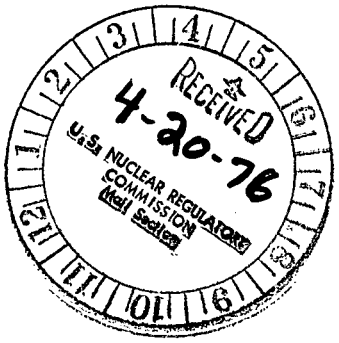
William J. Cahill, Jr.
Vice President

Regulatory Docket File

50-247

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 460-3819

April 16, 1976



Director of Nuclear Reactor Regulation
ATTN: Director, Division of Site
Safety and Environmental Analysis
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

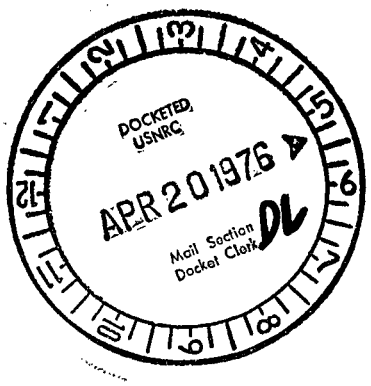
Consolidated Edison Company of New York, Inc. (Con Edison) respectfully submits its comments on the Draft Environmental Statement (the Statement) for selection of the preferred closed-cycle cooling system at Indian Point Unit No. 2, dated February 1976, prepared by the Office of Nuclear Reactor Regulation of the United States Nuclear Regulatory Commission. These comments are submitted pursuant to the notice of the Council on Environmental Quality in the Federal Register on March 5, 1976.

The comments are organized into two parts. The first contains Con Edison's principal comments on the Statement. The second part contains detailed comments and suggested corrections to the Statement.

Con Edison hopes that these comments will be of use to the Office of Nuclear Reactor Regulation in preparing the Final Environmental Statement.

Very truly yours,

Enc.



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Part I - Principal Comments

1. General

The Office of Nuclear Reactor Regulation (the staff) has in general done a thorough job of analyzing environmental impacts and is to be commended for the extent of its independent investigations.

2. Selection of a Preferred Cooling Alternative

The staff concluded that, on the basis of the evaluation and analysis set forth in this statement, the Facility Operating License for Indian Point Unit No. 2 should be amended to authorize construction of a natural draft cooling tower as proposed by Con Edison (p. iv, Item 8). However, the staff has found that the relative merits of the fan-assisted natural draft and circular mechanical draft cooling towers "warrant further investigation" (p. 5-1, para. 1). This request for further investigation is inconsistent with the conditions of the license which require Con Edison to proceed with construction of the cooling tower. It is not clear what purpose would be served by such an investigation in view of the necessity to proceed with construction.

Con Edison disagrees with the staff on the assessment of the fan-assisted natural draft and circular mechanical draft cooling towers as feasible cooling alternatives for Indian

Point Unit 2. We note that the staff's judgment is based on limited or no actual engineering data. As Con Edison stated in the report, "Economic and Environmental Impacts of Alternative Closed-Cycle Cooling Systems for Indian Point Unit No. 2, Supplement, Vol. No. 1," dated August 6, 1975, both of these cooling systems are considered technically unproven cooling alternatives at the present time. We do not believe it prudent to consider them as alternatives for a backfit on a large operating plant. Although Con Edison will continue to follow technological developments in this area, it should be noted that any such alternative cannot be designed and constructed within the time constraints of the present license.

3. Village of Buchanan

Con Edison believes that a major deficiency in the Statement is its failure to discuss the very strong local opposition to cooling towers. The staff has been notified by officials of the Village of Buchanan and other elected officials of neighboring communities that there is widespread concern among people living in the vicinity of Indian Point concerning the environmental impacts of cooling towers. The staff is also aware that the Village of Buchanan has denied Con Edison's application for a building permit for the cooling tower and the

validity of that denial is now being determined by the N.Y. State courts. One sentence on page 6-39 refers to this "strong local concern". More attention to this extremely serious and potentially controlling problem would appear warranted.

4. Cost Analysis

There are several serious deficiencies in the staff's analysis of cooling tower costs. The most significant one is the staff's apparent misunderstanding of the two concepts of replacement energy and of replacement power (capacity). Additional operation of existing capability can provide replacement energy, not replacement power. In order to perform a benefit/cost analysis, values must be placed on both the loss of energy and the loss of capacity. The loss of energy is valued by computing the incremental fuel cost to the Con Edison system of replacing the energy. It is assumed for purposes of calculation that the energy can be generated at existing power plants. This assumption is made merely for purposes of calculation and is not a guaranty that such generation would be available. The staff appears to have agreed with Con Edison's computation of the value of replacement energy.

