

HarrisCOLEIS Resource

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Additional Comments for NRC Environmental Scoping: Progress Energy (PEC) Combined Operating License HAR-2, HAR-3 Environmental Report

I have organized these comments in terms of chapters, sections and pages, but they apply to all chapters and sections where such issues, or facts are discussed, or ought to be included in an EIS.

The fact that I have organized them this way for the ease of the reviewer should not be taken as a limiting factor on the applicability of these comments to other relevant sections or chapters.

Chapter 5: Environmental Impacts of Station Operation

Section 5.1 Land Use impacts

Land use changes that would occur during construction are almost all also operational impacts.

The impacts from a higher level lake are listed as short-term, but they are very long term. (p.5-5) and are also called SMALL! Given the discharges of heavy metals into the lake from 3 reactors it is unlikely that the lake could be drained and returned to its original uses.

Since PEC states in one place in the ER that the E&E building would have to have a flood dike built around it, and elsewhere refers to unspecified PEC buildings and "PEC facilities" that would have to be relocated as part of raising the level of the Harris reservoir system, several questions arise:

- 1) what other buildings could be subject to flooding as a result of increasing the level of the lake? (i.e. other property owners)
- 2) has the applicant supplied comparative maps of the current 100-year and 500-year flood plains, and projected new 100-year, 500-year flood plains.
- 3) Has PEC analyzed the impacts on a higher level reservoir system and its watershed of a stalled hurricane like Hurricane Floyd?

Global warming is predicted to increase the frequency of heavy flooding as well as droughts and greater evaporation from water bodies.

Flood plain maps have been based on the assumption that frequency and severity of floods does not change over time. The Corps of Engineers, however, has recently completed a study of flooding on the Mississippi in the midwest, which finds that in the last 35 years there have been four "100 year floods." In the midwest "100 year floods" are now occurring every few years, several within a decade or two, and "500 year floods" every decade or so.

*NOAA Study Forecasts Greater Extremes in Weather
Greenhouse Gas Emissions Seen Fueling Swings
by Juliet Eilperin, The Boston Globe, June 20, 2008*

WASHINGTON - As greenhouse gas emissions rise, North America is likely to experience more droughts and excessive heat in some regions even as intense downpours and hurricanes pound others more often, according to a report issued yesterday by the US Climate Change Science Program.

The 162-page study, which was led by the National Oceanic and Atmospheric Administration, provides the most comprehensive assessment yet of how global warming has helped to transform the climate of the United States and Canada over the past 50 years - and how it may do so in the future.....

In a conference call with reporters, Karl and the other cochairman, Gerald Meehl, senior scientist at the National Center for Atmospheric Research, said there is no doubt that human-generated heat-trapping gases have helped intensify both the Southwest's current drought and the heavy downpours, which have been increasing at a rate three times that of average precipitation over the past century. "That's a certainty," Karl said. "People aren't questioning whether there's been an increase in heavy downpours."

By the end of the century, he added, models predict that intense bouts of precipitation that might have occurred once every 20 years will take place every five years.

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(p. 5-8) Section 5.1.1.1.2 Impacts on transportation system from an increased workforce

New roads (see figure 4.0-11 "Several new asphalt-paved roads will be constructed prior to HAR construction." All the road portions on PEC land would be additional undeclared costs of the reactors.

This is cited as solely an impact on the current transportation system, but these new roads should be added to the ever rising tally of land use impacts, area permanently lost to other more beneficial uses. Even additional highway modifications may be required (at taxpayer expense) with the loss of more acreage since DOT takes a gigantic swath just to add a turn lane.

For example a plant access road 10,000 ft X 32 ft. and miscellaneous plant roads totaling 8700 ft X 24 ft. = 320,000 sq. ft + 208,800 sq. ft = 528,800 sq. ft more than 12 acres.

Yet in its study of alternatives, in Chapter 9 PEC manages to include at least one new road for every wind turbine or solar panel!!!!

PE claims that the "operational impacts from these new plant roads are expected to be small" but this section is supposed to discuss effect of the plant on the current road

system, and if roads have to be widened, that is at least a moderate effect under the definitions provided.

Moreover, PEC fails to mention the hundreds of new construction workers commuting to the plant on roads that the taxpayers would have to maintain or improve, such as 751, 42, 64, US 1, and so on.

5.1.1.2.2 Recreation areas.

PEC doesn't specifically say it will replace boat ramp(s) As for Harris Lake County Park the expansion of the lake would flood many constructed facilities, and its not clear if PEC is going to pay to reconstruct new ones, but the overall acreage would definitely be reduced to something like half its current acreage. This is a significant impact on a park whose main attraction is not its lavatories, but its miles of walking and running trails.

There is also no stated mitigation for reduction of game lands, which is both an ecological and a recreation impact. But hey, says PEC, more area of water for water fun! (How much fun is a lake you can't swim in, or even wade?)

The fact is that double the water acreage at Harris is unlikely to increase the number of visitors: there are no public facilities near the boat ramps or anywhere else, except at Harris Lake County Park, and those are located for the use of land based visitors. Jordan Lake has swimming beaches, campgrounds, trails, picnic shelters and boat ramps (and park personnel), and therefore can be used by visitors from elsewhere in the state or country. Harris Lake is primary used for boating by very local visitors.

(p. 5-12) 5.1.1.2.2.3 Shearon Harris Game Lands.

13,227 total acres, 2022 acres of which would be flooded, which is actually 15% not 14% of total. However, its not specifically pointed out here that this (as cited earlier) represents a 31% loss of the forested habitat in those game lands. A pretty large loss which is being bundled into yet another "SMALL" impact.

(p. 5-14) Section 5.1.1.2.2.6 Transmission line impacts

89 "structures" will have to be relocated, so there are undeclared new land use impacts (construction and operational) for new ROW that PEC has not included in its land use comparison with other alternatives (Chapter 9) nor in the cost of the plant.

(p. 5-15) 5.1.2 Transmission corridors and offsite areas

New switchyard for HAR 3: is this included in the land use "footprint" of the two reactors?

PEC says that expanding current ROWs would "limit" how much more land would need to be acquired, but here and elsewhere there is no acreage specified. This means that yet again land use requirements and impacts are understated, as are costs. Yet PEC goes on to say that new transmission lines would require more access roads at some points, e.g. for switching equipment, so there are undeclared roads, land use impacts and costs.

(p. 5-18) Section 5.2 Water-related impacts.

PEC states that Harris Reservoir has a watershed area of 70.3 sq. miles, and is currently 3661 acres, with a storage capacity of 90,000,000 cubic meters (73,000 acre

feet).

On page 5-19 in next section PE states that new acreage of lake would be 7616 acres and that capacity would be increased -- but PE doesn't say "by" or "to" 177,563 acre feet. But it is clearly to that capacity, as can be calculated.

PE states that 28,122 gallons per minute (gpm) is "combined normal net consumptive water usage" plus there would be a required 8,040 gpm discharge over Harris Dam to "manage water quality." Which means that the actual water need is 36,162 gallons per minute, but PEC never adds these two together. Combined this equals 52,073,260 gallons per day (gpd) or 52 million gallons per day (mgd).

