salting and sanding) could adequately address safety hazards, and that the Massachusetts Highway Department did not indicate that such an approach would not work. Moreover, EPA also notes that while the "sensors" became nonfunctional, this was not cited as causing a safety problem despite fog in the area.

***17. Comment***
PG&E-NEG stated that EPA's statement on page 4-3 of the Permit Determinations Document that BAT limits require "reasonable further progress towards the national goal of eliminating the discharge of all pollutants" is a misstatement of the law because the enactment of CWA § 316(a) made it clear that thermal dischargers were not required to meet the "elimination" standard but only to ensure that fish, shellfish, and wildlife were protected.

***Response***
EPA disagrees. The Agency has properly stated the law with respect to BAT standards. It disagrees that CWA § 316(a) necessarily supplants BAT and water quality standards for regulating thermal discharges in all cases. CWA § 316(a) is a variance provision and where the variance standard is not met, then the otherwise applicable BAT based and water quality-based limitations apply. See 1972 Leg. Hist. at 175 (Report of the Conference Committee on the Clean Water Act of 1972) ("thermal pollutants will be regulated as any other pollutant *unless* an owner or operator can prove that a modified thermal limit can be applied which will assure 'protection and propagation' of ... [the BIP]" (emphasis added)). These BAT standards are as EPA described them, and they do not incorporate a test of what is adequate to assure the protection and propagation of the balanced, indigenous population of fish, shellfish, and wildlife in and on the receiving water. That is the standard for a § 316(a) variance, and it neither applies in the context of developing BAT limits nor replaces the goal of BAT. Rather, § 316(a) authorizes EPA to waive BAT (and water quality-based) limits for thermal discharges if the owner or operator of the facility "demonstrate[s] to the satisfaction of the Administrator . . . 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 . . ." CWA § 316(a), 33 U.S.C. § 1326(a).

The *Appalachian Power* court directly addressed the standard that thermal dischargers must meet under the CWA. The court held that EPA was "under a statutory duty to determine whether, in fact, its [thermal effluent] regulations for 1983 will 'result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants . . .'" *Appalachian Power,* 545 F.2d at 1361, quoting 33 U.S.C. § 1311(b)(2)(A). It also expressly indicated that EPA should not rely solely on § 316(a) in assessing the appropriateness of new discharge limits because "doing so would effectively preempt consideration of the

statutory factors set forth in §§ 304(b)(2) and 306 for [BAT]." *Id.* at 1369 n.46. EPA agrees that Congress did not intend the § 316(a) variance analysis to replace consideration of the factors or the overall goal of the BAT provision in the context of the development of BAT limits.

Having said this, EPA must also point out that the permit is now issuing is, in fact, based on a CWA § 316(a) variance and, thus, **is** based on the BIP standard.

***18. Comment***
PG&E-NEG stated that EPA's statement on page 4-3 of the Permit Determinations Document, that "there are no ELGs for thermal discharges from facilities in a steam electric power generating point source category," is incomplete and misleading because although there are currently no ELGs, EPA did promulgate such regulations in 1974, and under those regulations, BAT for Units 1, 2, and 3 of BPS was determined to be open-cycle cooling.

***Response***
EPA disagrees. Indeed, to say otherwise would be misleading. Currently, there are **no** effluent guidelines governing thermal discharges from steam electric power plants. The 1974 regulations were remanded to EPA in 1976 and have not been repromulgated. The permittee's arguments about what those regulations **would have** required are irrelevant to the present permit determination. That being said, EPA also notes its conclusion that the permittee's interpretation of the proposed effluent guidelines and how they would have been intended to apply to BPS is overly simplistic. First, it is clear that the proposed regulations would have required closed-cycle cooling for Unit 4, and BPS never previously agreed it was bound by the regulation to install closed-cycle cooling for Unit 4. Second, it was clear that these regulations did not intend to authorize open-cycle cooling at plants that would be discharging heat even beyond the year 2000. EPA expressly based its proposed approach on the expectation that plants commencing operations before 1970 would have shut down by 2000. BPS is expected to run at least another 20 years from the present date. Therefore, the proposed regulations would not have intended to allow Units 1, 2, and 3 to use open-cycle cooling as BAT. This issue is discussed in greater detail further above. In any event, these regulations have not been in effect for approximately 25 years. Therefore, BAT limits for this case are determined based on a case-by-case application of the BAT criteria in light of **current** facts, not proposals from 25 years ago.

***19. Comment***
PG&E-NEG stated that, despite EPA's statement on page 4-8 of the Permit Determinations Document that its regulations require it to consider "both the appropriate technology for the category of point sources of which the applicant is a member based on all available information and any unique factors relating to the applicant," EPA never in fact considers the appropriate technology for the category of point sources of which BPS is a member, and that the reason for this is that EPA's consistent practice confirms that open-cycle cooling is BAT for existing facilities like BPS.

***Response***
EPA disagrees with these comments and has addressed these issues above.

***20. Comment***
PG&E-NEG stated that on Page 4-16 of the Permit Determinations Document, EPA acknowledges that *Appalachian Power* requires EPA to consider the costs of a particular technology in light of effluent reduction benefits.

***Response***
EPA disagrees. Although EPA forthrightly identified the ruling of the court in *Appalachian Power*, it clearly did not endorse the court's conclusion on the consideration of costs and benefits. As explained

above, since the *Appalachian Power* decision, the Supreme Court and many other federal courts have held that comparison of costs and benefits is not part of the analysis for developing BAT standards. This is further discussed above.

***21. Comment***
PG&E-NEG stated that in concluding that no cost-benefit analysis is needed for developing BAT standards for the BPS permit, EPA ignores the fact that *Appalachian Power* is the only on-point case applying BAT and instead relies entirely on cases involving other industries and types of discharges.