The lost capacity must be valued by the cost of construction of a generating facility to replace the capacity. It cannot be determined at this time precisely what type of generating capacity would be constructed at some time in the future. Presumably this would be a portion of a new base load facility. For purposes of the benefit/cost analysis, Con Edison valued the lost capacity on the basis of the cost of a gas turbine replacement, not because it in fact intends to buy such gas turbines, but because this capacity has the lowest capital cost and represented the least expensive generating source to produce a "conservative" number. The fact that Con Edison may not have to purchase a gas turbine in the summer of 1979 is irrelevant. This is a cost of the cooling tower system which will be incurred at some time and must be taken into account in any proper benefit/cost analysis.

Other shortcomings in the staff analysis include using inaccurate discount factor and inaccurate capital cost estimates.

5. Environmental Analysis

The staff presented an inaccurate analysis on several environmental issues dealing with cooling towers. For example, the staff has seriously underestimated the potential for

botanical injury resulting from the operation of cooling towers at Indian Point Unit No. 2. This underestimation appears to result from the staff's use of erroneous assumptions which led to a misinterpretation of the botanical study conducted by Boyce Thompson Institute. The staff has made similar questionable assumptions on the analysis of plume, drift and noise.

6. Schedule for Implementing Cooling Tower Construction Program

The staff correctly stated that the May 1, 1979 date of License No. DPR-26 for termination of operation with the once-through cooling system has been postponed. (p. 4-3.) By letter dated January 8, 1976 (copy annexed), Con Edison submitted to the staff a revised schedule based on the then anticipated NRC schedule for processing the instant application. In that letter Con Edison said that its interpretation of the license condition resulted in a date for termination of once-through cooling at Indian Point 2 of February 1, 1980. Con Edison believes that the staff should express either its concurrence with the approach taken by Con Edison in deriving that date or indicate its basis for disagreement. The staff should address this matter in greater detail in the Final Environmental Statement although the exact length of the postponement cannot be definitively determined until all regulatory approvals have been received.

7. Impact of Natural-Draft Tower on Property Values

In connection with Con Edison's application for a zoning variance to the Village of Buchanan Zoning Board of Appeals, Con Edison requested three real estate appraisers familiar with property values in the communities surrounding Indian Point to prepare independent estimates of the impact of a natural-draft cooling tower on property values. The results of these three reports are inconsistent and inconclusive as to the magnitude of the impact but may be of interest to the staff in attempting to quantify esthetic impacts, although Con Edison does not believe that impacts on appraised values necessarily constitute full recognition of such esthetic impact.

The first appraiser concluded that the construction of a natural-draft cooling tower will not measurably reduce real estate values in the area. The second appraiser concluded that the market prices of residential property in the area would decline significantly, by approximately $22,755,000; there would be no reduction in the value of commercial and industrial properties. The third appraiser concluded that the adverse effects of the esthetics and plume would have no measurable impact on property values while the saline fallout would result in an estimated loss of $300,000.

Part II - Specific Comments

O-1. P. iii, Item 2: The description of the licensing condition is misleading because of omission of modifying conditions. If it is necessary to paraphrase the license conditions, we suggest the following would be more accurate (new material underlined):

> "Under conditions of the operating license (¶ 2.E) of the Facility Operating License No. DPR-26), the licensee is required to terminate once-through cooling at Unit No. 2 after an interim period, the reasonable termination date for which appeared at the time the license was issued to be May 1, 1979, and to operate thereafter with a closed-cycle cooling system, unless licensee can show that empirical data collected during this interim operation justifies an extension of the interim operation period or such other relief as may be appropriate."

O-2. P. iv, Item 5: It is suggested that the Advisory Council on Historic Preservation and the Village of Buchanan be asked to comment on the report.

O-3. P. iv, Item 8: The staff's conclusion is that a licensing condition should be imposed, requiring a determination of the significance of drift and salt deposition and botanical injury. This requirement is inconsistent with the staff's assessment that the salt drift impact was minor on-site and not important off-site (Table 7-1, p. 7-3).

1-1. P. 1-4, Footnote: The footnote is in error in implying that issues were resolved contrary to the wishes of Con Edison. The Commission's decision states that all parties were in agreement as to the disposition of the case.

1-2. P. 1-7, Line 7: Reference "5a" is not documented.

