Progress Energy

NPD-MISC-2010-014
November 3, 2010

Ms. Heather Hildebrandt
NC-DAQ
Planning Department
1641 MSC
Raleigh, NC 27699-1641

RE: Response to Comments on Previous Information Submittals
NC-DAQ Conformity Review of Emissions During Construction
Proposed HAR Units 2 and 3
Shearon Harris Nuclear Power Plant

Dear Ms. Hildebrandt:

This letter is written in response to Mr. Bob Wooten's e-mail dated October 6, 2010, which includes a list of questions related to Progress Energy's air emissions estimates for the construction phase of proposed new generating units 2 and 3 at the Shearon Harris Nuclear Power Plant (SHNPP). It is noted that Progress Energy has previously submitted extensive information, including emission calculations, supporting documentation, and additional correspondence to the North Carolina Division of Air Quality (DAQ) in conjunction with a request for a review of the project's construction related emissions. The purpose of these submittals was to assist DAQ in determining if the margin of safety in the existing State Implementation Plan (SIP) would be sufficient to account for the proposed emissions increase, or the SIP would require formal revision to be protective of air quality in the region. Mr. Wooten's e-mail indicates that, after reviewing the Progress Energy emission estimates, DAQ believes that there is in fact a sufficient margin of safety in the SIP to accommodate the project, and his questions are intended to ascertain if the estimates provided are the best possible representation of the expected construction activities. To address these concerns, Progress Energy's response to each of Mr. Wooten's questions is provided below:

DAQ Comment No. 1: The railroad operating parameters should be verified and the reason for choices made explained. Based on those parameters the emissions should be estimated. The current written material says one 5000 hp locomotive using line haul emission factors (and not citing the most recent EPA railroad emission factor document as the source) with a Tier 1 engine and a 0.59 load factor. In discussions you or your consultants have said the engine could also be a higher emitting Tier 0. It was also suggested that the while the line haul factors were lower than the switch service factors, the operating times were overestimated to compensate. It was also mentioned that there could be up to 4 engines doing switching (would they all be working or some just idling?). Some of the statements can't be true if the other statements are true. I sent you an example of an appropriate way to calculate emissions for one 5000 hp Tier 1 engine performing switching service; the estimated emissions were considerably lower than what you estimated. With two engine tiers, emissions for both types should be calculated and an appropriate proportion of each reported. Use of switch yard emission factors is because of the duty cycle of the engine on your site, not because of the normal use of the engine for freight hauling.

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Progress Energy Response to DAQ Comment No. 1: Additional clarification regarding the emissions from locomotives servicing the site was previously provided to DAQ in Item No. 6 of Progress Energy's September 7, 2010 letter to Heather Hildebrandt. To further clarify, Progress Energy agrees that the onsite rail emissions were based on the use of EPA emission factors for Road Engines (see Appendix A-3 of the July 6, 2010 Technical Memorandum entitled *Construction Related Emissions Analysis, HAR Units 2 and 3)*, using an estimated effective total combined horsepower of all four engines that would typically be expected to deliver loaded and unloaded rail cars to the facility during the construction phase of the project. However, it is noted that rail deliveries to and from the site are not expected to be dedicated trains that will terminate or originate at the SHNPP, rather they will be part of coordinated CSX deliveries that will be routed by or near the SHNPP. For deliveries of this type, it is typical to have up to four engines on a train. While DAQ Comment No. 1 indicates that switch engine emissions may be more appropriate, Progress Energy believes that the use of road engine emission factors is appropriate in this case because the engines delivering and picking up rail cars during construction would in fact be road engines rather than the much smaller (and significantly lower horsepower) switch engines. Road engines have typical horsepower ratings of 4,000 to 6,000 horsepower each (16,000 to 24,000 horsepower for a 4-engine train), whereas switch engines are much different, typically in the range of only 1,000 to 2,000 horsepower. The emission calculations provided in the Technical Memorandum were designed to account for a lower effective total horsepower rating when the locomotives are onsite (i.e., at lower locomotive "notch settings") of only 5,000 total effective horsepower (i.e., for all four locomotives combined) when servicing the site during delivery and pickup. The estimates are based on some general discussions with a major rail operator and they represent our best estimate of the emissions using our current expectations for rail activity at the site during construction.

With regard to the engine ratings used for the locomotive emission factors, Progress Energy believes that the use of Tier 1 (or better) emission factors is appropriate as an average representation of locomotive emissions during construction. Tier 1 engines began production in 2002 and, given the start of construction dates of 2011 (early start) or 2018 (late start), this engine vintage is believed to be a reasonable assumption. Progress Energy acknowledges that it is possible that some older (Tier 0, produced 1973 – 2001) and some newer (Tier 2, produced 2005 and later) engines could be servicing the site during construction; however, Tier 1 engines were chosen as a representative or typical engine in the absence of any more available or definitive information.