***Response***
EPA disagrees with the permittee's legal analysis here. The cases EPA cites are directly on point. The issue here is what factors must be considered in developing BAT limits under the CWA. The basic technology standard requirements do not vary on an industry-by-industry basis. EPA's legal analysis on this point is sound.

***22. Comment***
PG&E-NEG stated that EPA has failed to discuss the cost-effectiveness analysis that *Appalachian Power* requires, that EPA's consultant performed such an analysis, and that EPA has ignored BPS's analysis.

***Response***
EPA's consideration of costs was reasonable and consistent with CWA requirements for BAT analysis. EPA compared the costs of different options and compared the different levels of thermal discharge reduction that they could achieve. There is no requirement to do the cost-effectiveness analysis urged by the permittee. EPA did, however, review and consider the "cost-effectiveness" analysis provided by the permittee. EPA notes that the permittee's analysis is problematic for a number of reasons. First, the metrics provided completely ignore the environmental ramifications of the different levels of thermal discharge (and flow) reductions. EPA believes these ramifications are significant, as discussed elsewhere in this document and in the July 22, 2002, Permit Determinations Document. Therefore, these values are not meaningful. Second, EPA believes the permittee's cost estimates substantially overstate the cost of options. Finally, EPA notes that the *Appalachian Power* decision did not require a cost-effectiveness analysis.

***23. Comment***
PG&E-NEG stated that EPA ignores numerous cases confirming that EPA's decisions cannot be based on speculation and requiring that EPA use sound science as the basis for its conclusions (citing *Appalachian Power Co.* v. *EPA*, 251 F.3d 1026 (D.C. Cir. 2001) and *Chemical Manufacturers Association* v. *EPA*, 28 F.3d 1259 (D.C. Cir. 1994)).

***Response***
EPA disagrees. Its decision is based on sound science and is consistent with applicable legal standards. EPA also notes that the permittee's bare assertion that the Agency has ignored the case law does not raise a genuine issue that requires the Agency's response. "Assertions that the limitations are 'not based upon substantial evidence' and 'not supported by accurate data and analysis and sound scientific principles,' without elaboration or discussion of the information in the record which is pertinent to each limitation, cannot be considered." *U.S. Steel Corp.* v. *U.S. EPA*, 556 F.2d 822, 839 (7th Cir. 1977) (holding that unsubstantiated and conclusory comments regarding an NPDES permit for wastewater discharge, such as the bare assertion that "the limitations for chloride, sulfate and fluoride were based on an erroneous interpretation of the Combinatorics study," did not effectively raise the issue). See also *Chemical Mfrs. Ass'n* v. *U.S. EPA*, 870 F.2d 177, 228 (5th Cir. 1989) (rejecting industry claim that data EPA relied on to determine BAT were unrepresentative and holding that the industry must not simply claim sampling was unrepresentative or inadequate, but must explain why it is unrepresentative or inadequate).

As is explained elsewhere in this document, "[a]gency determinations based on highly complex and technical matters are 'entitled to great deference.'" *Appalachian Power Co.* v. *EPA*, 251 F.3d 1026, 1035 (D.C. Cir. 2001), quoting *Appalachian Power Co.* v. *EPA*, 249 F.3d 1032, 1051-52, quoting *Public Citizen Health Research Group* v. *Brock*, 823 F.2d 626, 628 (D.C. Cir. 1987). See also, *Reynolds Metals Co.* v. *U.S. EPA*, 760 F.2d 549, 559 (4th Cir. 1985) ("an agency's data selection and choice of statistical methods are entitled to great deference ... and its conclusions with respect to data and analysis need only fall within 'zone of reasonableness'") (internal citations omitted). EPA retains discretion to choose the method of analysis it deems appropriate, so long as that method was not chosen arbitrarily or solely for the purpose of achieving a predetermined outcome. See, e.g., *Chemical Mfrs. Ass'n* v. *U.S. EPA*, 870 F.2d 177, 228 (5th Cir. 1989)(holding that EPA's use of weighted averaging to determine long-term averages of toxics discharged by a plant using BAT was not an abuse of discretion, in part because weighted averaging is a recognized statistical method for adjusting a data set when each unit is not represented by a comparable number of samples).

Although courts give a great deal of deference to agency determinations concerning complex technical matters, that deference has its bounds. The two cases that PG&E-NEG cites in its comment demonstrate the extreme circumstances in which a court will strike down an agency's scientific determinations. For example, the D.C. Circuit Court overturned EPA's use of a generic air dispersion model to determine whether methylene diphenyl diisocyanate (MDI) was a high-risk pollutant because it found "no rational relationship between the model and the known behavior of the hazardous air pollutant to which it is applied." *Chemical Manufacturers Association* v. *EPA*, 28 F.3d 1259, 1265 (D.C. Cir. 1994). The court held that the use of a generic model for this purpose was perfectly acceptable, "even when faced with data indicating that it is not a perfect fit." *Id.* However, the model used in this case assumed that the pollutant would be a gas at 20 °C from a single 10-meter stack and would disperse as a gas through the atmosphere. MDI, however, was a solid at 20 °C, entered the atmosphere from many sources throughout a facility, tended not to evaporate, and dispersed as an aerosol. The court found that this complete lack of relationship between the model assumptions and the substance being modeled, together with EPA's failure to explain why it nonetheless chose this model, was arbitrary and capricious. *Id.* at 1264-65.