2-1. P. 2-13, Para. 2: "The staff considers the circular mechanical draft cooling tower to be a viable cooling option for Indian Point No. 2 despite the lack of data at operating units to validate computer modeling and wind tunnel tests." Con Edison disagrees with the staff on the above subjective assessment. Field data available on the only operational circular mechanical draft cooling tower (a 13-fan unit at Jack Watson Unit 5, Mississippi Power Company, Gulfport, Mississippi) indicated that the tower has failed to meet its thermal design criteria. (Oral conversation with tower manufacturer.) The tower will have to be backfitted with 3 additional fans in order to satisfy its performance guarantees. Until sufficient field data concerning thermal performance and environmental impacts are on hand for a realistic evaluation, the circular mechanical draft cooling tower should not be considered viable for Indian Point No. 2.

2-2. P. 2-14, Para. 5: "The staff considers the two types of FANDCTs

discussed above to be feasible for Indian Point Unit No. 2." This conclusion is not based on sound engineering justification. The staff failed to recognize the fact that those FANDCTs operated in Europe are either associated with plants smaller than Indian Point No. 2 or designed for part-time use. Since no actual performance data and no quantifiable basis for evaluating system reliability of FANDCTs capability of meeting the Indian Point Unit 2 design criteria, FANDCT should not be considered as feasible for Indian Point Unit 2 at this time.

3-1. P. 3-4, Para. 1: The staff has misinterpreted information furnished by Con Edison with respect to deratings for the fan-assisted natural draft cooling tower (FANDCT) and the circular mechanical draft cooling tower (CMDCT). The figures of 30 MWe and 38 MWe respectively, reported in the Statement represent the annual average total derating, not summer peak derating. See Supplement to IP-2 Cooling Tower Report dated April 6, 1975. Con Edison did not furnish data on summer peak deratings for these two alternatives. We have calculated those deratings as 65 and 69 MWe respectively, based on a 75°F peak ambient wet bulb temperature.

3-2. P. 3-13, Section 3.5.2: The total yearly average waste heat rejected to the Hudson River with the addition of a closed-cycle cooling system is not 120×10^6 Btu/hr; it should be 210×10^6 Btu/hr, which is the sum of 110×10^6 Btu/hr from the cooling tower blowdown and 100×10^6 Btu/hr from the service water system.

3-3. P. 3-14, Section 3.6, Para. 2: The statement "smaller sizes for the natural draft towers could be possible for the site" should be clarified by adding the following:

> "The specific natural draft cooling tower size will depend upon the final proposals submitted by the cooling tower vendors. The proposals will be evaluated on the basis of costs, environmental impacts, and other important factors. The 565-foot-high tower shown on Figure 3-1 was selected on the basis of preliminary evaluations. In general, a shorter tower, with a larger base area, requires added rock excavation during construction; a taller tower has certain benefits regarding dispersion characteristics."

4-1. P. 4-4, Para. 2: It is recommended that the following sentence be added to the end of this paragraph:

> "This requirement which was based on the license schedule described in Section 4.1 has, in accordance with EPA's regulations, been suspended pending an adjudicatory hearing."

4-2. P. 4-3, Section 4.2: This list of permits and regulatory approvals fails to include the Village of Buchanan building permit and the NY State air pollution permit. This failure is apparently based upon a recent decision of the Westchester County Supreme Court, a lower New York State court, which held that the U.S. Constitution prohibited the Village of Buchanan from interfering with the construction of a cooling tower. This New York State proceeding has not yet terminated because an appeal is pending.

5-1. Page 5-5, Section 5.1.3.1. The staff correctly notes that Con Edison's analysis of drift deposition was based on an assumed river salinity of 7,200 ppm. This was described as "a very conservative assessment of saline aerosol values." ER-CCC, IP-2, p. 6-15. This was intended as a "worst case" assessment. Con Edison used half this value, 3,600 ppm, to determine botanical injury for the month of August for the reasons stated by the staff. (See Figure 6.5, ER-CCC, IP-2, p. 6-18, which uses a drift salinity of 7,200 ppm corresponding to a river salinity of 3,600 ppm.) Since the staff used an August value of 5,000 ppm (Table 5-3), the staff has used a higher salinity value than Con Edison in assessing botanical injury.

The reference to Table 3-1 should be to Appendix B of ER-CCC, IP-2.

5-2. P. 5-11, Section 5.1.3.3.a: The ORFAD Program assumed a surrounding terrain of uniform elevation. This inapplicable assumption would underestimate the rate of ground drift deposition.

5-3. P. 5-12, Table 5-2: The 1.44 water/air ratio used by the staff seems too low for a natural draft cooling tower. In our opinion, this underestimates the impact of the cooling tower plume and drift deposition.