DAQ Comment No. 2: There are a number of parts to this construction project: excavation for the two reactor buildings and associated structures such as the cooling towers, moving excavated material, building the various structures, ditching for and laying pipe to the Cape Fear river, removing timber where the higher lake level will cover, reconstruction of various roads etc. that would otherwise be covered by the higher lake level, parking areas for the workers, etc. Were all of these parts of the project considered in arriving at the list of equipment? There doesn't appear to be any equipment listed for laying asphalt paving. Only one welding machine was indicated. Please explain in detail how the indicated types, sizes, numbers, and operating hours of equipment indicated (Levy Site Equipment List) is appropriate for the Harris project.

Progress Energy Response to DAQ Comment No. 2: Progress Energy believes that all aspects of the project have been adequately accounted for in the equipment list that was used as a basis for the construction emissions estimate. As noted in our response to Item No. 1 in our September 7, 2010 letter to DAQ, a list of potential construction equipment to be used on the project was requested from Shaw Stone and Webster (Shaw), Progress Energy's design

engineer for the project. Shaw's design engineers provided a list of construction equipment that would be used on the project, including the number of units and estimated operating hours for each item of equipment identified. This initial list of equipment is included in Appendix C-1 of the July 6, 2010 Technical Memorandum. It is noted that this list identified equipment that could be used during each year of the seven year construction project. It is also noted that this list of equipment was initially prepared for Progress Energy's Levy County, Florida project site, which is why this list is titled "Levy Site Equipment List". Based on guidance provided by Shaw, notations on the equipment list in Appendix C-1 indicate that certain equipment would not be used at the SHNPP (due to site-specific differences) and that equipment was therefore not included in the SHNPP analysis. It is important to understand that the proposed nuclear power plant at both sites (NC and FL) would be nearly identical in design since the plant is a standard design that is being reviewed by the U. S. Nuclear Regulatory Commisssion. As a result, the construction period and general construction activities would essentially be the same, except for any site-specific differences which we have accounted for. With regard to the comment that some very specific equipment is not included in our list of equipment (i.e., such as asphalt paving machines and other equipment), the list of construction equipment was intentionally developed to include *types* and *numbers* of equipment units that would be used rather than a listing of specific individual units since a detailed construction schedule for the project has not yet been developed. Progress Energy acknowledges that there will be variations from this list of equipment in practice once construction begins, but we believe that it is representative of the type and numbers of equipment that will be used and the emissions estimates are therefore representative of what can be expected to occur. With regard to the emissions associated with timbering operations, please refer to the response to Comment No. 9.

DAQ Comment No. 3: Emissions for each equipment type and size should be calculated. Simplifying a list of some 50 equipment items down to 4 (Link Belt crawler, crawler pumps, large equipment, small equipment) is not going to produce an accurate inventory. Indicate the appropriate power, load factor, and Source Classification Code (SCC) for each piece of equipment along with the calculated emissions.

Progress Energy Response to DAQ Comment No. 3: Progress Energy agrees that the emissions estimates were based on the size categories of equipment that will be used. Specifically, emissions were calculated based on three size categories of equipment, and the number of equipment units within each size category was accounted for when estimating the emissions. Size categories were based on assumed horsepower ratings for the equipment, with the intention of using the horsepower of the larger engines in the size category to represent all equipment in that category. The intent of categorizing equipment in this way was to ensure that the emission estimates would be representative of the <u>maximum daily emission rates</u> during construction rather than average annual rates since DAQ requested that the emissions be provided on a maximum ton/day basis. The categorization of equipment is provided in the calculation worksheets, specifically in Calculation Table 1.2 *Calculation of Criteria Pollutant Emission Rates for Construction Equipment* on pages 222 and 223 of Appendix B-2 in the July 6, 2010 Technical Memorandum (early start scenario), and also in Calculation Table 1.2 on page 249 of Appendix B-4 in the same document (late start scenario). This information was developed on the basis of the information obtained from the equipment list provided by Shaw (see Appendix C-1 in the Technical Memorandum) and through discussions with Shaw's engineers. In this categorization of equipment, the three classes of equipment used in the emissions estimates were:

Cranes	38 units (each with 4 hydraulic system pumps)
Large Equipment (750 HP)	81 units
Small Equipment (175 HP)	155 units