The second case cited by PG&E, *Appalachian Power Co.* v. *EPA*, 251 F.3d 1026 (D.C. Cir. 2001), involved a challenge to an EPA CAA rule requiring up-wind states to revise their State Implementation Plans to impose additional controls on nitrogen oxide emissions. These limits were derived by applying "growth factors" reflecting growth projections to emission inventory data. *Appalachian Power*, 251 F.3d at 1031. The court agreed with petitioners that EPA's reliance on the growth factors was arbitrary in that EPA had not explained the plain disparity between its model projections and "real world observations." *Id.* at 1035. Notably, the court did not disapprove EPA's reliance on the growth factors themselves, but remanded the regulations so that EPA could explain its choice. *Id.*

In contrast to the facts of these cases, EPA has carefully considered and explained its scientific analyses, ensuring that the methods are reasonable and appropriate for the circumstances. These technical issues are discussed elsewhere in this document and in EPA's July 22, 2002, Permit Determinations Document.

***24. Comment***

PG&E-NEG stated that on Page 4-36 of the Permit Determinations Document, EPA acknowledges that lack of a track record is reason to deny a particular technology, such as dry cooling, as BAT; and that despite this acknowledgment, EPA ignores this requirement when determining that closed-cycle cooling is BAT for BPS.

***Response***

EPA does acknowledge that lack of a track record for use of a technology is a reason to be cautious about finding that technology to be "available." However, EPA also notes that this, by itself, is not

determinative. EPA did not state and does not agree that the absence of a track record for a particular technology is necessarily reason to reject it as BAT. In fact, the legislative history and case law regarding BAT support the selection of technologies based on pilot studies or other research, even if they have not yet been implemented at a full-scale facility. This legal issue is discussed in § 4.2.3a of EPA's July 22, 2002, Permit Determinations Document. This makes sense because the BAT provision is designed to force technological developments that will accomplish the CWA's goal of eliminating the discharge of pollutants as quickly as possible. To deny a technology simply because it has not been used extensively would run counter to the purpose of the BAT standard. With respect to dry cooling, EPA did conclude that it was not clear that retrofitting this technology at BPS would be technologically feasible. In other words, EPA could not conclude that the technology was available. An important part of that conclusion was the fact that EPA has not identified a single power plant that has retrofitted its cooling system from open-cycle to closed-cycle using dry cooling. Dry cooling also would require significantly more space and raises more significant energy penalties. By contrast, EPA did find several suitable examples of existing electric power plants converting from open-cycle to closed-cycle cooling using wet mechanical-draft cooling towers. These examples support EPA's conclusion that this technology constitutes BAT for BPS. This issue is discussed in more detail above.

***25. Comment***
PG&E-NEG stated that on pages 4-62 through 4-94 of the Permit Determinations Document, EPA has not accurately described the technological and process requirements that would be necessary to retrofit closed-cycle cooling at BPS.

***Response***
EPA believes it has properly evaluated the technological and process requirements that are necessary to retrofit BPS to closed-cycle cooling and has responded to specific issues raised by the permittee's consultants (Stone & Webster and Bechtel) elsewhere in this response to comments.

***26. Comment***
The permittee cited to comments by its consultants and states that EPA's engineering cost analyses contain numerous errors and produce estimates of the cost of retrofitting that are too low, and that these errors are compounded by economically unreasonable assumptions in the financial cost analysis.

***Response***
EPA disagrees with this comment. This comment is responded to elsewhere in this response to comments.

***27. Comment***
The permittee stated that on page 4-64 of the Permit Determinations Document, EPA asserts that BPS failed to take into account a 6 percent "economy of scale" factor for a full-station retrofit to closed-cycle cooling. The permittee states that economies of scale would not be realized because of the "nature of the work," the complexity of the construction project, and the limited laydown space available. The permittee also asserts that due to the facility changes that will be required, it would be necessary to shut down BPS for much greater periods of time than EPA predicts to allow any economies of scale. In addition, according to the permittee, to the extent that EPA relies on the generic methodology in the proposed Phase II Existing Facility rule as justification, that methodology is highly controversial, and that, in any event, generic methodology has no application when a specific engineering design has been presented that demonstrates why the savings will not be realized.

***Response***
EPA has addressed this comment elsewhere in this response to comments. The bottom-line answer is that EPA and SAIC decided not to determine any economy of scale value for a full-station cooling tower retrofit. EPA took this approach as a conservative response to the permittee's comments, although the

Agency continues to believe that it would be reasonable to assume that some savings related to economies of scale could be realized for the entire station closed-cycle option rather than merely combining all the individual costs for retrofitting each separate unit.

***28. Comment***
PG&E-NEG stated that SAIC is not in the business of designing or constructing power plants and therefore is not an expert in the matters on which it opined; that its analysis is inherently flawed and not probative of the actual costs that would be incurred for the construction of any of the modeled options; and that it has significantly underestimated the capital costs associated with either option.

***Response***
EPA disagrees. SAIC is appropriately qualified to provide the estimates it has developed, and it has developed reasonable and appropriate analyses for EPA. This comment is responded to in more detail elsewhere in this response to comments.

***29. Comment***
PG&E-NEG stated that BPS's original estimates prepared by Stone & Webster are appropriate and accurate, and that it contracted for a separate review by Bechtel that was initiated after EPA's issuance of the Permit Determinations Document. The permittee states that its consultant Bechtel's analysis supports the conclusions of its consultant Stone & Webster, and that this material indicates that SAIC has significantly underestimated the capital costs associated with either option.

***Response***
EPA disagrees that SAIC has significantly underestimated the capital costs associated with the cooling tower options at hand. This comment is responded to in detail elsewhere in this response to comments.

***30. Comment***
PG&E-NEG stated that the conclusions from EPA's "Independent Line Item Analysis" are of no probative value because they resulted from incorrect inputs into a flawed methodology; that SAIC used demonstrably low labor rates (which failed to consider such costs as insurance, taxes, profit, and other items that BPS would be required to pay) and underestimated man-hours as a result of improper use of the generic Means database; and that when the labor rates and required labor hours are corrected to reflect actual conditions, SAIC's estimates correspond closely to BPS's.