5-4. Page 5-13, Table 5-3: In evaluating monthly salinity, it is recommended that the more current river flow/salinity data as presented in ER, IP-3, Appendix EE, Figure 7, be used.

5-5. P. 5-20, Table 5-5: Fan diameter for circular mechanical draft cooling tower should be about 30 feet, not 10 feet as referred to by this table. (The staff reported a 33-foot fan diameter on p. 6-18.)

5-6. Pp. 5-28 to 5-37: The staff analysis has seriously underestimated the potential for botanical injury resulting from cooling towers at Indian Point Unit No. 2. This underestimation appears to result from the staff's use of the following erroneous assumptions and serious misinterpretations of the Boyce Thompson

Research Institute Botanical Study:

1) Staff mistakenly assumes that experimental exposures were made at relative humidities of 50% - 90%.

2) Staff mistakenly assumes that injury levels were equal within the range of 50% - 90%, but doubled at relative humidities above 90%.

3) Staff mistakenly assumes that chamber experiments were carried out with a background saline aerosol concentration of 1500 µg/m.

4) Staff mistakenly assumes that botanical injury would not result in chronically deteriorating biota, but would, instead, be infrequent and transient.

5) Staff mistakenly assumes that because two pathways of leaf contamination may exist, real saline injury thresholds may be greater than those reported by Con Edison.

5-7. P. 5-28, Para. 2: Con Edison has been advised by its botanical consultant that the staff assertion that saline drift injury to vegetation in the Indian Point environs will not lead to progressive deterioration of the biota is inaccurate. There is no reason why plants cannot exhibit chronic deterioration from the cumulative effects of both injurious and non-injurious

atmospheric exposures. Each exposure need not be injurious. The aggregation of serial acute and chronic exposures causes plant deterioration. This effect may or may not be accompanied by observable foliar injury.

5-8. P. 5-28, Para. 5: Con Edison agrees that rainfall may wash salt from needles and leaves and reduce foliage injury from the non-absorbed aerosol. However, very light precipitation could increase injury by making soluble the deposited salt and providing a vehicle for penetration of salt into the needle or leaf.

5-9. P. 5-28, Para. 6: The staff asserts that results of screening indicate that only three species are sufficiently intolerant to be considered at risk. Other species may also be susceptible to some extent.

5-10. P. 5-28, Para. 7: Con Edison agrees with the staff that saline-induced symptoms do not imply that affected plants will die. However, partial or premature defoliation does adversely affect the subsequent growth and vigor of the tree, as well as its susceptibility to pathogens and destructive insects. Premature abscission of foliage from both coniferous and deciduous trees could produce abnormal effects such as reduced flowering and growth, and altered growth habitat, over a period of years. These

effects, although not necessarily lethal, are nevertheless significant.

5-11. P. 5-29, Table 5-8: The usefulness of the statistics presented in this table is questionable because:

1. The site of the staff survey cannot be readily determined from the Statement.

2. It cannot be determined whether only flowering dogwood and white ash, or all species of dogwood and ash were included in the survey. The statistics presented, therefore, may not represent a significant sample of the real totals for each species. (See also p. 22.)

5-12. P. 5-30, Para. 2: The appearance of foliar necrosis resembling "salt burn" and other air pollution injury is not unusual in any field survey. A pre-operational survey, therefore, might be of limited usefulness in determining apparently "healthy" vegetation upon which to measure the impact of saline injury.

5-13. P. 5-30, Para. 3: It would be more accurate to describe the position of the parafilm-covered deposition plates in the chambers as at a height close to the tops of the trees.

5-14. P. 5-30, Para. 4: The staff asserts that about twice the damage for the same amount of salt is caused when humidity above 90% exists as compared with the situation when humidity in the

range of 50-90% prevails. The basis for this statement is not known, because a relative humidity of 90% was not used in the BTI studies; 50%, 70% and 85% values were used.

5-15. P. 5-30, Para. 5: The experimental difficulties described by the staff are, in fact, constraints which might be applied to all air pollution studies with controlled environment fumigation chambers. Because appropriate methods for tests under field conditions have never been devised, the great weight of data on which air quality standards have been based has come from this type of study.

The second sentence of this paragraph states that in the experimental chambers, the background aerosol content approached or exceeded 1500 $\mu g.m^{-3}$ of salt. The comment appears to be based on section 4.2.1 (page 35) of the BTI report, where it states that "the concentration of saline aerosol found in the chamber would be 2000 $\mu g\ Cl^{-} \times m^{-3}$ when the chamber was devoid of plants . . ." and ". . . measurements taken during the exposure period with plants showed a reduction of about 20% in aerosol concentration (i.e., a value of 1500-1700 $\mu g\ Cl^{-} \times m^{-3}$)." These statements appear to have been taken to imply that there was a high background saline aerosol concentration. In reality, there was no background saline aerosol concentration. All saline aerosols in the chamber were produced by the spray nozzles.