(p.5-19) 5.2.1 HYDROLOGICAL ALTERATIONS AND PLANT WATER SUPPLY

An issue that needs to be addressed in the EIS is the effect on immediately local soil saturation and groundwater discharge if the lake level is raised. There could be significant impacts on adjacent landowners because of the curious hydrology of the Durham Triassic Basin, with a fractured rock geology that proved incapable of characterization during almost a decade's worth of effort and hundreds of millions spent on fruitless studies, by the NC Low-Level Radioactive Waste Management Authority. (See comments on Chapter 6, monitoring, below)

(p. 5-20) "The normal water withdrawal rate of ... 42,074 gpm ... is approximately 3.6 percent ... of the average daily flow reported at the USGS gauge at Lillington.

Once again PEC assures us that Harris Reservoir will be replenished during periods of high flow (when possibly least needed) and not during drought periods, when most needed. This is nonsense and so one of two undesirable courses of action are possible.

One is that withdrawals are limited by flow conditions in the Cape Fear, and PEC actually complies with those limits (though the state will not have someone stationed there to check), which means that water supply to the two new reactors will not be assured.

The other is that PEC will withdraw water from the Cape Fear whenever it is needed, and that those withdrawals will have significant effects on both listed and non-listed aquatic species, and on water users downstream, with more concentrated contaminants and less supply.

PEC states that "An alternative flow has been proposed to supplement the flows required from the Cape Fear River and would be to use effluent discharged from the proposed Western Wake County Regional Water Reclamation Facility (WRF). The use of WRF water has the potential for increasing nutrient loading to Harris Reservoir that is already eutrophic. It has been proposed to supplement the flows required from the Cape Fear River by using effluent discharged from the ... WRF to Harris Reservoir (impacts due to operation of the ..WRF are not included in this discussion of water-related impacts). ... This proposed WRF is beginning an {EIS}...." (p.5-20)

This has been proposed by Progress Energy, not by some outside entity, and the State of North Carolina wants the water discharged to the Cape Fear River (from which it originates) not to Harris Lake. The State of North Carolina is requiring a Holly Springs WWTP that currently discharges to Harris Lake to relocate to a point on the Cape Fear

instead. This WRF is under negotiation and mediation with the site's neighbors, Progress Energy, the state, the Corps of Engineers, etc.

Therefore PEC should be required either to demonstrate that water supply will be adequate without this source, and without significant environmental damage, or the license application should be put on hold until this issue can be resolved.

Both the siting and EIS process for this WWTP (also known as Western Wake Partnership) were conducted by consultants including one involved in the preparation of this Environmental Report and Combined Operating License (CH2M HILL). And its no wonder that Progress Energy might want the siting process to end up with a location near Harris Lake, even if the plan was to pipe around the lake, when the projected eventual discharge from the facility was more or less equal to the evaporative uses of the plant.

However, the state of North Carolina has not approved this diversion into the Lake, and may well not, as it would mean 100% of the nutrients going into the lake instead of a diluted fraction, and with evaporation, potential rapid concentration of nutrients.

In addition, the state had required that water withdrawn from the Cape Fear for distribution to various western Wake townships be returned to the Cape Fear to maintain flow. Flow cannot be maintained if that water is evaporated at an equivalent rate.

(In fact it seems questionable whether the chemical composition of treated wastewater is appropriate for nuclear plant cooling water.)

What is typical of this ER is that this "alternative proposal" appears twice, but not in all other sections of the ER where only pumping from the Cape Fear is mentioned as an additional water supply. It is also not stated when the plant is to be operational, nor what the volume of discharge would be. (Sources indicate that if it is ever built, the capacity would be 9 mgd at startup, and 19 mgd later. It was hoped by the municipal planners that it could utilize all of the discharge allocation obtained from the state, 38 mgd, though it appears that the planned facility cannot expand to that extent.

PE states that the Cape Fear's "flow varies seasonally, with an average daily flow in 2005 of ... 1,034,556 at Lillington." What about other years, and what are the low flow figures? This is not good enough. What about 2007, which was a drought year?

Drought increases evaporation water losses from rivers and lakes. (Source: Duke Energy spokesperson 6/20/08)

Global warming is predicted to increase the frequency of heavy flooding as well as droughts and greater evaporation from water bodies.

What evaporation model if any is PE using for water loss from the expanded lake area? What temperature range is this based on, and does PEC project for increasing temperatures in the future? Warmer air can carry more water so would increase evaporation.

The entire meteorological record, and low flow records, need to be provided. up to the

present, but an averaging out will not help assure water in the future.

The weather of the past is no longer a guide to weather of the future, which is scientifically predicted to produce warmer temperatures, more severe weather events more frequently, more precipitation per event, more prolonged hotter days for longer periods and so on.

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Greenhouse Gas Emissions Seen Fueling Swings
by Juliet Eilperin, The Boston Globe, June 20, 2008*

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The 162-page study, which was led by the National Oceanic and Atmospheric Administration, provides the most comprehensive assessment yet of how global warming has helped to transform the climate of the United States and Canada over the past 50 years - and how it may do so in the future.....

The authors found that the last decade has seen fewer cold snaps than any other 10-year period in the historical record dating back to 1895. Under a middle-range scenario of future greenhouse gas emissions, climate models indicate that by midcentury, extremely hot days that now occur only once every 20 years will occur every three years. Richard Moss, vice president and managing director for climate change at the World Wildlife Fund, said in an interview that the report was prepared by "an A-list of authors" and is "really frightening."

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<http://www.commondreams.org/archive/2008/06/20/9763/>

These considerations need to be built into models that would provide the NRC with some way of evaluating not only the impact of raising the level of the lake, but also the adequacy of the planned water supply.

Right now the only assured water supply is natural filling, which PEC clearly indicates is not enough, and the NRC should put the EIS process and the license review on hold until Progress Energy secures states permits for whatever additional water supply PEC thinks they would need, and the state ensures that this water would be available without harming other water users, or water quality in the Cape Fear.

(p. 5-21) PEC talks about those past droughts, with at least one recorded low cited, of 69, 569 gpm. In addition, as PE notes, Jordan Lake has to be managed to maintain a certain level of flow at Lillington, so the more water that PEC pumps out of the Cape Fear River to maintain Harris Reservoir (and/or evaporates through new cooling towers), the more water would have to be released from Jordan Lake. This would have a LARGE impact on a local recreation area which is visited by significantly more people than is Harris Lake, with commensurate localized economic impacts.

Low level conditions at Jordan Lake have an extremely severe series of impacts on

recreation at Jordan Lake.

- 1) The designated swimming areas have artificial sand beaches and roped off areas. Swimming is not permitted beyond the rope line. The area for swimming shrinks as the lake level declines, and in extreme conditions can effectively vanish.
- 2) As the lake level drops the hazards of submerged snags to boaters increases.
- 3) The aesthetics of the area are sharply reduced.
- 4) Camp sites with water access instead have access to deep mud.
- 5) In extreme conditions, boat ramps could become unusable.

