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Fred Dacimo
Vice President
License Renewal

May 14, 2008

Re: Indian Point Units 2 & 3
Docket Nos. 50-247 & 50-286

NL-08-083

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

SUBJECT: **Reply to Request for Additional Information
Regarding License Renewal Application – Refurbishment**

Reference: NRC letter dated April 14, 2008; "Request for Additional Information Regarding the Review of the License Renewal Application for Indian Point Nuclear Generating Unit Nos. 2 and 3 (Tac Nos. MD5411 and MD5412"

Dear Sir or Madam:

Entergy Nuclear Operations, Inc is providing, in Attachment I, the additional information requested in the referenced letter pertaining to NRC review of the License Renewal Application for Indian Point 2 and Indian Point 3. The additional information provided in this transmittal addresses staff questions for Refurbishment.

There are no new commitments identified in this submittal. If you have any questions or require additional information, please contact Mr. R. Walpole, Manager, Licensing at (914) 734-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 5/14/08

Sincerely,

A handwritten signature in black ink, appearing to read "Fred R. Dacimo", written over the word "Sincerely,".

Fred R. Dacimo
Vice President
License Renewal

A128
NRR

Attachment:

1. Reply to NRC Request for Additional Information Regarding License Renewal Application – Refurbishment

cc: Mr. Bo M. Pham, NRC Environmental Project Manager
Ms. Kimberly Green, NRC Safety Project Manager
Mr. John P. Boska, NRC NRR Senior Project Manager
Mr. Samuel J. Collins, Regional Administrator, NRC Region I
Mr. Sherwin E. Turk, NRC Office of General Counsel, Special Counsel
IPEC NRC Senior Resident Inspectors Office
Mr. Paul D. Tonko, President, NYSERDA
Mr. Paul Eddy, New York State Dept. of Public Service

ATTACHMENT I TO NL-08-083

REPLY TO NRC REQUEST FOR ADDITIONAL INFORMATION

REGARDING

LICENSE RENEWAL APPLICATION

Refurbishment

ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 and 3
DOCKETS 50-247 and 50-286

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3
LICENSE RENEWAL APPLICATION (LRA)
REQUESTS FOR ADDITIONAL INFORMATION (RAI)
REGARDING REFURBISHMENT

The staff received scoping comments during its review of the License Renewal Application (LRA) for Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3) indicating that Entergy had taken steps toward procuring replacement reactor vessel heads for IP2 and IP3 (ADAMS accession nos. ML071990093 and ML073100985). The scoping comments contained excerpts from a presentation by Doosan Heavy Industries indicating that Doosan plans to deliver replacement reactor vessel heads and control rod drive mechanisms (CRDMs) for IP2 and IP3 in October of 2011 and 2012, respectively. Based on this information, the staff requested, by letter to Entergy dated December 5, 2007, additional information regarding refurbishment.

Entergy's response, dated January 4, 2008, indicated that "no reactor vessel head replacements are required for purposes of aging management during the period of extended operation. Accordingly, no evaluation of the environmental impacts of reactor vessel head replacement as a refurbishment activity is required or presented in the Environmental Report." Further, Entergy also noted that "the decision to proceed with procurement of long lead items [replacement vessel heads] is strictly economic," and therefore need not be addressed in Entergy's Environmental Report.

During a telephone conference call on March 18, 2008 (ADAMS accession number forthcoming), the staff acknowledged that while there may be no requirement to replace the reactor vessel heads at IP2 and IP3 for license renewal, Section 2.6.1 of the Generic Environmental Impact Statement for License Renewal (GEIS) discusses environmental impact-initiating actions associated with license renewal. These actions include: (1) refurbishment, repair, or replacement activities that "may be performed to ensure that this objective (aging management and maintaining functionality of certain SSCs) is achieved," and (2) activities that the licensee may choose to undertake, including "various refurbishment and upgrade activities at their nuclear facilities to better maintain or improve reliability, performance, and economics of power plant operation during the extended period of operation." Since the GEIS considers refurbishment activities beyond those that are related to aging management during the period of extended operation, Entergy's response to the staff's RAI related to refurbishment did not effectively address the scoping comment regarding this potential refurbishment activity.

During the conference call, Entergy indicated that, if license renewal were not being pursued for IP2 and IP3, the vessel head forgings would not have been ordered. Entergy also indicated that the vessel head forgings that were procured for IP2 and IP3 may never be needed, and a decision by Entergy to replace reactor vessel heads for IP2 and/or IP3 has not been made.

Question 1:

In order for the NRC staff to better understand the specific nature of the steps taken by Entergy with respect to its plans for reactor vessel head and CRDM replacement, please identify the factors that Entergy may consider in deciding whether to replace these components. Please describe how those factors affect Entergy's decision whether to replace the vessel heads and CRDMs.