5-16. P. 5-30, Para. 7 & 8: Because high background concentrations of non-deposited aerosols did not prevail in the chamber, the tests were run at the doses used, not at the dose plus some background amount. Under field conditions both deposition rate and amount of injury may be expected to increase due to effect of wind impaction of salt particles on foliar surfaces. Therefore, we believe the staff conclusion that Con Edison's "estimates of damage thresholds are highly conservative" is unjustified.

5-17. P. 5-30, Para. 9 and P. 5-31, Para. 1: Con Edison has been advised by its consultant that, for the following reasons, it is unlikely that two pathways of contamination exist:

1. The stomatal dimension would, in all likelihood, be too small to allow the direct penetration of saline aerosols. The size of ambient aerosols in the staff reference (Cassidy) was between 0.1 and 10 μm. For aerosols of cooling tower origin, much larger particles are expected. In the Boyce Thompson experiments, nearly 95% of the particles ranged in size from between 50-150 μm (Table 7, ER-CCC, Appendix E, IP-2).

2. The stomatal distribution on deciduous tree species of the type used in the Boyce Thompson experiments essentially precludes the possibility that saline aerosols could enter by direct deposition on the upper leaf surface. While tropical

plant species used by Cassidy have significant numbers of stomates on the upper leaf surface, stomates on the leaves of deciduous trees, however, are generally confined to the lower surface or leaf underside. It is the susceptibility of these species that is reported in the Boyce Thompson experiments.

Also, while stomatal dimensions are usually measured when the stomates are fully open, there are several factors which influence the degree and daily periodicity of openness under both field and chamber conditions. These factors include light, internal water relations of the leaf, and temperatures. Furthermore, not all of the stomates on a plant are necessarily open at the same time, and different stomates may differ markedly in their degree of openness at a given time. It thus becomes apparent that stomatal size could limit entry of even the small particles that Cassidy describes, much less those expected from a cooling tower.

3. Further evidence that salt does not necessarily enter stomata is shown in the response of individual leaves of trees exposed to saline aerosol. In cases where two adjacent leaves or leaflets overlap, injury often occurred only on the leaf being overlapped. It is postulated that an area of localized high humidity was created which hydrated any salt crystals on the upper surface so that more rapid foliar absorption could

take place. Therefore, one may expect that saline aerosols enter the leaf through the cuticle (perhaps through fissures) in the liquid state.

5-18. P. 5-31, Para. 2: Because the dose rate in the experimental chambers was approximately equivalent to the dose rate expected in the field, less injury should not be expected. Also, although it is true that some ions absorbed through leaves are translocated to the roots, there is evidence that sodium accumulates in roots, and chloride accumulates in the foliage. Foliar chloride tends to accumulate along the margins of leaves of monocotyledonous plants. It is also generally reported that chloride is the more toxic ion in the salt molecule, but there are also many reports of the toxicity of sodium to plants. If injury is less under conditions of chronic exposure, it is not because the salt has not translocated but, more likely, because it has been removed from the tissue by weathering or has reacted with cellular components to make it physiologically inactive.

5-19. P. 5-31, Para. 3: The statement that threshold values were selected from 90% relative humidity experiments is incorrect. In fact, relative humidity of 90% was not tested by BTI. The highest relative humidity tested was 85%, where injury was twice

that at 50% relative humidity.

Because chamber experiments were never conducted at 90% relative humidity, there is no factual basis for the staff assertions that these experiments established conservative injury thresholds, (indeed, the actual thresholds are not yet known) and that injury has been overstated by a factor of two. Also, we note that the probability of a 14-day drought during the critical summer months is 0.4 per year. In contrast to the staff's assertion that a low probability of 14 rainless days exists, we maintain that 0.4 is a rather high drought probability. The staff's assertion that susceptible vegetation will survive ignores several important considerations:

1. Most plant species indigenous to the Indian Point environs have not been tested for saline drift susceptibility.
2. Injury to the susceptible species will have effects on subsequent growth, and tree vigor. Saline injury to hemlock produces dead branches and needles that are not replaced the following spring. Premature abscission of foliage from both coniferous and deciduous trees could produce abnormal effects such as reduced flowering and growth, and altered growth habits over a period of years.