PEC states that "State water use guidance values are based on withdrawals of 20 percent or more of the 7Q10. For the Cape Fear River at Buckhorn Creek, this would equate to ... 76.4 ft³/s) but does this mean for every user or all users combined?

p.5-22 "Assuming....a continuous Cape Fear makeup water flow rate of 18,088 gpm..." But PEC is trying to have it both ways yet again, saying that water supply is assured from the Cape Fear River, while saying it won't withdraw water from there during drought periods.

What is this about October 1939? Harris Lake wasn't built then.

(p. 5-23) 5.2.1.2 Lakes and Impoundments

"Normal releases of contaminants into the hydrosphere from the HAR facility will have negligible effects on surface and groundwater users" but does not specify what could be done about tritium discharges since they cannot be filtered out.

"Should an accidental release of contaminants occur, adverse impacts, if any, will be restricted to the area adjacent to the plant location." This is not accurate even in the immediate short term as it would depend on whether the lake level is low and being filled, or is discharging to Buckhorn and the Cape Fear River. Over the longer term many of these contaminants could be flushed into the Cape Fear which is a drinking water source for a large number of people.

(p. 5-24) PEC estimates that during and after land clearing etc. "6 inches of soil will settle at the bottom of Harris Reservoir." This of course would reduce the capacity of the reservoir, but doesn't seem to have been calculated.

5.2.1.3 Groundwater

PEC wants to get credit for "wetland mitigation" by "expanding the width of the stormwater drainage ditches near the discharge points" although it remains to be seen whether or not the rate stormwater discharge in the type of gully washer rains typical of NC's climate (and increasingly almost the only type of rain in any season) would be too much to maintain wetland habitat. Most stormwater channels built around here that channel stormwater into ponds are rocky chutes that would become torrents during storm events.

5.2.1.5 Conclusion

"The plant water supply will be adequate with the transfer of water from the Cape Fear River to the Main Reservoir." But in an earlier section and in one other Chapter in the ER PE suggests tapping a fourth source, the Western Wake sewage plant in New Hill.

Given the amount of space in the application given to the proposed pipeline from the Cape Fear to Harris Lake, PEC cannot hedge its bets regarding whether or not it would have access to another source, by the phrase "transfer of water from the Cape Fear River."

All this raises the question of water supply adequacy for two new reactors. A larger lake (at 240 ft) was presumed adequate for four reactors. An "Auxiliary Reservoir at 240 ft and Harris Reservoir at 220 ft was assumed adequate for two reactors in the Operating license, but has required pumping from the lower to the upper to support just one (source NC NPDES permit for Shearon Harris Nuclear Plant [unit one]).

Since the lake was first created, an additional water supply has been added to Harris Lake from a Holly Springs sewage treatment plant which the state is now requiring to relocate away from the Lake to the Cape Fear River.

But raising the lake to 240 feet is not apparently enough for just 3 reactors now, but would require pumping water from the Cape Fear, and a considerably prolonged effort to get at the discharge from the Western Wake sewage treatment plant. This would seem to indicate that natural filling is not enough, even if supplemented by a withdrawal from the Cape Fear River, which the state has not approved, but that another state which the state has not approved and may never approve is also needed.

None of this of course is mentioned in Chapter 9 when comparing the Harris site to the Brunswick site with its access to ocean water for cooling etc.

It should be noted that just when that heat sink of the lake would most be needed, during loss of offsite power, for all three reactors, PE has not provided any information about what is to power the artificial sources of water supply to the Auxiliary Reservoir which is to supply water to all 3 reactors:

- 1) the pump that pumps water from Harris Reservoir to the Auxiliary Reservoir,
- 2) the pump to pump water from the Cape Fear to the Harris Reservoir,
- 3) the pumps at the Western Wake WWTP in New Hill that might discharge directly to the Auxiliary Reservoir, or if not, into the Cape Fear River, maintaining adequate flow there.

5.2.2 WATER-USE IMPACTS

The NRC must include in the EIS an analysis of tritium buildup in Harris Lake for three reactors, particularly considering the following:

Water distributed to many local towns is purchased from Harnett County and is withdrawn downstream of Harris Lake, from the Cape Fear River at Lillington. Some of this water is currently being discharged back to Harris Lake through the Holly Springs WWTP, and Progress Energy would like to divert the discharge from the Western Wake Partnership WWTP to Harris Lake, rather than to the Cape Fear, this water originates from the Cape Fear at Lillington also.

Thus there is a significant potential for continued buildup of tritium and other

contaminants in the water of both Harris Lake and the drinking water at Lillington, not merely by a factor of three, from 2 additional reactors, but more because the water is going to be going around in an endless circle.

5.2.2.1 Freshwater Streams:

5.2.2.1.1 Water Availability

The environmental report and/or draft EIS for the relicensing of the current Harris reactor stated that current operations can lead to low water flows in Buckhorn Creek.

There is a complete inconsistency in the applicant's statements: "lower flow or no-flow periods may occur during drought periods when reservoir levels fall below the proposed normal...240ft." and "Since Buckhorn Creek is rated as supporting aquatic life, NC DENR will likely require a continuous minimum flow below the Main Dam to maintain aquatic habitat." So which is it? Once again, PEC is trying to double dip, to make the same water stay in the lake and be discharged,

The NRC should wait until all these water supply and water quality issues are resolved by the state before continuing to review the license application. Because water supply is possibly the most essential siting requirement.

In addition, this is hardly a SMALL impact on Buckhorn Creek.

5.2.2.2.2. Water Quality

The applicant states that "nutrients are of critical interest in southeastern lakes" including, in fact Harris Lake. This is why the State of NC is requiring the Holly Springs WWTP discharge to be relocated away from its current location on Harris Lake to another directly discharging to the Cape Fear River. So that currently, water supply is being reduced with no assurance of other sources increasing the supply. Raising the level of the lake may increase its capacity, but it will not increase its supply.

(p. 5-29) "An alternative lake water supply has been proposed to supplement the flows required from the Cape Fear River and be to use effluent discharged from the proposed Western Wake County Regional Water Reclamation Facility [aka Western Wake Partners] This would provide up to 12,500 gpm in 2020 and up to 20,834 gpm by 2030, if a decision is made to allow discharge of this water into the lake (Reference 5.2-008)."*

*[*Camp Dresser & McKee, Inc., Hazen and Sawyer, and CH2M HILL, "Draft Environmental Impact Statement. Western Wake Regional Wastewater Facilities, Prepared for Towns of Apex, Cary, Holly Springs and Morrisville, 2006]*

This "draft EIS" was prepared for discharge into the Cape Fear not Harris Lake.

PEC implies that it is up to the state to sort out issues related to withdrawal of water from the Cape Fear, and other water impacts (such as low flow downstream). But these are critical safety issues that the NRC must consider and resolve before continuing to review the license. In addition to normal cooling water needs, and evaporative losses, the Harris Lake system also would have to provide emergency cooling and firefighting water for three nuclear plants and an additional inventory of spent fuel from other reactors in dense storage at the site's extra fuel pools, and the ultimate "heat sink" for

3 reactors and that additional inventory of spent fuel.