Response to Question 1

In Chapter 3 and Appendix B of the LRA, Entergy has identified inspection programs at Indian Point Energy Center (IPEC) for the IP2 and IP3 reactor vessel heads. Results of the inspections conducted to date indicate that the heads are in good condition. It is not inconceivable, however, that future inspection results might indicate a need for replacement of the heads during the license renewal term.

Entergy's criteria for determining if the reactor vessel heads and CRDMs need to be replaced will be primarily economic. If the cost of inspection and maintenance of the existing components exceeds the cost of installing new components with lower inspection and maintenance costs, then a decision may be made to replace the heads and CRDMs. Such a decision is part of normal plant maintenance and is not unique to operation after license renewal.

The GEIS recognizes that "the license renewal rule does not require any specific repairs, refurbishment, or modifications to nuclear facilities, but only that appropriate actions be taken to ensure the continued functionality of SSCs in the scope of the rule." GEIS Section 2.4 at 2-30. The LRA indicates that the reactor vessel heads are subject to aging management through appropriate programs. Entergy does not view head replacement as a necessary measure to ensure the continued functionality of the vessel heads in the period of extended operation (PEO). LRA Section 3.1. Rather, Entergy views possible replacement of the heads and CRDMs as a discretionary matter, to be handled as a routine operational and maintenance activity. Any decision to proceed with fabrication and installation of the replacement heads and CRDMs would be made in the future based on economic considerations related to potential cost reductions, not on concerns regarding the functionality of the existing heads and CRDMs.

Question 2:

The staff recognizes that there is no certainty with respect to reactor vessel head and/or CRDM replacement at IP2 and/or IP3. Therefore, Entergy's response to Question 1 above will be duly considered by the staff in determining whether to address the potential environmental impacts of these actions in the upcoming draft Supplemental Environmental Impact Statement. Nevertheless, based on the information presented in the scoping comment and the conference call discussion with Entergy staff on March 18, 2008, the NRC staff may proceed with a review of the impacts associated with reactor vessel head and CRDM replacement in accordance with 10 CFR 51.71. To facilitate the staff's review and understanding of these impacts, please provide additional information and supporting analysis regarding the Category 1 and Category 2 impacts (as listed in 10 CFR 51 Subpart A, Appendix B, Table B-1) that would be associated with reactor vessel head and CRDM replacement (all issues are listed in Table B-1 and included in Chapter 3 of the GEIS). If Entergy is unable to provide information specifically addressing the likely impacts of replacing vessel heads and CRDMs at IP2 and IP3, please provide impact estimates based on Entergy's experience at other plants. If Entergy-specific information is not available, please provide estimates based on industry experience in replacing these components.

Response to Question 2

In response to industry experience and generic NRC communications, Entergy established inspection programs to routinely assess the condition of the reactor vessel heads. While inspection results indicate no significant problems with the heads, it is possible that future inspection results may indicate a need for replacement prior to the end of the period of extended operation (PEO). Entergy has determined, however, that reactor vessel head and CRDM replacement, as postulated by the Staff for purposes of this RAI, should not be considered a major refurbishment activity based on the NRC discussion in the GEIS. As stated in the GEIS, refurbishment activities would include those activities that require multiple and extended refueling outages to accomplish (e.g., multiple outages of at least several months in duration). GEIS, Vol. 2, Appendix B, Section B.3.1.3.5, including Figure B.1 and Table B.3. Industry experience with reactor vessel head and CRDM replacement demonstrates that this maintenance task can be accomplished during one refueling outage that lasts approximately 60 days (i.e., impacts bounded by those of a typical single refueling outage evaluated in the GEIS). As explained above, the hypothetical IPEC reactor vessel head and CRDM removal, replacement, and maintenance activities would take place during a 60-day outage concurrent with routine refueling activity. Entergy anticipates that up to 250 additional workers would be on-site at that time. The 250 workers would be in addition to the approximately 1,200 workers required for normal operations and the 950 temporary workers on-site for refueling.

Site construction activities for the long-term storage building for the original reactor heads and CRDMs would require approximately 50 additional workers, but this activity would be largely completed prior to the peak occurrence of 250 additional workers on site.

As the GEIS does not encompass and address refueling outages as "major refurbishment," the head and CRDM replacement as postulated by the Staff should not be treated as refurbishment either. In summary, the activity that Entergy would undertake simply would not be of the magnitude -- that NRC considered as a major refurbishment in the GEIS and therefore would not result in environmental impacts beyond those otherwise addressed in the IPEC ER and GEIS resulting from an extended term of normal plant operation.