***Response***
EPA disagrees that if "correct" values were used in SAIC's analysis, the cost estimates would correspond closely to BPS's own estimate. SAIC has revised certain values in response to the permittee's comments. With these revised values, SAIC's estimate under this method has gone up somewhat. This estimate remains, however, significantly lower than the permittee's estimate. EPA believes SAIC's estimate is reasonable and appropriate and that the permittee's value represents an overestimate. These issues are addressed in more detail elsewhere in this response to comments.

***31. Comment***
PG&E-NEG stated that SAIC's methodology for the "Independent Line Item Analysis" is flawed because it presumes that matching a small percentage of costs against a generic database and then scaling the costs up to the whole is a legitimate means of estimating costs, and that this presumption is rebutted by its consultants Stone & Webster and Bechtel.

***Response***
EPA disagrees that the permittee's analyses "rebut" the cost-estimation method used by SAIC. This comment is responded to in more detail elsewhere in this response to comments.

***32. Comment***
PG&E-NEG stated that SAIC improperly relied on the costing methodology from the EPA § 316(b) Phase II Proposal for Existing Facilities (August 7, 2002) to derive its second capital cost estimate; that this costing methodology received significant criticism; that this methodology's use of generic and arbitrary "retrofit" costs and addition to account for salt water conditions is inappropriate for estimating specific costs for specific projects; and that Stone & Webster's estimates of cooling tower costs alone are roughly comparable to the estimates obtained in the § 316(b) methodology, but Stone & Webster's engineering estimate of add-on costs exceed the generic EPA values by more than a factor of 4.

***Response***
EPA does not agree that the estimates generated using the "316(b) method" were unreasonable or inappropriate in the context of developing the proposed BAT limits. The method was not entirely "generic" and certainly was not "arbitrary" because the analysis was based on general analysis augmented with certain factors to reflect the situation at BPS (e.g., costs for salt water cooling towers). EPA has made some revisions to the § 316(b) method in response to comments received. But, ultimately, all of this has become immaterial because EPA based its detailed cost estimates for the Final Permit on the estimates generated by its alternative, independent estimation method (the "line-by-line method"). EPA has used the figures from the line-by-line method because the estimates from that method were somewhat higher than, although close to, the § 316(b) method values. EPA used the higher values to produce a more conservative estimate. EPA has addressed the permittee's comments regarding the estimates generated using the "316(b) method" in detail elsewhere in this response to comments.

***33. Comment***
PG&E-NEG stated that EPA asserts on page 4-71 of the July 22, 2002, Permit Determinations Document that, according to SAIC, the contingencies used by BPS were high, but as a "conservative" measure, SAIC used BPS's contingencies. The permittee states that the contingencies are appropriate "for a project of this magnitude at the current level of design," that contingencies as small as 4 to 7 percent are appropriate for use only when a project has undergone detailed engineering design and bids have been received from contractors, and that Bechtel had identified a number of considerations that would be better defined during the detailed engineering phase of design that could significantly increase the capital cost above existing estimates.

***Response***
This comment is responded to in more detail elsewhere in this response to comments. In any event, SAIC used the contingency proposed by the permittee.

***34. Comment***
PG&E-NEG stated that according to page 4-71 of the July 22, 2002, Permit Determinations Document, SAIC estimated costs for system modifications to allow multi-mode operation during fogging and icing conditions, which in turn would eliminate any need for shutdowns as a result of these conditions. The permittee also states that if conventional plume abatement technology were to be used, EPA's estimates of the cost of a full station retrofit to closed-cycle cooling would be higher than those presented by BPS.

***Response***
EPA disagrees that the costs of conventional plume abatement would push the cooling system conversion costs either as high as or higher than the costs estimated by the permittee. EPA notes, however, that SAIC did make a significant error in its estimate of the capital cost of plume-abatement cooling towers in its work for the Draft Permit. This error has been corrected and is discussed in detail elsewhere in this response to comments. EPA's consultants SAIC and Abt Associates then developed detailed cost estimates for the use of this technology. The costs of this approach were found to be practicable. Such plume-abatement towers are clearly one option that the permittee can consider for meeting the new permit

limits and addressing water vapor plume issues as needed. Thus, the permittee has several options for meeting the permit limits and it might wish to consider combining some of these approaches (e.g., providing some plume-abatement cooling towers). These issues are discussed in more detail elsewhere in this response to comments.

***35. Comment***
PG&E-NEG stated that SAIC presented no basis for the costs to allow multi-mode operation, which would be very significant and far greater than the amount allocated in the estimates; and that because the Draft Permit allows only 122 hours of open-cycle operation in any year, the units would still need to shut down frequently, even if multi-mode operation were physically possible, because far more than 122 hours of potential fogging and icing conditions are forecast to result from the 72-cell towers associated with entire station closed-cycle cooling.

***Response***
EPA disagrees with these comments and has responded to them in detail elsewhere in this response to comments.

***36. Comment***
The permittee concurred with EPA's decision to adopt BPS's estimates of O&M and auxiliary energy costs.

***Response***
EPA notes, however, that for the Final Permit it actually decided to use SAIC's estimate of the auxiliary energy penalty because it was **higher** than the permittee's estimate. EPA believed SAIC's estimate was reasonable and would tend to produce a more conservative estimate.

***37. Comment***
PG&E-NEG stated that SAIC failed to take into account the actual design of BPS in estimating the efficiency losses from installing cooling towers at BPS; that SAIC would not have been able to determine the effect of cooling towers on turbine efficiency with any accuracy unless the turbine's last stage area was known, and SAIC's report does not mention this information; and that BPS's units have very large amounts of last stage area and are thus unusually sensitive to the increases in condenser pressure that would result from the installation of cooling towers.