PE states that "additional analyses may be required during the state permitting process...." They should be required now, and the license review put on hold until water supply and water quality issues are resolved.

(p. 5-30) 5.2.3 Additional Impact Analysis Methods

PEC points out that the assimilative capacity of the Cape Fear for wastewater nutrients would be reduced during drought conditions. This would be particularly true if the equivalent amount to what is withdrawn (and the state wants discharged back) is being evaporated instead, with the H₂O going up in steam and the contaminants and nutrients being discharged over the dam (when and if) in concentrated form.

The assimilative capacity is also going to be considerable less during drought for a relatively static lake compared to a flowing river, particularly when wastewater is a much greater percentage of the water supply for the lake. There is no assurance that the State of North Carolina is going to approve the creation of a new 7,000-8,000 acre liquid superfund site.

But more importantly PEC is suggesting that "appropriate use of water resources in the basin" is something that PEC can work out with state regulators during water quality permitting, even though this leaves the question of adequate water supply for two new reactors totally up in the air.

(p.5-31) PEC appears to have gone ahead and modeled more than the Cape Fear pipeline as a water source. They state they have modeled "hydraulic residence time...under both potential inflow alternatives compared to the existing conditions." Does this mean also the Western Wake wastewater plant discharge option?

(p. 5-33) *Table 5.2-1:* PEC lists municipal water users downstream but does not list their gpd demand which would be more relevant than their zip code. They also don't list here the low flow data at those intake points.

It should be noted that Fayetteville is guaranteed to need more water because the Base Realignment and Closure Commission is consolidating a number of bases to Fort Bragg.

(p.5-34) *Table 5.2-2:* Buried in this table is the rather astonishing fact that the pipeline PEC plans from the Cape Fear would be powered by 3 pumps of 20,000 capacity each, and that 60,000 gpm would be the "total or maximum lake makeup flow withdrawal from Cape Fear River."

That's way in excess of the operating needs of the two new reactors, and is equivalent to 86.4 million gallons a day. It doesn't matter if PEC says that this would not be continuous demand, it is just for emergencies, this is a huge withdrawal that is more than the City of Raleigh. "Raleigh water customers by comparison, consume about 49 million gallons a day. (Source: Raleigh News and Observer, Jan. 25, 2006)

(Progress Energy has not made it clear whether the "net consumptive use" (evaporation) figure given of 28,122 gallons a minute (gpm) includes cooling needs for the fuel pools, especially since they apparently plan to use dense packing of fuel.)

Table 5.2-4: I don't quite understand the point of a comparison of water chemistry data from Harris Reservoir and that in the Haw River at Moncure, since there is a PEC coal plant and a number of heavy industries that discharge into the Haw River there.

Chapter 6 Monitoring

PEC cannot adequately monitor for groundwater leaks from HAR-2 and HAR-3 (or Harris 1) because of the curious geology and hydrology of the Durham Triassic Basin, with a fractured rock geology that proved incapable of characterization during almost a decade's worth of effort and hundreds of millions spent on fruitless studies, by the NC Low-Level Radioactive Waste Management Authority.

If you cannot characterize a site it means that all the groundwater flows cannot be mapped and modeled, and therefore you cannot place monitoring wells in such a way as to detect contamination before it reaches other wells or water bodies.

Chapter 7 Accidents

There seems little point in poring over the safety analyses and SAMDAs for this project when the AP1000 design is incomplete and under significant revision.

It is of continuing frustration that the NRC is not requiring this applicant (or Westinghouse) to address aircraft attacks on the reactor or fuel pools.

And as for terrorist threats, why hijack an aircraft when you could just blow up the dam? Has catastrophic failure of the dam for any reason been considered as part of the potential accident scenario?

Chapter 8 Need for Power

Page 8-17 Screening of Generation Alternatives.

There's no standard for reserve margin, says PEC. However, the larger the MW of a single unit, the larger the margin needs to be for when it is idle. In a distributed generation model, the margin can be less, and so would be the environmental impact.

Section 8.2.2 (p. 26) Growth forecasted to be 2% a year before deducting for DSM (retail drops to 1.15 annual). For a home with peak demand of 3 KW that's equal to putting in one CFL (34.5w) or if 6 kW putting in 2 of them, per year.

PE currently serves 1.4 million customers in NC and SC and expects 1.9 million by 2026. (This represents some vague addition across all classes of customer of 36%) This magically works out to 2%. Unstated is where the water is to come from another half a million "customers"

8.2.2 Factors affecting growth and demand. PE claims "adding 25,000 to 30,000 new homes annually." But this is old data, and unlikely true now or in immediate future. Many homebuilders are going into bankruptcy or foreclosure in the area.

Further growth in the region is not assured to match past growth, as companies now continue to shrink and lay off workers.

One exception is the Fort Bragg expansion but as with all relocations, these relocated military personnel and their families (and civilian employees) will be leaving their power supply behind, purchase from which would likely be cheaper for ratepayers than two new reactors.

This the only guaranteed increase in population in PE's service area either in NC or SC. According to the Sandhills Business Times July 2008 (for example) the Base Realignment and Closure (BRAC) expansion in the Fayetteville area "will add 40,800 new residents to the region by 2013." Some of these new residents are anticipated to be living in adjacent "Tier 1" counties.

Of course two new reactors would be too slow a baseload solution for that growth. Although other, cleaner alternatives could be brought online faster, and more cheaply.

"Larger homes and more appliances and electronics mean that there is a greater reliance on electricity for homes and businesses." But local builders report that buyers want energy efficient homes and are responding to that demand.

In addition to higher gas prices, PEC's customers may soon be paying all or part of a requested 16% rate increase, so there would be a consequent price-driven drop in demand, as there has been for fuel, the more so since budgets are more squeezed, and job security is non-existent.

Curiously, PEC fails to mention one possible increase in demand in future, and that is increased use of plug-in electric cars. However, these would mostly all be charged overnight, during off-peak hours, and with Battery Management Systems (BMS) that shut off the charge at the vehicle's battery, virtually all of these vehicles would be charged up and not adding demand once the winter peak occurs.

Currently PEC's peaks occur around 5 pm in summer and around 8 am in winter.

" But a recent "well to wheels" life-cycle analysis by the Electric Power Research Institute and the Natural Resources Defense Council shows that a shift by the U.S. to plug-in vehicles would cut carbon emissions by as much as 500 million tons annually and 10 billion tons cumulatively by 2050. At the same time, other exhaust pollutants would decline.

"They found that the U.S. power grid could easily handle the load of three-quarters of Americans switching to plug-ins, which require only about 1 to 2 kilowatts -- about the energy load of a dishwasher. The cost of that electricity for transportation would end up being about a 75-cents-per-gallon energy equivalent, according to the study."