In response to this NRC request, Entergy is providing the following project description and impact analysis, using the GEIS topics for refurbishment as a guide, to demonstrate that postulated reactor vessel head and CRDM replacement does not involve the level of impact commensurate with the impacts considered for a refurbishment activity for purposes of 10 CFR Part 51. Entergy has provided information for nine Category 2 impacts associated with refurbishment as indicated in Chapter 3 of the GEIS. Category 1 refurbishment issues and environmental justice are also addressed below.

Major Refurbishment Activities as Discussed in the GEIS

Section 3.1 of the GEIS states that refurbishment activities could result in environmental impacts beyond those that occur during normal plant operation. For example, site excavation and grading associated with construction of new waste storage facilities could result in fugitive dust emissions, localized air quality impacts, erosion, sedimentation, and disturbance of both aquatic and terrestrial ecosystems. Moreover, refurbishment could (1) require a sizable addition to the workforce, (2) increase the radiation exposure of workers, and (3) generate increased quantities of LLW. In light of the above discussion, refurbishment as discussed in the GEIS involves workforce and construction activities that substantially exceed those typically associated with normal plant operational outages.

In discussing major refurbishment activities the GEIS assumes that the refurbishment period would include activities during five outages. The GEIS anticipates that the first 4 outages would each last approximately 2-3 months, separated by 18 months. The fifth outage was to last approximately 4 months leading up to the period of renewed operation (GEIS Table 2.5).

As noted above, in contrast, any reactor vessel head and CRDM replacement activities at IPEC, if necessary, would be scheduled during refueling outages. The following hypothetical project description is based on experience Entergy gained from the replacement of the IP2 and IP3 steam generators. A reactor vessel head and CRDM replacement involves a significantly shorter schedule of activities than the steam generator replacement project.

Hypothetical IP2 and IP3 Reactor Head and CRDMs Replacement Project

IPEC is located on a portion of the Hudson River that is used for commercial navigation. The IP2 and IP3 reactor vessel heads would be manufactured overseas, transported to a U.S. port, and delivered, with the CRDMs installed, by barge up the Hudson River to the existing IPEC onsite barge slip. Each component would be moved to temporary storage facilities for storage and pre-installation preparations, such as metal preparation and prefabricated fittings.

Temporary storage and pre-installation preparations of the new components likely would be in either onsite temporary structures, or if space is available, within existing warehouse structures. For the purposes of this evaluation, it is assumed that new structures would be utilized. The storage structure for each replacement reactor head would be approximately 2,400 square feet. Chemical and oil storage and spill prevention measures would be in accordance with site and company environmental protection procedures and existing permits and licenses. This would include development and implementation of a Construction Stormwater Pollution Prevention Plan in accordance with New York State Department of Environmental Conservation (NYSDEC) requirements. Therefore, no challenges to stormwater pollution prevention would be expected. The reactor containment building is composed of reinforced concrete walls, more than three feet thick with an interior steel liner. To perform the reactor vessel and CRDM replacement, a temporary construction opening approximately 26 feet by 25 feet would be created in the

containment building. The process of creating the opening would include activities such as removing concrete, cutting rebar, and cutting and removing a section of the steel liner. A hydro-demolition (high pressure water) process and other mechanical methods would be used to remove the concrete and cut the liner.

The water used in the hydro-demolition process would be cleaned up via a portable water treatment system prior to being discharged to the discharge canal via a permitted outfall. The discharge would occur in accordance with the site's State Pollutant Discharge Elimination System permit. The concrete debris would be disposed of as construction and demolition debris. No challenges to or exceedances of clean water or waste regulations would be expected for these hypothetical IP2 or IP3 projects activities.

The steel reinforcement would be cut to the extent necessary to make the temporary opening. It then would be restored upon re-assembly of the containment wall. After reactor vessel head and CRDM replacement, the containment liner and building would be returned to their original configuration.

Reactor vessel head and CRDM replacement would also require removal of the old reactor vessel head from the containment building. Loose contamination would be removed from the exterior of the old reactor vessel head and CRDMs and a coating would be applied to affix any residual contamination. Upon removal from the containment building, the old reactor vessel heads and CRDMs would be transported to a newly constructed onsite storage building or transported off-site for permanent disposition. For the purpose of this evaluation, it is assumed that the old heads and CRDMs would be stored onsite.

Facility construction or modification of existing buildings and other preparation activities would occur at IPEC prior to removal of the old components. The only new permanent facility would be the onsite storage building. Several temporary facilities would be used to house most project activities. These would include fabrication, mock-up, weld-testing, warehouse, and laydown areas. A temporary office complex might also be erected on-site. A containment access facility, consisting of shops, meeting rooms, and an access point into the radiologically controlled areas and containment building, would be constructed. All temporary structures for the projects would be located on previously disturbed areas.