***Response***
EPA believes that SAIC's efficiency loss estimate was reasonable and adequately substantiated. The permittee points to generic issues that it says would affect the efficiency loss at BPS but does not provide specific values or calculations to support its position.

***38. Comment***
PG&E-NEG stated that EPA asserts on pages 4-68 and 4-76 of the July 22, 2002, Permit Determinations Document that BPS might achieve economic gain due to the ability to generate more electricity in peak summer months as a result of using cooling towers, and that Abt's analysis dramatically overstates the amount of income that BPS will be able to gain because Abt uses incorrect values for the price of electricity during these "extra" hours of generation.

***Response***
EPA notes that the permittee has conceded that this positive economic and energy effect will occur (i.e., that the power plant should be able to generate more electricity during some peak-demand, hot-weather periods as a result of using cooling towers because the new cooling capacity will enable the facility to avoid having to curtail generation as a result of "bumping up against" its maximum discharge temperature limits). EPA believes its estimate of the economic effect of this benefit is reasonable and adequately

explained. In particular, EPA notes that, while the company criticized Abt Associates' use of an electricity price schedule that was originally provided by the company, the company has not provided detailed documentation of the alternative, lower electricity price schedules that it subsequently included in its submissions to EPA, including its comment on the proposed permit. EPA has responded to this comment in more detail elsewhere in this response to comments.

***39. Comment***
PG&E-NEG stated that EPA asserts on pages 4-76 and 4-77 of the July 22, 2002, Permit Determinations Document that BPS has overestimated the length of time of the outage (in unit-months) required to install entire station closed-cycle cooling. The permittee maintains that SAIC's determination that the outage time was excessive is based on incorrect assumptions regarding construction; that Bechtel concluded that SAIC's engineering approach would cause significant damage to the condensers, which could not practicably be replaced or upgraded; and that even if meaningful information had been provided about the four case studies cited by SAIC as a basis for determining outage length, SAIC's reliance on those case studies is unsupported because none of those cases is comparable to BPS.

***Response***
EPA maintains that its outage estimates are reasonable and has explained them in detail elsewhere in this response to comments and in EPA's July 22, 2002, Permit Determinations Document. EPA has discussed the case studies above and has explained that they are relevant examples of how outages have been managed at other facilities that have undergone cooling tower retrofits. EPA does not believe that Bechtel's comments indicate or establish that SAIC's design approach, which is based on Stone & Webster's design, would result in damage to the condensers. SAIC's approach also does not rely on replacing the condensers. This issue is also discussed elsewhere in this response to comments.

***40. Comment***
PG&E-NEG stated that EPA asserts on Pages 4-79 and 4-80 of the July 22, 2002, Permit Determinations Document that SAIC shortened the construction time from 47 to 39 months based on the reduced estimates for constructing each unit's cooling systems, but that the reductions in construction time for each unit were improper and, as a result, the overall reduction in construction time is unsupported.

***Response***
EPA continues to maintain that its proposed construction schedule is reasonable. This comment is responded to in detail elsewhere in this response to comments.

***41. Comment***
PG&E-NEG referenced Page 4-82 of the July 22, 2002, Permit Determinations Document and stated that in discussing two errors in BPS's dynamic cost analysis, Abt made a calculation error of its own that overstated the significance of BPS's errors; and that while EPA states that the errors increased the permittee's estimate of the costs of the closed-cycle option by 15 percent, in fact they increased the costs of the closed-cycle option by less than 5 percent.

***Response***
The permittee's comments on the details of the financial cost analysis are addressed elsewhere in this response to comments, including memoranda by EPA's expert consultant, Abt Associates, Inc.

***42. Comment***
PG&E-NEG stated that on page 4-83 of the July 22, 2002, Permit Determinations Document, EPA assumes that all construction-related generation outages occur in the last year of the construction period; that this assumption contradicts the schedule developed by Stone & Webster, which shows that outages

would occur throughout the construction period; and that, as a result, Abt's analysis significantly understates the costs of closed-cycle cooling.

***Response***
EPA has adopted the permittee's estimate of the timing of the construction outages but notes that this does not result in a large cost increase. This issue is addressed in detail elsewhere in this response to comments.

***43. Comment***
PG&E-NEG stated that on page 4-83 of the July 22, 2002, Permit Determinations Document, EPA chose to use the permittee's estimates of auxiliary power consumption; that this demonstrates bias in EPA's methodology because if EPA had used its own consultant's estimates, its overall cost estimate for the full-station retrofit would have increased about 6 percent; and that while EPA claims to have always used the highest cost estimates, that is not the case here.

***Response***
EPA's original approach was not reflective of any bias on EPA's part, but EPA has revised its auxiliary power estimate to use SAIC's higher estimate, thereby producing a more conservative estimate. This issue is also addressed in more detail elsewhere in this response to comments.

***44. Comment***
PG&E-NEG stated that, in reference to Pages 4-84 and 4-85 of the July 22, 2002, Permit Determinations Document, in its dynamic cost analysis, EPA's consultant used spark-spread prices taken from a previous USGen NE submission despite the fact that the company revised them to account for better information in its most recent submission; that those spark-spread prices are unreasonably high; and that, in addition, EPA's consultant assumed almost 60 percent more hours of high spark-spread prices per summer than the evidence in the record would suggest.

***Response***
EPA believes its consultant's approach to this analysis was entirely reasonable and that the permittee did not provide a compelling justification for its alternative approach. This issue is addressed in detail elsewhere in this response to comments.

***45. Comment***
PG&E-NEG stated that, in reference to page 4-85 of the July 22, 2002, Permit Determinations Document, that EPA's economic analysis of the effect of plume-reduction technology is based on the unsubstantiated and arbitrary assumption that EPA's proposed multi-mode capability can be built into an entire station closed-cycle retrofit for 25 percent of the already low capital cost estimate that SAIC made; that the only feasible option that BPS explored to avoid plumes, aside from shutting down units, is a plume abatement technology; and that this additional technology would add $70.6 million to the capital cost of the entire station closed-cycle option.