Most importantly, the staff analysis does not incorporate a significant safety factor. Also, partial defoliation and occurrence of foliar salt burn appear to be acceptable to the staff even though these symptoms may not be acceptable to the 44.8% of property owners determined by the staff survey to be affected.

5-20. P. 5-31, Para. 6: Plant dormancy is unlikely to mitigate the injurious effects of saline drift since other pollutants can cause injury to conifers during dormant periods.

5-21. P. 5-34, Para. 3 and Para. 4: Statements contained in these paragraphs appear to be inconsistent and misleading. For example, although the staff states that land uses in the potential affected areas consist of "single family residences, manufacturing plants, and scattered woodlots," only residential ornamental vegetation is inventoried. The effect of saline drift on the three susceptible species known to be growing in woodlots a mile above and below the plant site are ignored in this analysis. Also, for the following reasons, the survey conducted by the staff is of limited usefulness in determining the ornamental impact and cost of saline drift in this impact area:

1. Because ornamental trees are inventoried en masse, the resulting percentages are not meaningful impact measurements: There appears to be no distinction between ornamental tree species. The result is that percentages of dogwoods are compared with percentage of hemlock. It would appear that the potential ornamental impact of saline drift could best be determined by percentage comparison between species that serve comparable purposes in the ornamental landscape. For example, the percentage of (flowering) dogwood should be compared to the percentage of flowering crab, or magnolia; the percentage of hemlock should be compared to the percentage of yew, juniper or spruce.

2. Replacement costs are known to vary with tree size, yet the staff survey presents no information on ornamental tree size classes. All are assumed to be 20' tall for analysis of replacement costs. This size distribution may be the most important variable in calculating the total replacement costs figure.

3. As previously discussed, an adequate safety factor does not seem to be incorporated into the staff analysis.

5-22. Replacement of sensitive ornamentals should be related not only to mortality, but also to diminished plant esthetic value, and abnormal growth effects resulting from partial defoliation.

5-23. P. 5-34, Para. 7: For reasons previously stated, Con Edison disagrees with the staff assertion that injury to susceptible species will occur only within the area bounded by the 200 Kg/Km^2 isopleth and that hemlock will "recover" the following spring following scattered "brownouts."

5-24. Although "scattered brownouts and "infrequent deaths" of susceptible ornamental vegetation may not be as visible to the public as "wholesale destruction", every such occurrence is likely to adversely affect individual property owners.

5-25. P. 5-34, Para. 9: Con Edison disagrees with the staff assertion that the risk of serious saline drift-induced injury to vegetation is confined to the immediate MDCT area. MDCT's pose a serious threat to the continued biological productivity of hemlock over residential and open space areas in the Indian Point environs. Complete restoration of injury to hemlock in these areas is not technically feasible.

5-26. P. 5-35, Para. 3: For the reasons previously stated, Con Edison

disagrees with the staff assertion that our biological assessment of the potential for saline drift-induced botanical injury is "conservative."

5-27. P. 5-35, Par. 7: For reasons previously stated, Con Edison disagrees with the staff assertion that the statistic of 52 hemlocks per 100 households is necessarily useful in determining the ornamental impact in the Verplanck-Buchanan area.

5-28. P. 5-35, Para. 9: For reasons previously stated, Con Edison disagrees with the staff assertion concerning numbers of trees at risk, estimates of injury thresholds, and restoration potential.

5-29. P. 5-36, Section 5.2.2.7, Conclusion (3): Con Edison disagrees with the staff on this conclusion. It has been shown that the probability is relatively high - 40% - that drought conditions sufficient to cause a maximal saline injury will occur at Indian Point. On the average then, such conditions may occur every 2.5 years over the approximately 40-year plant life span. Cumulative injurious effects of the type described for hemlock would likely be visible as crown defoliation within groves or complete or partial defoliation of free standing trees within areas where high saline deposition rates are predicted. Visible

injury such as leaf spotting and premature abscission of foliage may normally be less pronounced for ash and dogwood; however, the cumulative impact of such effect may well be reduced flowering and reproduction, reduced growth, altered growth habit, and other abnormal effects over a period of years.

5-30. P. 5-36, Section 5.2.2.7, Conclusion (5): Con Edison disagrees with the staff on this conclusion. Botanical injury, especially to hemlock, is not predicted to be slight and/or non-existent; injured hemlock foliage will not recover in the spring. Effects of injury are predicted to be cumulative.

5-31. P. 5-36, Section 5.2.2.7, Conclusion (6): Con Edison disagrees with the staff on this conclusion. In fact, neither the total number of trees at risk, which are known to be both susceptible and indigenous to the area, nor the total number of trees at risk which may be both susceptible and indigenous, is known. Also, although the staff asserts that it may be both technically and monetarily possible to replace ornamental trees known to be at risk with less susceptible species, a similar operation would not appear possible for naturally occurring species found in parklands and open spaces in the Indian Point area.