All necessary removal, replacement, and maintenance activities would take place during a 60-day refueling outage. The peak period of activity would occur when the actual removal and replacement of the reactor vessel head and CRDMs.

The storage building for the old IP2 and IP3 reactor vessel heads and CRDMs would be located adjacent to either the storage building for the old IP2 or old IP3 steam generators. The area for the new storage building was disturbed during station construction and is covered by grasses and other low vegetation. The storage building would occupy less than 4,800 square feet and likely would be a reinforced concrete structure on a reinforced concrete mat foundation. Any excavated materials would be handled in accordance with waste management rules in effect at that time.

Assessment of Environmental Impacts of Hypothetical IP2 and IP3 Reactor Head and CRDM Replacement Project

Although Entergy does not consider reactor vessel head and CRDM replacement to constitute a major refurbishment as discussed in the GEIS, the following discussion addresses the Category 1 and Category 2 impacts (as listed in 10 CFR 51 Subpart A, Appendix B, Table B-1) that would be associated with that postulated action (*i.e.*, for all issues that are listed in Table B-1 and included in Chapter 3 of the GEIS). The discussion that follows assumes an additional 500 workers for an outage duration of 65 days even though, as previously indicated, a more realistic estimate for a reactor vessel head replacement project is less than 250 workers during an outage of less than 60 days. The minimal impacts shown in the following environmental analysis further demonstrate that this activity does not rise to the level of major refurbishment as discussed in the GEIS.

Category 1 Issues

The NRC identified the following issues as Category 1 issues when considered in the context of refurbishment:

- Onsite land use impacts (GEIS Section 3.2)
- Surface water quality and use impacts (GEIS Section 3.4.1)
- Ground-water quality and use impacts (GEIS Section 3.4.2)
- Aquatic ecology impacts (GEIS Section 3.5)
- Socioeconomic impacts related to social services (GEIS Section 3.7.4.4)
- Socioeconomic impacts related to tourism and recreation (GEIS Section 3.7.4.6)
- Socioeconomic impacts related to aesthetic resources (GEIS Section 3.7.8)
- Radiological Impacts due to radiation exposures to the public during refurbishment (GEIS Section 3.8.1)
- Radiological Impacts due to occupational radiation exposures during refurbishment (GEIS Section 3.8.2)

Entergy has reviewed the NRC's evaluation of these issues in Section 3 of the GEIS (which included IPEC as one of seven facilities evaluated in the case studies) in relation to the hypothetical replacement of the IP2 and IP3 reactor heads and CRDMs and identified no new and significant information that would invalidate the findings for the site. Therefore, Entergy adopts by reference the NRC findings in the GEIS for these Category 1 issues.

Category 2 Issues

GEIS Section 3.6: Terrestrial Ecology

The GEIS postulates potential refurbishment impacts resulting from laydown areas and possible construction of new waste storage facilities. Potential offsite impacts may occur due to increased local residential and commercial growth. The significance of habitat loss depends on the importance of the plant or animal community involved. If no important ecological resource would be affected, the impacts would be considered minor and of small significance.

Replacing the IP2 and IP3 reactor vessel heads and CRDMS would include construction of a storage building for the old IP2 and IP3 reactor vessel heads and CRDMS on a previously disturbed area of the site. The area currently has a thin covering of low grasses and weeds. As such, this activity would involve use of existing industrial areas, rather than the loss of terrestrial resources. Thus, any potential impacts likely would be to more "urbanized" wildlife, if any, existing in those settings.

The IP2 and IP3 project would have little potential for disturbing or otherwise affecting local flora and fauna. The replacement reactor vessel heads and CRDMS would be moved from the barge slip to the storage area along an onsite service road (built during initial site construction) that was previously upgraded to allow transportation of the replacement steam generators. Therefore, no natural habitat would be lost or altered. Construction of the storage building would occur on a previously disturbed area on site and thus no undisturbed habitat would be lost.

The only potential environmental impacts of the postulated project would be noise and construction-related impacts to existing wildlife populations. Such impacts might result from temporary disruption of wildlife behaviors and distribution during the period of onsite activity, including construction of the storage building. However, no endangered, threatened, or otherwise sensitive species have been reported to inhabit or otherwise utilize this site. Entergy concludes that project impacts on terrestrial resources would be SMALL. Mitigation of these impacts, if any, would not be warranted.

GEIS 3.9: Threatened or Endangered Species

As noted above, all potential project activities associated with the hypothetical replacement of the IP2 and IP3 reactor vessel heads and CRDMS would occur on previously-developed or altered industrial lands on-site. In addition, no endangered, threatened, or otherwise sensitive species have been reported to inhabit or otherwise utilize the site. Therefore, Entergy concludes that project-related impacts to threatened or endangered species would be SMALL, and no mitigation would be warranted.

