Progress Energy

NPD-MISC-2010-011

September 7, 2010

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

RE: Summary of the Methodology Used in July 6, 2010 Technical Memorandum entitled: *Construction Related Emissions Analysis HAR Units 2 and 3*.

Dear Heather,

During our meeting at NC DAQ's offices on August 26, 2010, there was discussion regarding the methods used to calculate the air emissions during the construction of the proposed Harris Advanced Reactor (HAR) Units 2 and 3 at the Shearon Harris Nuclear Power Plant in Wake County. As you are aware, Progress Energy previously submitted estimates of the construction emissions for the proposed project to NC DAQ for review and comment prior to their use in the evaluation of project emissions relative to the State Implementation Plan (SIP). Our initial submittal was provided to Laura Booth of NC DAQ in July of 2009 and included emission estimates for the period 2011 – 2017 (subsequently designated the "early start" construction scenario). Since the actual period of construction has not yet been finalized, Progress Energy was requested in June of 2010 (by the U.S. Nuclear Regulatory Commission [NRC] and NC DAQ) to further expand our previously submitted emission estimates to include a possible later construction period (designated the "late start" construction scenario) so that the potential impact on the SIP could also be evaluated in the event construction is delayed. As we discussed during the meeting, Progress Energy has been in discussions with Laura Booth since May 2009 and she has reviewed and commented on the specific approach to making these estimates, resulting in the current approach.

On August 19, 2010, a conference call was held among Progress Energy, CH2M HILL, and Bob Wooten of NC DAQ to discuss Mr. Wooten's questions and concerns regarding the construction emission estimates. During the call, Mr. Wooten indicated that he had not yet seen or reviewed all of the documentation regarding the method of calculation of the emissions during the construction period, and was not aware that detailed documentation had been submitted to NC DAQ. He specifically noted that some of the information that he had reviewed indicated that the emissions estimates appeared to be based on only "four items of equipment" and that he had expected to see additional detail. During the call it was noted that there were numerous additional document submittals to NC DAQ's Laura Booth, including emissions modeling input and output files, detailed emission calculation spreadsheets, and a Technical Memorandum that described the methodology and specific procedures used in estimating the construction emissions. This information was submitted at Laura Booth's request. Given the fact that all of the documentation was not reviewed by Mr. Wooten prior to developing his comments on the analysis (e-mail addressed to Progress Energy and the NRC on August 19, 2010), Progress Energy feels that it would be beneficial to provide a summary of the methodology that was used and described in our July 6, 2010 Technical Memorandum entitled: *Construction Related Emissions Analysis HAR Units 2 and 3*.

The assumptions, methods, and basis for the emissions estimates for the "early start" and "late start" construction scenarios are described and quantified in detail in the July 6, 2010 Technical Memorandum and its appendices. In summary, the methodology used to develop the emission estimates provided in the Technical Memorandum consisted of the following general steps:

Progress Energy Carolinas, Inc.
P.O. Box 1551
Raleigh, NC 27602

1. ***Identification of Equipment to be Used During Construction*** – 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 general list of construction equipment that would be used on the project, including the number of units 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 prepared for Progress Energy's Levy County, Florida project site, which is why this list is titled "Levy Site Equipment List". Notations on the equipment list in Appendix C-1 indicate that certain equipment would not be used at the Harris site and that equipment was therefore not included in the 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 NRC. As a result, the construction period and general construction activities would be very nearly the same.

2. ***Identification of Other Vehicles Used Onsite During the Construction Period*** – Aside from construction equipment, other equipment/vehicles/activities that would be used during the period of construction includes rail deliveries, truck deliveries, and concrete delivery trucks servicing the concrete batch plant. Discussions with Shaw's design engineers resulted in estimates of the number of rail and truck deliveries (per week and day, respectively), as well as the number of concrete truck deliveries per day. The number of hours and/or the number of miles travelled onsite for each type of vehicle were estimated on the basis of discussions with Shaw engineers. This information is documented in a transmittal dated June 3, 2009 that is included in Appendix C-2 in the Technical Memorandum. Table 1 in the same Appendix summarizes this information. In addition, construction workers will travel to and from the site using public roads and will likely park their vehicles in central parking lots upon arriving at the site, accessing specific construction areas on foot or using small construction fleet vehicles to move around the site. Progress Energy was instructed by NC DAQ not to include construction worker vehicle emission estimates 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).