5-32. P. 5-44 Para. 3: The staff compares the measured ambient A-weighted equivalent sound level, L_{eq}, with the A-weighted equivalent of the Buchanan property line noise limit, and concludes that the ambient noise exceeds local requirements (which are equivalent to L_{eq} = 48 dB(A) or L_{dn} = 54 dB). The source of the ambient noise has been identified as transportation vehicles (see page 5-45). Since the Buchanan noise ordinance objective is to limit continual noise from fixed facilities located in M-D districts, the ordinance is not applicable to regulating other community noise sources, such as vehicular traffic. (See Buchanan Zoning Code, §54-22 F(3)).

5-33. P. 5-45, Last Para.: The staff imposes three restrictions which it believes will make construction noise "not be unacceptable". However, the staff does not provide a noise analysis to justify these restrictions. The Con Edison analysis indicates that on-site construction noise emissions will not significantly change the surrounding community ambient equivalent noise level. Therefore, it appears to be unnecessary to impose the restrictions cited by the staff. Furthermore, off-site construction noise from motor vehicles is limited by the New York State motor vehicle noise emission regulations (see 6-53, ER-CCC, IP-2).

5-34. P. 5-47, Section 5.2.5.4: To evaluate the proposed closed-cycle cooling system impact, the staff compared estimated noise emissions with the measured ambient noise level only at the eleven discrete sites where Con Edison measured ambient noise levels. We do not believe this procedure is sufficiently objective. In our analysis, we evaluated the noise impact on all areas within 2,000 meters of a proposed tower, and could thus account for local ambient noise variations that depend upon relative distances from transportation arteries. The procedure we used evaluates the amount of land area for which there will be an expected change in noise due to the proposed cooling tower's continuous operation.

The Con Edison analysis determines the area for which each alternate cooling system would increase the existing community ambient noise level (Table 6-8, p. 6-59, ER, CCC Indian Point 2). However, the staff's discrete point analysis does not evaluate the overall extent of the community noise increase.

The staff states that the only violation of the Village of Buchanan noise code would be caused by linear mechanical draft-cooling towers. The Con Edison analysis shows the extent to which alternate cooling towers could be

expected to exceed the Village of Buchanan noise limits (Supplement 1, ER-CCC, IP-2, p. 16-18).

5-35. P. 5-56, First 3 Paragraphs: The staff asserts that Ldn is a conservatively high offsite noise descriptor, because it is strongly influenced by nighttime ambient noise levels and is sensitive to nighttime noise level increases. We believe that it is necessary to evaluate changes (although minor) in nighttime noise caused by continuous operation of an alternate cooling system since use of the Ldn descriptor is recommended for environmental noise assessment by the USEPA (U.S. Environmental Protection Agency Report No. 550/9-74-004) and similarly permitted by the NRC (U.S. Nuclear Regulatory Commission Regulatory Guide 4.2 Revision 1). Furthermore, Table 5-10 of the staff's report shows only a 1-3 dB difference between daytime equivalent noise levels (L_{eq}) and L_{dn} levels, which illustrates the minor influence nighttime noise affects L_{dn} levels in the community surrounding the site.

5-36. P. 5-68, Para. 7: The staff states the issuance of a new NPDES permit will require review of chlorine discharges to see if lower than guideline limits are required. This is not necessarily the case. If the discharges comply with existing license conditions, a new NPDES permit may not be required.

The staff correctly states that the proposed maximum chlorine concentration of the blowdown (less than 0.5 ppm free available Cl_2) could be higher than that permitted by the existing ETS (0.5 ppm maximum total residual). However, the IP-2 cooling tower blowdown should not exceed these limits for available chlorine, whether total or free. Since the condenser will be chlorinated 1/3 at a time, there will be an insignificant residual because the chlorinated portion will be diluted with the unchlorinated portion. Furthermore, the water is aerated in the tower which should minimize, if not eliminate, the residual chlorine.

6-1. P. 6-1, Section 6.2.1, Item 3: The cost described in this item should include two components: (1) cost of replacing deficient energy and (2) cost of replacing capacity. Additional operation of existing capability can only provide replacement energy, not replacement power (capacity). (See Part I, comment 4, above.)

6-2. P. 6-1, Section 6.2.1, Item 4: The downtime cost is not only the cost of providing replacement energy, but also the cost associated with the loss of reliability incurred by the system during the outage period.