GEIS 3.3: Air Quality

As stated in the GEIS, the only potential sources of impacts to air quality would be (1) fugitive dust from site excavation and grading for construction of any new waste storage facilities and (2) emissions from motorized equipment and workers' vehicles. As previously explained, the bulk of the postulated activities required to replace the IP2 and IP3 reactor vessel heads and CRDMS would occur during a 65-day refueling outage. Most of the project activities would be performed on equipment within existing buildings and would not generate atmospheric emissions. However, laydown areas and a new building in which to store the replaced reactor vessel heads and CRDMS would be needed to complete the postulated project. Entergy

estimates that the disturbed area for building construction and laydown areas would be less than 5 acres. The small amount of disturbed area and implementation of dust management practices (e.g., watering, silt fences, covering soil piles, etc.) would minimize the amount of fugitive dust generated during construction. Also, particulate matter in the form of fugitive dust consists primarily of large particles that settle quickly and thus have minimal adverse public health effects.

During the project, temporary and localized increases in atmospheric concentrations of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), volatile organic compounds (VOC), ammonia, and particulate matter (PM) would result from exhaust emissions of motorized equipment and workers' vehicles. Vehicles and motorized equipment would be equipped with standard pollution-control devices to minimize emissions. As discussed in Section 3.3 of the GEIS, air quality impacts from these sources would be minor and of short duration.

Although the IPEC site is located in Westchester County, the majority of the site workforce resides in Dutchess County, with significant numbers residing in Orange, Putnam, and Rockland counties. Therefore, the focus of the air quality analysis is on the following counties: Dutchess, Orange, Putnam, Rockland, and Westchester. The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six common pollutants and has designated all areas of the United States as having air quality better than (attainment) or worse than (non-attainment) the NAAQS. Table 1 summarizes the current attainment status of each county with respect to ozone (8-hr standard), PM_{2.5} and carbon monoxide.

Table 1
Attainment Status Summary

County	Ozone (8-hr standard)	PM_{2.5}	CO
Dutchess	No	Yes	Yes
Orange	No	No	Yes
Putnam	No	Yes	Yes
Rockland	No	No	Yes
Westchester	No	No	Maintenance

It should be noted that, although the U.S. EPA classifies Orange, Rockland, and Westchester Counties as being out of compliance for PM_{2.5}, NYSDEC considers these counties to be in attainment, based on actual monitoring data. However, NYSDEC agreed, in a letter dated December 14, 2007, to include these three counties within the PM_{2.5} non-attainment boundaries of the New York Consolidated Metropolitan Statistical Area (CMSA).

In addition, all of the above counties are designated as non-attainment for the 8-hour ozone standard. Ground-level ozone is generated through the atmospheric combination of NO_x and VOC emissions. According to the EPA's *Green Book*, Westchester County is designated as a maintenance county for CO.

The removal and replacement phase of the project would be completed over a limited (65-day) outage period. A limited amount of diesel-powered construction equipment (crane, bulldozer, trucks) would be required on an intermittent basis to complete the project. This construction equipment would be fueled with ultra low-sulfur diesel fuel.

All necessary IP2 and IP3 removal, replacement, and maintenance activities would take place during a 65-day outage, concurrent with routine refueling activity. Entergy anticipates that up to 500 additional workers would be required on-site in addition to the approximately 1,200 workers required for normal operations and the 950 temporary workers on-site for normal refueling and maintenance activities. Site clearing and construction activities for the long-term storage building for the original reactor heads and CRDMs would require approximately 50 additional workers, but this activity would be largely completed prior to the peak occurrence of 500 additional workers on site.

In order to avoid underestimating impacts to area resources, Entergy assumes that all direct jobs for the postulated project would be filled by in-migrating residents. As noted above, adding up to 500 temporary workers for as many as 65 days would also have the indirect effect of creating additional jobs. Due to the temporary nature of the project, the size of the surrounding population, and the fact that most indirect jobs would be service-related, Entergy assumes that the majority of indirect workers already would be residing within the 50-mile radius and the five counties identified above.