***Response***
These comments are addressed in detail elsewhere in this response to comments. We will only state here that EPA's estimate of the costs of providing multi-mode capacity to the cooling towers was far from arbitrary, and that EPA has also provided a detailed estimate of plume abatement technology, as well as outage approaches.

***46. Comment***
PG&E-NEG stated, in reference to with regard to Page 4-85 of the July 22, 2002, Permit Determinations Document, that EPA improperly assumes that there is no increase in maintenance costs with the multi-mode capability it proposes.

***Response***
EPA believes its approach to maintenance costs was reasonable and appropriate and that no compelling arguments were made to support a different position. EPA notes that for its plume abatement tower cost analysis, it increased maintenance costs to a degree similar to, but slightly higher than, that reflected in the permittee's estimates for that technology. These matters are addressed in detail elsewhere in this response to comments.

***47. Comment***
PG&E-NEG stated that on page 4-86 of the July 22, 2002, Permit Determinations Document, EPA states that in considering the reasonable life of the capital equipment, "30 years might be a more reasonable figure"; and that EPA's reliance on a 30-year operating life for the technology is inconsistent with the expected lifetime of these technologies based on communications between BPS and the vendors of the technology.

***Response***
EPA has documented the basis for its conclusion, which also includes discussion with vendors, that a 30-year useful life is a reasonable estimate for this equipment and continues to hold this view. EPA also, however, evaluated costs assuming a 20-year period as urged by the permittee.

***48. Comment***
PG&E-NEG stated with respect to page 4-86 of the July 22, 2002, Permit Determinations Document that Abt "estimated a market capitalization weighted cost of capital at 11.8 percent"; that this discount rate is unreasonably low; that based on reported market conditions, it appears that Abt's analysis was performed before the end of 2001, and since then, the financial condition of the firms on which Abt's cost of capital estimate is based has significantly deteriorated; and that based on these factors, the 15 percent to 20 percent discount rate used by BPS is likely to be below the discount rate that should be applied.

***Response***
The discount rate issue is discussed in detail above and elsewhere in this response to comments. EPA notes here only that its consultant, Abt Associates, Inc., did develop a new discount rate estimate based on changed economic conditions as urged by the permittee.

***49. Comment***
PG&E-NEG stated that EPA states on page 4-86 of the July 22, 2002, Permit Determinations Document that Abt actually discounts back to the beginning of 2002, and that this error leads to an understatement of costs by 5.4 percent for each technology.

***Response***
EPA and Abt agree that Abt unintentionally erred by discounting back to the beginning of 2002. Abt corrected this error to discount back to mid-2002 as it had intended to do. This issue is addressed in more detail elsewhere in this response to comments.

***50. Comment***
PG&E-NEG stated that while EPA makes clear on Page 4-96 of the July 22, 2002, Permit Determinations Document that the requirement of a full station retrofit might trigger additional air permitting regulations entirely due to the retrofit, EPA fails to quantify the cost of these additional regulations, which should be included in the cost of the retrofit.

***Response***
EPA does not agree that it should have included any cost increases as a result of the facility's need to comply with air regulations. The Agency has no reason to believe that any additional costs will be incurred in order to comply with such regulations and that there is no reasonable basis for adding any

costs in this regard. For example, while controlling salt particulate emissions from saltwater cooling towers could be an issue for air pollution control, EPA has no reason for concluding that the drift eliminators proposed by the permittee will not be adequate to address this issue. These issues are also addressed in more detail elsewhere in this response to comments.

***51. Comment***
PG&E-NEG stated that on page 4-97 of the July 22, 2002, Permit Determinations Document EPA's suggestion that any noise impacts can be mitigated at reasonable cost relies on speculation and is incorrect; that BPS's planned multi-mode design already uses advanced noise mitigation technology comparable to the state-of-the-art; that, as a result, there is no basis for EPA's suggestion that "low noise fans" could further reduce noise levels; and that EPA's suggestion that trees could minimize noise is groundless and that trees are not considered in noise analysis.

***Response***
These comments are addressed in detail elsewhere in this response to comments.

***52. Comment***
PG&E-NEG stated that regarding footnote 229 on page 4-97 of the July 22, 2002, Permit Determinations Document, EPA has not provided any basis for its conclusion that the entire station closed-cycle option could be built on the southwest portion of the site near the discharge canal, that EPA has not estimated the cost of this change and how it might proportionally increase the cost of the closed-cycle option, that significant additional large-diameter piping runs would be required, and that relocating the towers away from noise receptors would at most reduce noise levels by 1 to 2 dB(A).

***Response***
EPA did provide the basis for its suggestion that perhaps some or all of the cooling towers could be built in the stated area of the site. Indeed, this was based, in part, on the permittee's own proposals. EPA did not develop costs for this option because it did not rely on it for any of the alternatives for achieving permit compliance that EPA investigated. EPA noted only that this area might provide some useful flexibility for the permittee. The Agency agrees that there are other ways to implement the closed-cycle options at the site without using this area. Additional discussion of this issue is provided elsewhere in this response to comments.

***53. Comment***
PG&E-NEG stated that the sources EPA cites in footnote 234 of the July 22, 2002, Permit Determinations Document are not adequate to support EPA's conclusion, consist of general statements made without any reference to the specific circumstances of BPS, and therefore cannot serve to refute BPS's detailed testimony.

***Response***
EPA believes the references provided in the above-mentioned footnote are relevant, valid matters to consider here. In addition, EPA has addressed this issue and the issue of visible plumes from BPS in more detail elsewhere in this response to comments.