6-3. P. 6-2, Line 15: The use of a discount factor derived from the average rate of return for investor-owned utilities for an economic analysis of a specific utility is invalid, when data applicable to the specific utility are available.

6-4. P. 6-3, Section 6.2.2.2: In cost estimates, the staff has discounted the costs to a present value in 1976 while Con Edison discounted to a present value in 1974. Also, the staff annualized the costs over the twenty-eight-year period from 1976 to 2003, while Con Edison annualized the costs over the twenty-four-year period from 1980 to 2003, which is the period during which the cooling tower would be in operation. It is recommended that the staff should either perform the estimates on the identical time basis used by Con Edison or specify these differences in the text to avoid confusion when comparing the two independent cost analyses.

6-5. P. 6-6, Last 3 Paragraphs: The staff suggests that the loss of 63 MW of capacity at peak should not be considered, as it would not result in "lowering the reserve to an unacceptable level". This is a misunderstanding of Con Edison's argument

(see Part I, comment 4, above). The reduction in capability is a cost of a closed-cycle cooling system which must be taken into account in a proper benefit/cost analysis.

6-6. P. 6-10, 2nd Paragraph from bottom: The discussion should not ignore the fact that it is extremely doubtful that the firm purchase alternative would be available to Con Edison.

6-7. P. 6-11, "Case 3: Winter Outage": The staff should be more specific on the referred "winter outage scenario" which must be established on a realistic construction schedule. A "Winter Scenario" would require "replacement energy". It would not "maintain system reliability", as it would reduce the corresponding reserve over the winter period, although with a smaller impact than in the case of a summer outage. A winter tie-in could lead to a need to delay maintenance outages and cause the performance of some units to deteriorate. Postponing the cut-in to a later winter period would be beneficial as compared to the May 1, 1979 date, but it would not be without some effect on reliability, and would certainly not "cancel the need for replacement energy" during the tie-in. The same comment applies to the description of Case 3, in the Summary of Page 6-24 (Section 6.2.7).

6-8. P. 6-4, Table 6-1: The capital cost estimate for a natural-draft cooling tower has been revised by Con Edison and was submitted to the staff on June 6, 1975 (refer to Con Edison's "Environmental Report To Accompany Application for Facility License Amendment for Extension of Operation With Once-Through Cooling for Indian Point Unit No. 2" p.4-11). It is recommended that the revised cost estimates be used.

6-9. P. 6-25, Table 6-17: The derivation of the cost of installing 900 MW of gas turbines ($21,271,000, annualized) in Case 2 is unclear, since the reference calculation on p. 6-11 for Case 2 produces $33,438,000.

6-10. P. 6-34, Line 3: The planned 80-acre recreation area on the site will be reduced considerably if a closed-cycle cooling system is implemented.

6-11. P. 6-39, Para. 2: It is highly speculative to generalize that "during the winter the slight warming of the air as the sun rises in the sky will decrease the relative humidity sufficiently to greatly reduce the visibility of the plume."

6-12. P. 6-40, Fig. 6-1: The viewshed map is unclear and has no key.

6-13. P. 6-53, Line 11 from bottom: The staff's reference to cooling tower noise abatement devices is unwarranted, since the staff has not identified practical and feasible noise abatement devices which could be incorporated into all cooling alternatives, in particular the natural-draft cooling tower. In response to the staff's question concerning sound mitigative measures, Con Edison stated that there is no readily available, proven technology of noise abatement for natural-draft cooling towers (Supplement, ER, CCC IP-2, p. 16).

7-1. P. 7-1, Section 7.2: It is our understanding that the purpose of the Statement is to analyze the economic and environmental assessments of various cooling alternatives so that an appropriate conclusion could be reached on selecting the preferred system that should be built if one is ultimately determined to be necessary. Thus the Statement fails to reflect the limited "proposed action" involved in Con Edison's December 2, 1974 application.

7-2. P. 7-1, Section 7.3: "The staff concludes that the irreversible and irretrievable commitments are appropriate for the benefits to be gained." Con Edison considers this conclusion inappropriate in this Statement for the reasons given in comment 7-1 above.

The Statement contains no benefit/cost analysis to support this conclusion, and indeed contains only the most cursory reference to the alleged benefits of closed-cycle cooling systems. We agree with the staff that a discussion of such benefits is not required in this Statement, but believe it follows that these conclusions must be deleted.

7-3. P. 7-1, Section 7-4: For the several reasons stated above, Con Edison believes that the range of cost for natural draft, fan-assisted natural draft and circular mechanical draft cooling tower systems is substantially greater than the 3% estimated by the staff.