Can Plug-In Hybrids Ride to America's Rescue? ABC News, 7/19/08
<http://abcnews.go.com/print?id=5406454>

Firstly, not all vehicle owners are limited to the range of the vehicles coming on line in a couple of years, and would opt for hybrids if they can actually afford a new vehicle, which would add no demand.

Secondly, for plug-in vehicles to be adopted in such a widespread manner to increase

PE's demand significantly would require a program of financial incentives or tax credits at the state and/or federal level.

These would be unlikely to pass without also being tied to credits for the installation and/or generation of solar, wind, and other green technologies. These measures might well also address additional incentives and programs to reduce demand from other residential (and other) electricity use (appliances, insulation, smart meters etc. etc.)

Section 8.2.2.2 Energy Efficiency and Substitution

PE claims that embedded in its forecast are programs including "aggressive customer education" "home energy checks" financial incentives, rate incentives and commercial reduction strategies. Which is to say more of the relative nothing they have been doing up to now.

And yet PEC also states, "In June 2007, PEC announced a goal of displacing 2000 MW of power generation through DSM and energy efficiency programs." However, this 2000 MW has been stirred into the pudding and has vanished.

Plus, PE now says it only has to save half that because its already saving 1000 MW! What a swindle!

(But) the displacement of an additional 1000 MW through DSM measures does not eliminate the need for additional future baseload generation.(p.27) Which is funny math.

Of course the need for power that is not demonstrated in Chapter 8, is the need for baseload rather than intermittent or seasonal peaking power.

Using the find word feature "baseload" to follow the argument through this "environmental report" one finds very slim justification,

- (a) some expert testimony from NCUC IRP hearings saying new baseload might be needed,
- (b)) rising cost of natural gas which is only used by PEC for peaking power needs,
- (c) need to diversify (but with so much of PEC's generation already coming from coal and nuclear how it is diversifying, to build more nuclear plants?
- (d) other irrelevant considerations such as greenhouse gases which is meaningless if coal plants are to continue to operate (and Chapter 9 indicates they plan to build 2 more.

(p.8-28) (p.29) PE also considers gains from appliance efficiencies to be also built into the forecast but a review of past IRP filings show that there are no speculative deductions for customers upgrading to more efficient appliances or for new standards coming into effect.

(p. 35) *Section 8.3.1. Power Supply:* "An increase of 2803 [MWe} is identified under the heading of Generation Additions as "Undesignated".... In order to meet the requirements for Generation Additions, new baseload generation will be needed." But the analysis of power supply is only based on peak demand not baseload demand.

"Baseload units are the most cost-effective resources to address a very predictable and stable load." But PE hasn't identified a growth in baseload, predictable and stable or

not, only peak demand, necessarily unpredictable and unstable.

Baseload plants are in fact the LEAST cost-effective means of meeting peak demand. However, in North Carolina PEC can earn a rate of return on a very expensive new nuclear plant (or two) through an increase in rates to its captive customers, even if much of the power from that plant is being sold outside the region. Gas plants, currently used to meet peaking power may have the most expensive fuel (with costs passed through annually) but they put the least into increasing the basis of the rate of return, being the cheapest to build. Thus there is a strong financial motive for PEC to make a case for expensive nuclear baseload plants that are not really needed.

(p. 8-29) Section 8.3.2: Reliability in the Region of Interest

"Reserves projected in PEC's current "Resource Plan"... are appropriate for providing an adequate and reliable power supply with capacity margins ranging from about 11 to 21 percent through the study period (2007 to 2022). These reserve levels correspond to reserve margins of about 13 to 27 percent (Reference 8.0.002). The higher reserves occur later in the planning period with the possible addition of large baseload generating plants."

A 27% reserve margin is unheard of and totally excessive.

"Nationwide need to reduce reliance on fossil fuels, generally and imported petroleum, in particular" even though PE using little to no oil for peaking demand, and of course never in recent memory for baseload generation. As for coal PE has no plans to phase out existing coal plants as far as we can tell, and has stated an intention for only a 2-year moratorium on additional coal plants, and has identified sites for two new coal plants (see Chapter 9, alternative sites).

(p. 8-35) PEC's "resource studies show that carbon emissions (produced by coal and natural gas capacity will continue to rise through 2017. PEC notes, however, that one new nuclear plant will decrease these emissions significantly. (Reference 8.2.001)"

But a new nuclear plant would not move into carbon neutral status for 10 or 20 years, or possibly ever. And would never reduce carbon emissions per se from other sources. PE's power supply and demand figures show that the nuclear plant would be in addition to and not instead of these other generating sources.

(Page 8-35) Section 8.4.2: Cost-Benefit Summary

PEC tries to argue that the existence of NC & SC IRP review is adequate for "eliminating the need for additional NRC review." But NRC review has not included the determination of the need or advisability of a new baseload nuclear plant, or two.

PE want the NRC to believe that NCUC has concluded new baseload is needed and NUREG-1555 allows this "great weight." However, this is backwards to how NCUC works and what they found. In looking forward, NCUC simply couldn't eliminate the need for new baseload plants in future. The actual need for power, and the real costs and benefits are not looked at until a utility requests a "certificate of public need and necessity."

In the past and relatively recently demand forecasts by both Duke Power and Progress Energy have been wildly wrong and typically adjusted to demonstrate the supposed

need for new plants (or not). For instance, the real boom in the Raleigh and RTP area occurred right before and after the completion of the Harris plant, and may well have leveled off, yet during all those years Progress Energy never projected the need for a new baseload plant, and didn't do until now when new reactor designs and streamlined licensing procedures (and federal subsidies) have all fallen into place.

Regarding climate change and carbon emission concerns in NC. "The HAR serves another important need by reducing carbon emissions in the state. The HAR will displace significant amounts of carbon as soon as the plant becomes operational, as compared to a coal-fired generating plant." Once again PEC tries to perpetuate this fallacy with regulators who should know better.

PEC once again is also trying to have it both ways. First they want the NRC to believe that a new baseload plant is needed based on little to no data. Then they just have to argue that it will replace other baseload. It can be or do both.

Chapter 9: Alternatives to the Proposed Action

9.2.1.3 Purchasing power from other utilities or power generators

Can't pay more to small producers or cogenerators than would pay to purchase power elsewhere or generate itself. Too few to be viable alternative. But this ignores two things, one being NC Green Power which supplements what utilities pay to small to medium sized independent generators, at the rate of 4¢ per kWh, and the second is that under NC law, Progress Energy is required to obtain a significant amount of power, 12.5% from a combination of efficiency and renewable energy. This is not in PE's forecast cited in Chapter 8.

"Because there is not enough electricity to import from nearby states, purchasing power from other utilities or power generators is a less attractive option than the construction of new nuclear units at HAR. However a study from SERC states that there is a surplus of power in the SouthEast.

9.2.2 Alternatives that require new generating capacity

PEC says "a reasonable set of alternatives should be limited to analysis of single discrete electrical generation sources and those electricity generation technologies that are technically reasonable and commercially viable." So they say they considered, wind, geothermal, hydropower, solar power (concentrating solar systems, PV cells), wood waste (and other biomass), MSW, energy crops, petroleum liquids (oil), fuel cells, coal, natural gas.