***54. Comment***
PG&E-NEG stated that EPA's conclusions on pages 4-99 through 4-100 of the July 22, 2002, Permit Determinations Document that "during at least some of the conditions when cooling water fog might occur, naturally-occurring fog would also be likely to occur in the coastal environment of BPS," and "[u]nder such conditions, fogging from the cooling towers would only present a small marginal increase over background conditions" is unscientific and misleading and rests only on the personal observation of an EPA attorney; and that the fact that there might be many hours of naturally occurring fog does not

mean that the fogging caused by the cooling towers is irrelevant, especially because the cooling towers could create fogging and icing conditions very suddenly at times when motorists would not be expecting them.

***Response***
Although this point was raised in a memorandum written by an attorney documenting a site visit, other EPA technical staff were also present and shared the same empirical observation and common sense conclusion. In addition, EPA hired an outside expert contractor to evaluate TRC and EarthTech's modeling efforts and this expert reached a conclusion similar to that expressed earlier by EPA on this point. See MFG report. This issue is addressed in more detail elsewhere in this response to comments.

***55. Comment***
PG&E-NEG states that, on page 4-104 of the July 22, 2002, Permit Determinations Document, EPA's stated reasons for questioning BPS's modeling of plume effects are unsupported and speculative, and that none of the alternatives EPA proposes is realistic.

***Response***
EPA disagrees and these issues are addressed elsewhere in this response to comments.

***56. Comment***
PG&E-NEG stated that EPA's conclusions regarding the feasibility of developing and using an "early warning system" to address fogging and icing conditions shows that EPA misunderstands the problem of fog or icing due to plume effects; that it will rarely be possible to predict in advance when fogging and icing might occur; that, unlike naturally occurring fog which usually develops over a period of time, small changes in wind directions or other ambient conditions could quickly produce fogging or icing conditions on an otherwise clear day; that the materials to which EPA cites in footnote 271 of the July 22, 2002, Permit Determinations Document do not support EPA's early warning system proposal; and that the Massachusetts Highway Department was skeptical of the feasibility of an early warning system.

***Response***
EPA does not agree with the permittee's assessment of this issue or its characterization of Agency communications with the Massachusetts Highway Department. Moreover, EPA notes that the permittee's proposed "enhanced multi-mode" system relies on the ability to predict in advance when fogging and icing might occur so that it can bypass the cooling towers without necessitating generating-unit shutdowns. In addition, its proposal to shut down generating units to avoid fogging and icing if it has to use conventional cooling towers also relies on making such predictions. This comment is further responded to elsewhere in this response to comments.

***57. Comment***
Regarding EPA's statement on page 4-108 of the July 22, 2002, Permit Determinations Document that it "has reviewed the permittee's air modeling analysis and has a number of concerns and questions about it," PG&E-NEG stated that BPS had done a thorough analysis of water vapor plume effects using the CALPUFF model. The permittee further states that EPA has rejected this analysis based on the "critical comments of a handful of individuals" and has not performed an independent analysis of the plume effects that would actually occur. The permittee further stated that the comments on which EPA relies are not criticisms but merely questions about aspects of the model that the viewers did not fully understand, and that those aspects of the model are fully explained in BPS's comments on the Draft Permit.

***Response***
EPA disagrees with the permittee's characterization of EPA's reservations about the permittee's water vapor plume analysis. The comments and concerns were expressed by expert technical personnel, these

concerns raised significant issues, and the permittee's submissions did not adequately address or resolve these concerns. EPA has since reviewed the new material submitted by the permittee and hired an expert contractor to conduct additional review of this issue. These matters are discussed elsewhere in this response to comments. See MFG report. EPA notes, however, that it concluded from its evaluation that the permittee appears to have overestimated the vapor plume issue.

***58. Comment***

PG&E-NEG stated that EPA stated on page 4-109 of the July 22, 2002, Permit Determinations Document, "experience of other plants does not appear to corroborate the threat suggested by the permittee"; that this conclusion rests on speculation based on "a few personal phone calls" conducted by an EPA attorney; that EPA did not provide a detailed analysis of similarity of conditions at these "other plants" and at BPS; that among other differences, the cooling tower array contemplated by the Draft Permit is far larger than any facility in the northeastern United States and would be one of the largest arrays in the world; and that, as a result, any conclusion reached on the basis of these phone calls is speculation and inadequate to respond to the comprehensive and detailed information provided by BPS.

***Response***

EPA's references to experience at other plants were not based on a "a few personal phone calls" conducted by an EPA attorney. That is evident from the record. In addition, EPA did investigate relevant similarities between these plants and BPS, such as whether they are in cold climates and their proximity to highways. Moreover, EPA continues to note that many other plants that use cooling towers have managed to adequately control icing and/or fogging concerns. In any event, EPA has also engaged in further more-detailed analysis of these issues as discussed elsewhere in this response to comments.

***59. Comment***

PG&E-NEG noted EPA's statement on page 4-109 of the July 22, 2002, Permit Determinations Document that "in the January 1997 NEPCO report, the permittee predicted that although incidents of ground fog can occur during periods of high relative humidity, cool weather, moderate to low winds and inversions or some combination thereof ... it is unlikely however that the fog would extend further than 500 to 1,000 downwind of the towers," and states that the 1997 study was based on a cooling tower array much smaller than the 72-cell array proposed by EPA and did not include a formal evaluation of fogging and icing.

***Response***

EPA notes the permittee's points regarding the limitations of Stone & Webster's work conducted on behalf of the prior plant owner, the New England Power Company. However, EPA also notes that these conclusions are consistent with other general information collected regarding vapor plumes from cooling towers. See EPA's July 22, 2002, Permit Determinations Document, page 4-109. The vapor plume issue is discussed in more detail elsewhere in this response to comments. See MFG report.