3. ***Assumptions Regarding Equipment Usage*** – Progress Energy and CH2M HILL had extensive discussions with the Shaw design engineers to better understand how the construction equipment would be used, the approximate daily usage of the equipment (hours/day), and the age of the equipment at the outset of and through the duration of the project. Shaw advised that the equipment list was representative of the design team's best estimate of the equipment that would be used, based on their experience with large construction projects and their current knowledge of the project design. Shaw also advised that, because of the project size, most equipment would likely be dedicated to the project and they would expect that much of the equipment would be less than two years old when construction starts. Equipment will be replaced on an as-needed basis based on normal wear and tear, typical of any construction project. 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.

   Equipment usage rates were also discussed with the Shaw engineers, including the expected number of hours of operation (6 hours per day, typical). Also estimated was the percentage of all equipment that would be used during each year of the seven year construction period, with 100 percent of all equipment being used during 2 ½ years of peak years of construction, and lesser amounts that will vary between 25 and 50 percent during other years. This information is summarized in Table 1 of Appendix C-2 of the Technical Memorandum. Load factors for all construction equipment (i.e., percent of maximum engine load) were estimated using EPA

guidance to be 59% for large equipment and 21% for small equipment as indicated in the emission calculation spreadsheets in Appendices B-2 (Early Start) and B-3 (Late Start).

4. ***Categorization of Equipment for Emission Estimating Purposes*** –The emissions estimates were calculated based on three size categories of equipment; however, 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 maximum daily emission rates during construction rather than average annual rates since NC DAQ requested that the emissions be provided on a 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

Note 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 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.

5. ***VOC Emissions Estimates from Coatings and Sealants*** – Progress Energy 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 large or 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 low in VOC content, consistent with current practices and applicable regulations. It is 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 and therefore project VOC emissions were not of particular concern.

6. ***Emission Factors Used in Emission Estimates*** – Emission factors used in the calculation of emissions for construction equipment and onsite vehicles (except railroad engines) were obtained from EPA's NONROAD2008 and the MOBILE6.2 emission models, as directed by NC DAQ. All model input parameters, including the default national vehicle mix (fleet average distribution), fuel specifications, ambient air temperatures, etc., were reviewed and approved by NC DAQ (see Appendices A-1 and A-2 for input and output files). A general summary of the model input assumptions as previously reviewed and approved by NC DAQ is provided in Tables 1a, 1b, 2a, and 2b in the July 6, 2010 Technical Memorandum. Based on direction provided by NC DAQ (Laura Booth), offsite rail emissions were specifically excluded from the analysis. NC DAQ indicated that they had contacted CSX (Progress Energy's rail delivery vendor) to obtain their emissions. Onsite rail emissions were based on the use of EPA emission factors for Road Engines (see Appendix A-3 of the Technical Memorandum), using an estimated effective horsepower of four engines that would typically be delivering loaded and unloaded rail cars to the facility during construction. Rail deliveries to the site are not expected to be dedicated trains that will terminate or originate at the Shearon Harris Nuclear Plant; rather they will be part of larger deliveries that will be routed by or near the Harris site. For larger deliveries, it is typical to have up to four engines on a train. During the August 19, 2010 conference call with Mr. Wooten and during the August 26 meeting, Mr. Wooten indicated that he felt that the rail emissions should have been based on switch engine emission factors rather than road engine emission factors. 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 1,000 to 2,000 horsepower. The emission calculations provided in the Technical Memorandum accounted for a lower effective total horsepower rating of only 5,000 horsepower for all locomotives combined when servicing the site during delivery and pickup.

Progress Energy hopes that the explanations provided will be useful to NC DAQ in understanding the methodology used in the estimation of emissions for the proposed construction project. If you should have any questions concerning any aspect of the above, please do not hesitate to contact me.

Sincerely,

Paul Snead

Paul Snead
Supervisor, Environmental Permitting
New Generation Programs & Projects
Progress Energy

cc: Ms. Linda Hickok (Progress Energy)
Mr. Arun Kapur (Progress Energy)
Dr. Donald Palmrose (US NRC)