In performing evaluation of what not reasonable/feasible to generate baseload power "PEC relied heavily on NRC's Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants." which is now something like 14 years out of date!. There is no GEIS for NEW nuclear plants.

That GEIS included consulting various state energy plans to "identify the alternative energy sources typically being considered by state authorities across the country." NRC developed a "reasonable set of energy source alternatives to be examined."

The costs and technologies in that old GEIS are totally inapplicable here, and should not

be accepted as representative of current costs and requirements.

(p.9-9) "Distributed energy generation was not seen as a competitive or viable alternative and was not further examined." It is not acceptable for this alternative to be excluded from the analysis, particularly when PEC did find a combination alternative to be viable. Distributed generation has been shown to require low to no additional transmission line costs.

9.2.2.1 Wind

PEC claims that "a turbine with a generating capacity of 1.5 MWe would require approximately 10.8 hectares (ha) (26.7 acres [ac]) of dedicated land for the actual placement of the wind turbine." The concrete base of one large wind turbine is not even one acre, and typically are not located singly.

The land around one, or between several turbines, isn't going to be concreted over, and doesn't have to be off limits to agriculture and it's common in Europe to see cows or sheep grazing nearby. The land could be used for any agricultural use or left in a relatively natural state. It is simply outrageous to claim these ridiculous land use figures as equivalent to the land use changes that would be required for the construction of a nuclear reactor and the flooding of a lake that would become contaminated.

Page 9-11 "Technical improvements in wind turbines have helped reduce capital and operating costs. In 2000, wind power was produced in a range of \$0.03 to \$0.06/kWh (depending on wind speeds), but by 2020 wind power generating costs are projected to fall to \$0.3 to \$0.4/kWh). Reference 9.2.009

There is no way that power from HAR-2 or HAR-3 could be that low. The SHNPP came into to a rate case hearing after completion with busbar cost of 25¢ per kWh.

Regarding bird fatalities, the Altamont Pass Wind Resource Area in California was sited in a windy, but particularly birdy valley, and it has a very old fashioned design and windmills very close together, like a group of fast spinning fans. New turbines just have three blades which rotate relatively slowly and the turbines are not placed close together.

PEC admits that in spite of the intermittent nature of wind power, with storage it could be "captured on a continuous basis" and dispatched as needed.

Even when generated in remote locations, new transmission line cost addition still brings wind in more cheaply than \$8,500 kW.

http://www.nytimes.com/2008/07/19/business/19wind.html?_r=1&adxnnl=1&oref=slogin&partner=rssnyt&emc=rss&adxnnlx=1216483434-n5WHKAL+nQs2nwoJnrCHaQ

Texas Approves a \$4.93 Billion Wind-Power Project
By KATE GALBRAITH, New York Times, July 19, 2008

Texas regulators have approved a \$4.93 billion wind-power transmission project, providing a major lift to the development of wind energy in the state.

The planned web of transmission lines will carry electricity from remote western parts of the state to major population centers like Dallas, Houston, Austin and San Antonio. The lines can handle 18,500 megawatts of power, enough for 3.7 million homes on a hot day when air-conditioners are running....

Texas is already the largest producer of wind power, with 5,300 installed megawatts — more than double the installed capacity of California, the next closest state. And Texas is fast expanding its capacity.

"This project will almost put Texas ahead of Germany in installed wind," said Greg Wortham, executive director of the West Texas Wind Energy Consortium.....

Lack of transmission is a severe problem in a number of states that, like Texas, want to develop their wind resources. Wind now accounts for 1 percent of the nation's electricity generation but could rise to 20 percent by 2030, according to a recent Department of Energy report, if transmission lines are built and other challenges met.

That added transmission line cost works out to a mere \$266.49 per kW.

In addition it appears that high voltage DC transmission (HVDC) if preferred, has minimal losses, 3% per 1000km/600 miles, depending on voltage level and construction details.

North Carolina has been long identified as an area of tremendous wind potential. While some of that is in the NC mountains, outside of PEC's service area, and limited by a ridge law to preserve the view, there is a huge potential at the coast, offshore and on, and commercial development of these resources is beginning.

<http://www.charlotte.com/local/story/727450.html>

Wind's just waiting to be ridden in N.C. Shoreline and sounds are 'significant,' and a three-turbine project has been proposed. By Wade Rawlins, (Raleigh) News & Observer, Jul. 25, 2008

The State Energy Office is hoping to attract wind power projects along the North Carolina coast....

North Carolina has a significant untapped source of energy, said Bob Leker, renewables program manager for the State Energy Office. But so far, there have been few commercial-scale proposals to tap.

"The U.S. Department of Energy is very interested in North Carolina," Leker said in remarks this week to the N.C. Coastal Resources Advisory Council, a group that gives input to the state's coastal policymakers. "We have a significant resource by virtue of the miles of coastline and relatively shallow sound."....

During the recent legislative session, lawmakers directed a study of the permitting of commercial-scale wind farms to ensure they're built in an orderly manner that doesn't harm the environment.

One small commercial wind project is proposed in Carteret County. Raleigh

entrepreneurs Nelson and Dianna Paul have cleared the first hurdle in seeking to build the state's largest wind power plant in the coastal community of Bettie.

The Pauls propose three wind turbines that would generate 4.5 megawatts of electricity – enough to provide power for about 900 homes when the wind blows.

In April, the state Utilities Commission approved the project on the condition that the Federal Aviation Administration and Carteret County also approve it.....

<http://www.charlotte.com/local/story/727450.html>

Section 9.2.2.4 (p.9-14 onwards)

PEC says that land requirements for 2000 MWe for solar thermal "too large to construct at the proposed plant site." and also has "substantial impacts on natural resources (such as wildlife habitat, land use and aesthetics.)" -- worse than a nuclear plant? But a solar thermal plant doesn't need access to a large cooling lake and so wouldn't necessarily have to be built at that site, although PEC has a gazillion acres there besides the current plant site, reservoir and perimeter. It turns out though that PEC has got its land requirements all wrong, see below.

PEC says NC's solar capacity is approx. "4500 to 5000 W/hr sq. meter/day" using flat plate. But says 4000 to 4500 watt hours per square meter per day using concentrated (tracker). Their source for this is reference 9.2-016, supposedly DOE but this data is clearly wrong since it shows a lower generation rate from a tracker system than from flat plate! And everyone and his uncle knows that that is backwards.

But a tracker system is photovoltaic, like a flat plate, which is a completely different technology from solar thermal (also called solar concentrating power).

PEC appears to be using data (right or wrong) for flat plate collectors to come up with land requirements for solar thermal, and this is likely not an innocent mistake.

Unlike photovoltaics, which convert light to electricity, solar thermal plants concentrate the sun's heat, using mirrors to heat a liquid to create steam to drive a turbine to create electricity. Newer technologies have eliminated the costs and delays involved in older parabolic trough designs.