As noted in Section 3.3 of the GEIS, a conformity analysis is required for each pollutant to determine if the combined direct and indirect emissions caused by a proposed federal action would exceed established threshold emission levels in a non-attainment or maintenance area. Federal conformity rules are defined in 40 CFR Parts 51 and 93. The EPA approved a limited carbon monoxide maintenance plan as part of the re-designation of the former Westchester County nonattainment area. Under limited maintenance plans, EPA policy does not require a CO emission budget test for conformity determination. Emission budgets in limited maintenance plan areas are considered not constraining for the length of the initial maintenance period. Therefore, conformity for CO is demonstrated in Westchester County and no analysis of impacts is required. Due to the status of all five counties as ground-level ozone non-attainment areas (NAA), the generation of NO_x and VOC, which combine in the presence of heat and sunlight to create ozone, is a source of concern. Background data with respect to VOCs and NO_x for the 2002 Baseline Ozone Season Day (OSD) Summary for the Poughkeepsie CMSA (which includes Dutchess, Orange, and Putnam Counties) indicated VOC and NO_x emissions of 308.49 tons per day (TPD) and 93.23 TPD, respectively. Most significant sources of VOC (205.72 TPD) emissions were biogenic, while most significant sources of NO_x emissions (50.33 TPD) were on-road transportation sources.

Projected 2009 OSD VOC and NO_x emissions for the Poughkeepsie CMSA are 286.37 TPD and 77.62 TPD, respectively. Again, the most significant sources of these pollutants are projected to be biogenic and on-road transportation.

The 2002 Baseline OSD Summary for the New York CMSA, which includes Rockland and Westchester Counties, indicated VOC and NO_x emissions of 5,796.69 TPD and 1,812.20 TPD, respectively. Major contributors to these emissions were biogenic and on-road transportation sources, respectively.

Projected 2011 OSD VOC and NO_x emissions for the New York CMSA are 932.09 TPD and 566.45 TPD, respectively. The projected most significant sources of these pollutants are area or non-point sources and on-road transportation sources, respectively.

Since Westchester County is a maintenance county for CO emissions, the baseline 2002 CO emissions for the county were cited as 236,633 TPY, most of which (161,917 TPY) was from on-road transportation sources. The baseline 2002 OSD CO emissions for the New York CMSA were 12,748.29 TPD. Projected 2011 OSD CO emissions are 4,497.79, of which the most significant contributor is projected to be non-road (e.g., construction equipment, marine, rail) sources.

With respect to the postulated project, Entergy has calculated air emissions from workers' vehicles using AP-42, *Compilation of Air Pollutant Emission Factors*, Vol. 2, Appendix H, "Highway Mobile Source Emission Factors Tables", (5th Ed., April 3, 1998) and the following assumptions:

- 20% of workers would carpool, resulting in an additional 400 cars/pickup trucks per day during the entire 65-day project period.
- The average worker vehicle would be a light gasoline-powered car or pickup truck.
- The project would draw workers from throughout the five-county area, resulting in fairly uniform emission impacts radiating outward from the plant site.
- The typical worker vehicle would be an average of five years old with 50,000 miles on the odometer.
- The average worker vehicle would travel 30 miles one way to the site, seven days/week, or 420 miles/week.

Table 2 summarizes the results of this screening analysis.

Table 2
Summary of Project Vehicular Emissions

Condition	Hydrocarbons (VOCs)	Carbon Monoxide (CO)	Nitrogen Oxides (NO _x)
Estimated Emissions			
400 vehicles, 65 days	0.95 T	16.1 T	1.02 T
Regulatory Project Thresholds			
40 CFR 51.853(b) conformity threshold	50 T*	100 T	50 T*
*No value shown for moderate ozone NAA; threshold value for serious ozone NAA shown in Table 2.			

Therefore, based on the conservative assumption that each worker would commute 30 miles each way, the total vehicle miles traveled during the 65-day period would be 1,560,000 miles. The project's average daily contribution to existing VOC, CO, and NO_x levels in the five-county area would be 0.015 TPD of VOCs, 0.25 TPD of CO and 0.016 TPD of NO_x.

Since it is assumed that workers would be traveling to and from IPEC from and to points located throughout the five-county area, project air quality impacts on any individual county would be small. Based on the data presented in Table 2 above, air quality impacts during the postulated reactor vessel head and CRDM replacement would be SMALL, and mitigation would not be required.

GEIS 3.7.2: Housing Impacts

The GEIS states that the impacts on housing are considered of small significance when a small and not easily discernible change in housing availability occurs, generally as a result of a very small demand increase or a very large housing market. The estimated 500 temporary employees needed to perform the project activities associated with possible replacement of the IP2 and IP3 reactor vessel heads and CRDMs could generate demand for 500 housing units for a period of up to 65 days. Project activities would increase the demand for housing in the area, but the increase would be temporary and the housing market is large. Based on Entergy experience during the IP2 and IP3 steam generator replacement outages, an adequate number of housing units would be available to accommodate the estimated project workforce.

Therefore, Entergy expects project related housing impacts to be SMALL and mitigative measures would not be warranted.