It is noted that the number of units corresponds to the total number of units in each category (see Table 1.2 on page 222 of 276 in the July 6, 2010 Technical Memorandum). The number of cranes used on the project was estimated to be 38, which consists of all the cranes listed as Classes D through M in the first 8 lines of Table 1.2 in the calculation worksheet. To be conservative, and to account for the fact that the actual equipment has not been specified under an Engineer, Procure, and Construct (EPC) contract, all cranes in this size category were assumed to be the larger 300 ton cranes, each with 4 hydraulic system pumps. The number of Large Equipment units was assumed to be 81, which consists of all of the units identified under the line item "Large Equipment >750 HP" in the table. To be conservative, and to account for the fact that the actual equipment had not been specified under an EPC contract, all equipment was assigned a HP rating of 750 HP since it is possible that larger equipment could be used on a short-term daily basis. This was based on a review of the equipment and 750 HP was assumed to be generally typical of the horsepower of the largest equipment listed in this category. The number of Small Equipment units was assumed to be 155, which consists of all of the units identified under the line item "Small Equipment". To be conservative all equipment in this size category was assigned a HP rating of 175 HP. This was based on a review of the equipment and 175 HP was assumed to be generally typical of the horsepower of the largest equipment listed in this category. This equipment list was not intended to be an exhaustive list that captured small and incidental equipment such as small-engine portable generators, gasoline powered equipment such as cutoff saws, trowel machines, or other minor equipment. The approach that was used to estimate the emissions was intended to be conservative enough to account for these minor sources of emissions which cannot be reasonably predicted at this time, either in terms of the number of those units that will be used or their estimated schedule of usage. Progress Energy does not believe that it should be necessary to include estimates for such small ancillary equipment when we believe that the estimates that are provided are conservative enough to be inclusive of these and other incidental emission sources that will not materially change the emission estimates.

DAQ Comment No. 4: The NONROAD2008 model was used. You should use the NONROAD2008a model which was corrected to produce more accurate NOX estimates (lower). The way you ran the model assumes that the equipment mix will match the national average equipment mix. With each year you show lower emission factors because the model assumes that older equipment is steadily retired and replaced with the newer and cleaner equipment. Are you able to make sure this equipment improvement happens? If not, the estimates should be modified appropriately.

Progress Energy Response to DAQ Comment No. 4: Progress Energy used the NONROAD2008 emissions model based on guidance provided by DAQ in mid-2009. Originally, the NONROAD2005 model was used to estimated the emissions for the construction phase of the project; however, the NONROAD2008 model was released before the emissions estimates were officially submitted to DAQ for review so the analysis was re-run using the more current version of the model. Given that the NONROAD2008a model was released after the emissions estimates were submitted for review by DAQ, and since DAQ expects that the NONROAD2008a model will generate lower (less conservative) emissions, Progress Energy requests that DAQ continue to base its review on the NONROAD2008 version of the model.

With regard to the mix of equipment and its rate of retirement, the design engineer for the project has advised us that, because of the project size, most equipment would likely be dedicated to the project. Equipment will be replaced on an as-needed basis based on normal wear and tear, typical of any construction project. Progress Energy therefore believes that the rate of retirement of this equipment will be consistent with national averages (i.e., as specified in the model) and there is no reason to believe that the life expectancy, deterioration rates, or use of this construction equipment will differ from other large construction projects. Because an EPC contract has not yet been negotiated for the project, Progress Energy cannot dictate the age of the equipment at the beginning of the project. For this reason, the assumption that has been used, namely that the equipment age and its rate of retirement will be consistent with the national average equipment mix, is believed to be reasonable.

DAQ Comment No. 5: You have stated in conversation that, probably, new equipment will be brought to the site and used through the several years of the project. If this happens, the emission factors would certainly start lower than what was indicated using the NONROAD model as you did. That means we may be using more of the safety margin than necessary. If this new equipment approach is actually going to be used, I can show you how to develop emission factors by equipment type, size, and model year for years into the future. For example, a particular size crawler tractor made in 2008 and used in 2011, 2012, 2013, 2014, etc.

Progress Energy Response to DAQ Comment No. 5: Progress Energy appreciates your offer for assistance. PE has responded in DAQ Comment No. 4 above.

DAQ Comment No. 6: It is likely that there will be some use of gasoline powered equipment (compressed gas too?). Things like chain saws, power trowels, diamond saws or abrasive saws, small air compressors, and so on. Make reasonable estimates of this equipment use and emissions. It is not reasonable to guess that these emissions are insignificant and therefore dismiss the need to estimate them.

Progress Energy Response to DAQ Comment No. 6: The equipment list used to estimate emissions during the construction phase of the project was not intended to be an exhaustive list that captured small and incidental equipment such as small-engine portable generators, chain saws, cutoff saws, trowel machines, or other minor equipment. The approach that was used to estimate the emissions was intended to be conservative enough to account for these minor sources of emissions which cannot be reasonably predicted at this time, either in terms of the number of units or their estimated schedule of usage. Progress Energy does not believe that it should be necessary to include estimates for such small ancillary equipment when we believe that the estimates that are provided are conservative enough to be inclusive of these and other incidental emission sources that will not materially change the emission estimates.