Utilities are interested in this source of power because it is cheaper than so-called clean coal IGCC.

<http://sfgate.com/cgi-bin/article.cgi?f=/c/a/2007/11/05/BUBTT5KM2.DTL>

PG&E embraces solar thermal power technology

David R. Baker, San Francisco Chronicle, November 5, 2007

"As California utilities scramble to buy more renewable energy, Pacific Gas and Electric Co. and a Palo Alto startup will announce plans today to build a solar power plant big enough to light more than 132,000 homes.

"Ausra Inc. will design and build the plant, which will be located on the Carrizo Plain of eastern San Luis Obispo County and could begin operating as soon as 2010. San

Francisco's PG&E has agreed to buy the plant's power for 20 years.....

"In July, the company agreed to buy power from a solar plant planned for the Southern California desert, which will generate 553 megawatts....

"Solar thermal plants do not use the solar cells that more Californians are bolting to their rooftops.

"Instead, they use the sun's energy to heat liquids that turn turbines and generate power. Ausra's technology uses flat mirrors that focus sunlight on tubes carrying water, which then turns to steam. The plants can produce far more electricity than silicon solar cells provide and at a far lower price.....

"Ausra's plant will cover a square mile and cost between \$500 million and \$550 million. The privately held company is funded by Khosla Ventures and Kleiner, Perkins, Caufield & Byers - two of Silicon Valley's most aggressive venture capital firms in the green tech industry.....

Even at the higher estimate of \$550 million, that a capacity cost of only \$994.57 per kW. If North Carolina solar range is 4.0-4.5, and California ranges from 5.00 to 8.00 depending on which area of the state (Source: National Renewable Energy Laboratory), then you could double to cost to capacity ratio for North Carolina to \$1989.14 per kW.

And these are far more predictable costs.

In addition, the plant would be manufactured in the USA with fewer carbon emissions from imports of parts or rare metals, very low operating costs and virtually no environmental impact other than nonpolluting land use during the years of operation.

<http://www.greentechmedia.com/articles/ausra-to-build-worlds-largest-solar-thermal-factory-394.html>

Ausra to Build World's Largest Solar-Thermal Factory

The company said it plans to begin operations in April at a 700-megawatt production plant in Las Vegas.

by: Jennifer Kho Bullet Arrow December 13, 2007

"....The factory, which the company also says is the first solar-thermal manufacturing plant in the United States, is expected to begin operations in April and will be able to produce up to 700 megawatts of solar-thermal equipment annually when it's fully ramped up.....

"A flurry of announcements in the last year, including solar-thermal parks from Israel's Solel Solar Systems and Spain's Acciona Energy, and an announcement Wednesday that a consortium of southwestern states is looking to commission a 250-megawatt plant, indicate the market for a once-staid technology is growing. A report released by Emerging Energy Research on Tuesday forecast that up to \$20 billion will be invested in concentrating solar power in the next five years....

"Solar-thermal power plants use the sun's heat, instead of its light, to produce electricity. In Ausra's case, the company is using fields of mirrors to heat water into steam, which can then be converted into electricity using a standard steam turbine.....

"Instead of expensive parabolic troughs, which are curved mirrors, and pricey evacuated tubes, Ausra's design uses fixed receivers that don't move and cheaper steel-backed troughs....."

"....by replacing hand-built troughs with tractor-truck-sized modules that can be made on a production line and dropped into place with a forklift, Ausra claims its technology can cut solar-thermal costs to 10.4 cents per kilowatt-hour, from an estimated 16 to 18 cents per kilowatt-hour, right away and to 7.9 cents per kilowatt-hour -- less than the cost of coal-fired power -- in three years....."

"There are supply constraints in parabolic troughs, and the equipment comes from Europe from only a few suppliers, so with the dollar low, that hurts," he said. "Lead times to get equipment are long -- if you order today, you can't get vacuum tubes for over a year and prices have risen 40 percent in the last year. So having a new concentrated solar power technology that can get around these issues can't hurt."

What is uniquely suitable for a summer peaking utility like Progress Energy is that baseload solar thermal is a load following technology, in that while it can store power it also increases along with demand as the temperature rises.

Currently Progress Energy is missing out on gigantic reductions in its AC demand that are available: raising institutional thermostats above 72, eliminating sun gain, radiant barrier and other insulation in ceilings and roofs.

But its probable that air conditioning is one of the largest and most variable loads on Progress Energy's system in the Carolinas, as well as in the past the most predictable. It is also the largest area of potential efficiency.

(p.9-15) "While concentrating solar power technologies currently offer the lowest cost solar electricity for large scale electricity generation, these technologies are still in the demonstration phase of development and cannot be considered competitive with fossil- or nuclear-based technologies ..." *

Now don't that take the cake!!!! The AP1000 isn't even at the demonstration stage. The little model doesn't count because it was for the AP600 and the AP1000 was significantly changed from that and is now being changed again!

On the other hand concentrating solar plants are up and running.

So we are expected to take the more expensive and untried over the cheaper and proven, so PEC can earn more profit from the more expensive plant.

Might we note here that PE is currently a summer peaking utility and that that peak occurs just when the sun is shining most brightly!!!

Many of PEC's references in this and other sections of the ER are old, and/or self-referencing. For instance, in this section, regarding concentrating solar (also sometimes called "solar thermal:") one reference is an article in "Carolina Country Magazine," which is created for and distributed monthly to customers of North Carolina's rural electric cooperatives. The source for this type of content is frequently the generating utilities

themselves or their industry associations).

This is cited as source for the highly technical opinion that the NC AVERAGE of 4 to 4.5 kwh per sq. meter/day and "slightly higher in the summer" (!) "is highly dependent on the time of year, weather conditions, and obstacles that might block the sun." Such as very large UFOs presumably. What part of AVERAGE do PE's technical writers not understand, eh?

And here's another great argument. "Currently, PV solar power is not competitive with other methods of producing electricity for the open wholesale electricity market. PV solar power will not be a viable alternative because it will not meet the baseload capacity necessary for HAR." Isn't that a bit of a Freudian slip? Isn't it supposedly the other way round?

What's this about including wiring lights and appliances in the cost of PV solar, not to mention, "design costs, land, batteries" and so on. Isn't PEC trying to bump up the cost instead of citing some actual examples of operating plants and their costs?

(p.9-16) Regarding the land use requirements for solar PV compared to solar, PE states that with solar "this land use is preemptive; land used for solar facilities would not be available for other uses such as agriculture." (Well it can't be for nuclear either, and PEC has vastly understated the land use requirements for two new reactors, of which the 4055 acres to be flooded is one example. It would be a heck of a lot easier to farm the land once occupied by solar panels than it would be to later farm the land once occupied by a nuclear plant and its befouled cooling lake. Solar is dismissed as not meeting baseload requirements although PE has not provided any data on their baseload baseline demand.