***60. Comment***

PG&E-NEG commented that EPA's statement on page 4-110 of the July 22, 2002, Permit Determinations Document that "as a matter of common sense it does not seem that the problem should be severe enough to require hundreds of hours of generating unit outages," is speculative and unresponsive to the detailed analysis submitted by BPS. The permittee stated that EPA might not simply ignore the comprehensive information that BPS has provided on this subject by an "unsupportive [sic] appeal to common sense."

***Response***

EPA disagrees. EPA's comment was based on its review of the vapor plume issue, including the data presented by the permittee, and the experience of other power plants. Based on the very few hours of ice or fog that even the permittee predicted, the hundreds of hours of claimed outages seem unreasonable as a

matter of common sense. Morever, to EPA's knowledge, this outage approach would be an atypical solution to the problem because no information has been provided that indicates any electric generating facility operates in such a manner. The company admits that the station is not designed to operate under such conditions. Furthermore, EPA hired a consultant to conduct an additional more-detailed analysis of the plume issue, and EPA has concluded from this work that the plume issue should be manageable, and that the permittee appears to have substantially overstated the plume problem and the number of hours of outage that would be needed under the permittee's approach. EPA also assessed costs both accepting the outages assumed by the permittee, and assuming the installation of plume-abatement cooling towers to obviate the plume issue. Both approaches would be economically feasible, but the plume-abatement tower approach (or the use of some plume abatement tower cells) would likely provide more operating flexibility to the permittee (i.e., would avoid outages), if the permittee believes the plume issue warrants taking that step. The vapor plume issue is also discussed in more detail elsewhere in this response to comments.

***61. Comment***

Regarding EPA's statement on page 4-122 of the July 22, 2002, Permit Determinations Document that "BPS has long been a very profitable plant, and it will remain so after the improvements associated with the Closed-Cycle Entire Station option are installed," PG&E-NEG stated that EPA's estimate of the ultimate financial impact of the entire station closed-cycle option understates that impact by a factor of 10. The permittee stated that this is partly because EPA's cost estimates are unreasonably low, and partly because EPA overstates BPS's baseline profitability by 171 to 254 percent due to flawed forecasting, the lack of consideration of property taxes, incomplete operating and maintenance costs, and a discount rate that is below a reasonable level given the financial state of the merchant power industry.

***Response***

EPA disagrees. EPA's consultant, Abt Associates, Inc., has made some particular adjustments to its financial impact analysis (e.g., changed discount rate, addressed property tax values provided by the permittee's comments). However, EPA's overall conclusion remains the same—the costs of permit compliance are achievable, and BPS will remain very profitable after these expenses are undertaken. These issues are addressed in greater detail in a Memorandum from Michael Fisher, Abt Associates, Inc., to Mark Stein, Damien Houlihan, EPA Region 1; Shari Goodwin, Tetra Tech, Inc., "Financial Impact of Closed Cycle System Installation at Brayton Point Station" (August 12, 2003) (the "August 12, 2003, Financial Impact Report"). While this memorandum is part of EPA's Administrative Record, it is not included as an appendix to this response to comments or included in the publicly available record because some of the analysis contained therein relies on information that the permittee has designated as Confidential Business Information (CBI) and EPA's current view is that some of this CBI could be revealed if the memorandum was released. This issue is also addressed in more detail elsewhere in this response to comments.

***62. Comment***

PG&E-NEG referenced EPA's statement on page 4-122 of the July 22, 2002, Permit Determinations Document, "BPS has long been a very profitable plant, and it will remain so after the improvements associated with the Closed-Cycle Entire Station option are installed," and stated that EPA misleadingly omits information about who ultimately bears the costs of conversion to the closed-cycle entire station option; that "a significant part of the lost 'profits' is actually a loss to the U.S. Treasury" of approximately $144 million in present value terms; and that the remaining loss, to the extent it cannot be offset through higher electricity rates, will be paid by shareholders, including individual investors and pension funds and mutual funds that benefit individuals, in the form of reduced returns on their investments.

***Response***
This issue is addressed elsewhere in this response to comments. Nothing about EPA's discussion of this matter was misleading. EPA acknowledged that the costs of permit compliance would have an impact on the permittee's profits. The effect on Federal tax revenues is not a required consideration in applying these CWA standards, and there was nothing misleading about not trying to estimate or discuss such potential effects.

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***Comment***
Some commenters supported EPA's determination of BAT effluent limitations in the Draft Permit. (1132, 1150) One noted that EPA appropriately used its BPJ in determining the BAT effluent limitations for BPS by thoroughly considering the six factors required under CWA § 304(b)(2)(B), including costs. The commenter pointed out that although BPS urges EPA to give costs more attention, EPA has substantial discretion in the weight it gives to the factor of cost. Moreover, the commenter noted that the U.S. Supreme Court has interpreted the CWA to mean that BAT requires a commitment of the "maximum resources economically possible to the ultimate goal of eliminating all polluting discharges." The commenter concluded that even if EPA did not have such discretion, "BPS's cost related arguments have very little to do with the 'economic cost of achieving the effluent reduction' required by the Draft Permit, and very little relevance to the 'commitment of maximum resources economically possible' for BPS as required by the Clean Water Act." (1150). Another commenter agreed with EPA's determination that closed-cycle cooling throughout the plant satisfies BAT. (1132).

***Response***
EPA agrees with the comments, except that the Agency feels that the permittee did provide a substantial number of comments addressing the question of the "cost of achieving the effluent reduction" that would be required by the Draft NPDES Permit. Specifically, having essentially accepted that closed-cycle mechanical draft wet cooling towers would be the most cost-effective way to meet the thermal discharge reductions required by the Draft Permit, the permittee then presents comments regarding the cost of making such cooling system improvements at BPS. The permittee's comments dispute EPA's assessment of such costs and present alternative cost estimates. EPA has addressed these comments, however, elsewhere in this document.