GEIS 3.7.4.5: Public Utilities (Public Water Supply)

The GEIS indicates that impacts on public utility services are small if little or no change occurs in the ability to respond to the level of demand and thus there is no need to add to capital facilities. The impacts to public utilities as a result of original construction of IPEC were small. The estimated 500 temporary employees needed to perform the postulated project activities are a fraction of the temporary employees involved in original construction and would be used for a fraction of the duration of original construction. Therefore, Entergy expects project related public utility impacts to be SMALL and mitigative measures would not be warranted. The following discussion focuses on public water supply availability impacts from up to 500 temporary workers for a period of 65 days.

The maximum impact to area public water supplies was calculated using the following assumptions: (1) all direct jobs would be filled by in-migrating residents; (2) all indirect jobs would be filled by residents within the 50-mile radius, (3) the project workforce would reside predominantly in Dutchess, Orange, Putnam, Rockland, and Westchester counties in the same ratio as the existing workforce, and (4) project-related workers would not bring their families due to the temporary nature of the project activities (i.e., 65 days or less).

The impact to the local water supply systems from plant-related population growth can be determined by calculating the amount of water that would be required by these individuals. The average American uses between 50 and 80 gallons per day for personal use.

Conservatively assuming that each temporary employee used 80 gallons per day while at the IPEC site, the additional maximum usage at IPEC would be 40,000 gallons per day. The Village of Buchanan, which supplies water to the IPEC site, purchases water from the City of Peekskill Public Water System and the Montrose Improvement District. The Montrose Improvement District, along with the Cortlandt Consolidated Water District and Yorktown, joined to form a new corporation known as the Northern Westchester Joint Water Works (NWJWW). Jointly, the City of Peekskill Public Water System and NWJWW have excess capacity of 7.2 million gallons per day. Therefore, Entergy concludes that impacts resulting from the temporary workforce at IPEC would be SMALL and mitigative measures would not be warranted.

Also conservatively assuming that each temporary employee used 80 gallons per day while in their temporary residences, the additional maximum usage in the five-county region of interest would be 80,000 GPD. The combined water systems in Dutchess, Orange, Putnam, Rockland, and Westchester counties have a total excess capacity of approximately 23.1 MGD.

Therefore, Entergy concludes that impacts resulting from the temporary workforce in their counties of residence would be SMALL and mitigative measures would not be warranted.

GEIS 3.7.4.1: Education

The GEIS indicates that impacts on education are associated with project-related enrollment increases. Entergy experience from IP2 and IP3 steam generator replacements suggests that the estimated 500 temporary workers needed to perform the postulated replacement of the IP2 and IP3 reactor vessel heads and CRDMs are either already located in the area or would immigrate, but would not relocate families to the plant area for a project of this duration. Therefore, Entergy estimates that few to no children would be relocated to the region, and that impacts of vessel head and CRDM replacement activities on educational resources would be SMALL and mitigation would not be warranted.

GEIS 3.7.5: Off-site Land Use

The GEIS indicates that impacts to off-site land use are small if population growth results in very little new residential or commercial development. Although an estimated 500 temporary employees would be needed to perform the project activities associated with possible replacement of the IP2 and IP3 reactor vessel heads and CRDMs, additional indirect jobs likely would be filled by residents, resulting in no additional population growth.

In Section 3.7.5 of the GEIS, NRC stated that, if project-related population growth is less than 5 percent of the study area's total population, offsite land-use changes would be small, especially if the study area has established patterns of residential and commercial development, a population density of at least 60 persons per square mile, and at least one urban area with a population of 100,000 or more within 50 miles.

Eighty-six percent of the IPEC workforce resides in Dutchess, Orange, Putnam, Rockland, and Westchester counties. IPEC is located in Westchester County. Entergy assumes that the project workforce would find temporary residences within this area.

The 2000 population was 280,150 for Dutchess County, 341,367 for Orange County, 95,745 for Putnam County, 286,753 for Rockland County, and 923,459 for Westchester County, for a total of 1,927,474. Five percent of this value is 96,374. The estimated project-related temporary population growth, 500, would be much less than 5 percent of the study area's total population. Land use planning in Dutchess, Orange, Putnam, Rockland, and Westchester counties considers patterns of residential and commercial development. These counties contain a combined total of approximately 1,669,760 acres or 2,609 square miles, resulting in a population density of approximately 640 persons per square mile. The 2000 population of New York City, which is located approximately 24 miles south of the plant, was 8,008,278.

In summary, the IPEC area satisfies the GEIS criteria for establishing that project-related off-site land use changes would be small. Due to the small number of project workers compared to the area's total population, available residential and commercial development, proximity to a major metropolitan area, and the short duration of the project, project-related off-site land use changes would be SMALL, if not undetectable, and would not warrant mitigation measures.