DAQ Comment No. 7: While anthropogenic VOC emissions are generally insignificant contributors to the formation of ozone in North Carolina, it is still required that they be estimated. In addition to VOC from equipment and vehicles, it is reasonable to expect that solvents, paints, coatings, and sealants will be used. Estimate the amounts of and then the VOC from paints, coatings, adhesives, solvents, sealants, etc. used.

Progress Energy Response to DAQ Comment No. 7: Progress Energy agrees that it did not provide emissions estimates associated with the application of paints, coatings, or sealants. At this time there is insufficient information to provide estimates of these emissions. However, they are not expected to be significant compared to the emissions from the combustion of fuel during

the construction process. The type of coatings and sealants has not yet been specified; however, it is reasonable to expect that coatings and sealants will be of the "low VOC" type, consistent with current practices and applicable regulations. Additionally, the construction of the facility's modular-based AP1000 reactor units will involve the assembly of major components using pre-manufactured modules, resulting in a significant fraction of the work (that could emit VOCs from painting, etc.) occurring off-site. It is also noted that the emissions of VOC's during construction was discussed with NC DAQ in 2009 and Progress Energy was advised that anthropogenic VOC emissions had previously been determined by the agency to be insignificant (as noted in DAQ Comment No. 7) and therefore project VOC emissions were not of particular concern and did not need to be estimated.

DAQ Comment No. 8: Once the workers arrive on the construction site (no longer on public roads), the emissions from their vehicles become part of the indirect emissions. These need to be quantified. Also quantify onsite emissions from any shuttle buses and errand running in trucks and vans. Emissions from the vehicles (off the public roads) of workers engaged in raising the roads, moving or replacing other structures because of higher water levels, and piping the river water must also be accounted for in the analysis.

Progress Energy Response: Construction workers will travel to and from the site using public roads and will likely park their vehicles just inside the project gate in designated parking lots upon arriving at the site, accessing specific construction areas primarily on foot, or in some cases using a limited number of small company provided construction fleet vehicles to move around the site. As a result, minimal emissions from onsite worker related transport is expected. Progress Energy was instructed by DAQ not to include emissions associated construction worker vehicles since emissions from those vehicles are already accounted for in the SIP (i.e., those workers would be commuting, parking, and working elsewhere in the region if they were not involved with this project). The amount of traffic (and corresponding emissions) associated with the transportation of workers around the site once they are onsite is not expected to be significant and Progress Energy believes these to be well within the range of total emission estimates during the construction phases of the project that has already been provided to DAQ.

DAQ Comment No. 9: To the extent that the timber removal for the lake flooding exceeds the typical yearly timber removal for the property, the emissions from this activity should be quantified as part of the construction project. Reduced timbering once the project is in operation due to reduced timber area could be counted toward reducing operating emissions.

Progress Energy Response to DAQ Comment No. 9: Progress Energy believes that the activities associated with the logging around the perimeter of the lake (to expand the lake surface area), will be offset by a corresponding decrease in its current average timbering operations. In general, Progress Energy intends to maintain its current level of logging activities on its owned lands, regardless of whether it is in conjunction with the implementation of the new construction project or if it is part of its existing forestry management program. Based on this approach no significant change in emissions associated with logging activities is expected during the construction phase of the project. It is also noted that timbering operations around the lake could occur earlier than the construction of Units 2 and 3. There are no plans for open burning as all saleable timber will be sold and the remainder will be chipped onsite.

DAQ Comment No. 10: The increase in emissions due to this Federal Action once the facility is in operation should be recalculated to include driving (parking and departing included) by additional workers at the facility.

Progress Energy Response to DAQ Comment No. 10: The emissions estimates provided in our submittal to DAQ were intended to reflect only the emissions during the seven year construction phase of the project. While there will in fact be additional mobile source emissions associated with employee commuter traffic once HAR Units 2 and 3 become operational, these emissions would represent only a very small fraction of total county emissions. The estimated number of additional workers that will commute to the site for HAR Units 2 and 3 is 773 per day. For comparison purposes, the maximum percentage increase in traffic on U.S. Highway 1, at its nearest point to the project site, is therefore estimated to be less than 5 percent of the current average annual daily traffic (AADT) volume of over 18,000 vehicles per day. The percent increase in the AADT for all of Wake County would therefore be expected to be insignificant, with no measureable or discernible impact on the regional mobile source emissions inventory for any pollutant.

Progress Energy has addressed NC-DAQ's questions. Please let us know when NC-DAQ will send EPA the letter of commitment regarding the HAR Project.

If you should have any questions concerning any aspect of the above, please contact Mr. Paul Snead at 919-546-2836.

Sincerely,

Robert Kitchen
Manager, Nuclear Plant Licensing
New Generation Programs & Projects

cc: Mr. Bob Wooten (NC DAQ)
Dr. Donald Palmrose (US NRC)