GEIS 3.7.4.2: Transportation

Transportation impacts attributed to refurbishment per the GEIS are individual to each specific plant and are directly related to the capacity and quality of local roads.

Access to the IPEC site is via State Route (SR) 9. Historically, increased traffic during outages has not degraded the capacity of local roads. Additionally, the increased worker populations for the specific IP2 and IP3 outages that included steam generator replacements did not create the need for new roads or the widening of existing roads, or additional traffic control devices. Peak traffic during outages would be expected to be leaving and entering the site from 5:30 to 7:00 a.m. and from 6:30 to 8:00 p.m. The site has previously implemented mitigative measures, such as staggered shift starting and quitting times, to accommodate the increased traffic flow during outages and to maintain a reasonable level of service. Available traffic count information shows generally increasing traffic volumes on Route 9 and 9A, but these increases are unrelated to traffic from IPEC. Outage activities are not expected to increase the volume of traffic or affect the current highway Level of Service around the site, including Bleakley Avenue, Broadway, and US Highway 9. Therefore, Entergy concludes that impacts to transportation from IP2 and IP3 reactor vessel head and CRDM replacements would be SMALL, and additional mitigative measures would not be necessary.

GEIS 3.7.7: Historic and Archeological Resources

The GEIS discusses the impact of refurbishment to historic and archeological resources in terms of ground disturbance of previously undisturbed land. The only project activity that would involve ground disturbance for potential replacement of the IP2 and IP3 reactor vessel heads and CRDMs would be construction of the storage building for the old IP2 and IP3 reactor vessel heads and CRDMs. If Entergy opted to replace the IP2 and IP3 reactor vessel heads and CRDMs, it would construct the storage building for the replaced heads and CRDMs adjacent to the existing storage building for the old IP2 and IP3 steam generators. This area was graded and otherwise disturbed during initial station construction.

The New York State Historic Preservation Office (SHPO) recently reviewed Entergy's procedure for protection of cultural resources, which requires site environmental personnel to review any planned excavation and to consider means for protecting potentially significant historical and archaeological resources. Specifically, IPEC environmental personnel are responsible for determining if proposed land-disturbing activity would occur in the vicinity of a culturally-significant site, and, if so, consulting with the SHPO to mitigate potential impacts. Environmental personnel are also responsible for evaluating any cultural artifacts that might be inadvertently discovered during construction to determine if such items have potential archaeological or historic significance and thus should be reported to the SHPO. In any case, the discovery of cultural artifacts at IPEC requires employees to stop work until environmental personnel have evaluated the finding. Work can resume only after the finding has been evaluated, the evaluation of any material or artifacts has been documented, and environmental personnel agree that culturally-significant resources are not at risk. These controls ensure that known archaeological/historical sites are avoided and that newly-discovered archaeological/historical sites are protected.

The proposed area for construction of the storage building is within the area that the procedure identifies as requiring no prior consultation for historic, cultural, or archaeological resources. Based on the IP2 and IP3 steam generator replacement project, replacement of IP2 and IP3 reactor vessel heads and CRDMs has little potential for disturbing, uncovering, or harming cultural artifacts. Additional construction personnel and additional traffic on area roadways

associated with reactor vessel head and CRDM replacement would not be expected to impact archaeological or historical sites in the area. The reactor vessel heads and CRDMs would be transported by barge up the Hudson River to the IPEC site and transported over an existing paved surface to the containment building by a large, all-terrain vehicle (transporter). The area through which the service road passes was heavily altered during original construction of the units and is surrounded by buildings, transmission towers and other infrastructure. Because the area was cleared and graded for original construction of the units, and because moving the reactor vessel heads and CRDMs to the containment building and moving the replaced heads and CRDMs to storage would require no land disturbance, potential replacement of the IP2 and IP3 reactor vessel heads and CRDMs is not expected to adversely affect the area's archaeological or historic resources. Therefore, impacts would be SMALL and additional mitigative measures would not be warranted.

Environmental Justice

The consideration of environmental justice is required to assure that federal programs and activities will not have "disproportionately high and adverse human health or environmental effects...on minority populations and low income populations..." Entergy's analyses of the Category 2 refurbishment issues defined in 10 CFR 51.53(c)(3)(ii) indicate that no significant adverse human health or environmental impacts would result from the postulated replacement of the IP2 and IP3 reactor vessel heads and CRDMs. Thus, as the NRR procedure LIC-203, rev. 1 and the NRC's final policy statement on environmental justice matters (69 Fed. Reg. 52,040, 52,047; Aug. 24, 2004) recognize, if no significant off-site impacts will occur in connection with the proposed action, then there will be no disproportionately significant and adverse environmental impacts on minority and low-income populations.