(p.9-17 Section 9.2.2.5) Regarding wood waste and other biomass, PE complains that "the largest wood waste power plants are 40-50 MWe in size which would not meet the proposed 2000 MWe baseload capacity. (As stated before, PE hasn't demonstrated the need for 2000 MWe baseload, or even peaking capacity) but their service area could be adequately served by 40 or 50 plants distributed throughout the service area closest to fuel sources, or preferably fewer in combination with other renewable resources.

They would be especially suitable in a distributed combination model.

The impact of wood waste plants is not the same as for a coal fired plant, because if coal remains in the ground the carbon is not released, but for wood waste the carbon would be released, unless it is buried as biochar in which case part of the carbon is released and part is sequestered as plant food for crops or preferably forest.

PE cites an RTI study for the NC Division of Forest Resources that NC's wood energy production is 1017 MWe.

PE says that "due to the small scale of biomass generating plants, high cost, and lack of an obvious environmental advantage [!!!!], biomass energy is not a reasonable alternative for baseload power. But this is ignoring the fact that PEC already has built coal plants, so the construction costs (adaptation if any) would be tiny.

Unlike coal ash, wood ash is not hazardous and is a potential compost feedstock or soil amendment, so that the waste would be either on the credit rather than debit site, or neutral.

9.2.2.7 Energy Crops

Alternatives including burning crops, gasifying (including wood waste) and converting to ethanol. "None of these technologies has progressed to the point of being competitive on a large scale or of being reliable enough to replace a baseload capacity of 2000 MWe."

However, Progress Energy Florida has signed a long-term agreement to buy power from a biomass plant burning switchgrass.

<http://www.orlandosentinel.com/orl-cleanpower0706may07,0,3188296,print.story?coll=orl-home-headlines>

November 17 2007, it was reported that Duke Energy "planned to invest in biomass power plants" using "animal waste and other organic material."

North Carolina -- with multiple paper mills, scads of poultry farms and more hogs than people -- is well-suited to be a center for the nascent biomass power-generation industry, said David Mohler, Duke's chief technology officer.

It could mean more jobs and extra investment as the plants come online over the next decade-and-a-half. It also would help N.C. hog and chicken farmers dispose of environmentally hazardous animal waste by putting it to good use, supporters of biomass energy say.

A March 27 story in the Charlotte Observer described an effort to build a series of biomass plants by Rollcast Energy Inc., and hoping to have 10 operating in NC by 2015, saying the state has the potential for 20.

New Bern NC currently has a 45 MW biomass plant.

It appears that a biomass plant can go from groundbreaking to the grid in two years. The cost of construction is somewhat higher than for a coal plant, but the cost of fuel is lower [and could be more stable over time].

The estimated price for Duke Energy Corp. to build its 800-megawatt coal-fired power unit at its Cliffside facility west of Charlotte is \$1.8 billion, not including financing charges. That's \$2.25 million per megawatt. For Rollcast Energy's \$170 million biomass power plant project in Georgia, the price per megawatt is \$3.4 million. But biomass fuel to run the plant is cheaper than coal, said Penn Cox, Rollcast president and CEO. And he expects that fuel cost advantage to increase as coal prices keep rising.

Rollcast tapping into power among trees: Energy company plans plants that burn vegetation instead of using fossil fuels, Charlotte Observer 3/27/08
<http://www.charlotte.com/business/story/554569.html>

The most advantageous biomass plants would be those generating energy from a renewable fuel that would otherwise decay and release emissions, such as wood waste like brush.

9.2.2.10 Coal

PE claims that US has "abundant low cost coal reserves" and that "the price of coal...is likely to increase at a relatively slow rate. Even with recent environmental legislation, new coal capacity is expected to be an affordable technology for reliable, near term development and for potential use as a replacement technology for nuclear power plants."

Cost usually averages about \$0.023/kWh. (This appears to be just fuel cost.)

9.2.2.11 Natural gas

"There are currently 14 natural gas-fired plants being considered for North Carolina. Together they would be able to generate over 9000 MWe..."

Faster to construct and smaller land requirements, only 110 acres for 1000 MWe plant. "Co-locating ... with an existing nuclear plant would help reduce land-related impacts." It should be noted that there is a major gas pipeline near the Harris site.

9.2.3 Assessment of reasonable alternative energy sources and systems

What's interesting about this table is that nothing is rated as NONE rather than SMALL. We find that the impact of "accidents" is considered equivalent for all 4 alternatives, which is patently not the case. The impact of an accident at a nuclear reactor could be beyond LARGE, whereas that from some of the other alternatives would be minor to nothing at all, or accidents not likely during operation.

The "human health" impact of HAR is "small", for coal "moderate" for gas "small" for alternatives combination "Small to moderate" !!!!! That is just plain incorrect.

p.9-24 9.2.3.1 Coal fired power generation

It appears that PE is saying that a new coal plant would create a lot of construction jobs.

But a coal plant would "emit particulates and chemicals" and "public health risks such as cancer and emphysema are considered likely results." SO₂ and NO_x "have been identified with acid rain" and water withdrawals would cause "losses to aquatic biota ... through impingement and entrainment, and discharge of cooling water to natural bodies." Equally true for a nuclear plant. Then how is this effect called SMALL rather MODERATE or even LARGE.

9.2.3.1.1 Air quality (coal)

In comparing coal with nuclear, PE cites "water quality impacts from runoff and other potential adverse consequences of coal mining." How does it rate uranium mining?

9.2.3.1.2 Waste Management

By PE's reckoning, the waste impacts of a nuclear plant or two are only SMALL, yet a coal plant would be MODERATE and a alternatives combo would be SMALL to Moderate. This is WRONG. The waste impacts of a nuclear plant are HUGE and the waste impacts of the wind-solar-gas option are virtually nonexistent. (see 9.2.3.2.2. below)

If PEC isn't going to take its homework seriously I don't see why valuable NRC staff

time should be taken up reviewing this application.

9.2.3.2 Natural Gas

"The environmental impacts of operating natural gas-fired plants are general less than those of other fossil fuel technologies" sort of an understatement. T(he use of that gas by customers to replace electrical heat generation would be even more advantageous.)

9.2.3.2.1 AQ

PE admits gas is cleaner and more efficient (56 vs 33 percent) but claims it would release "similar types of emissions but in lesser quantities." What about mercury? PE does say no SO2 emitted.

9.2.3.2.2. Waste Management

"Gas fired power generation would result in almost no waste generation producing minor (if any) impacts; therefore, impacts associated with waste management would be SMALL."

No, they would be NONE. (Even under these definitions) And the waste management impacts of a nuclear plant are not small, they are large, under these criteria or any other.

9.2.3.2.3 Land use

A new gas plant would "disturb" approx. 60 acres of land "and associated terrestrial habitat" with another 10 acres for pipeline.

Both text and table 9.2-2 fail to identify that the "SMALL" (possibly) "MODERATE" socioeconomic impact of the gas fired alternative is Beneficial not Adverse. All other impacts on the table not identified are adverse impacts

Yet in *Section 9.2.3.2.4* PE states that "The natural gas generation at the HNP site would require less land area than the coal fired plant but more land area than the nuclear plant"!!!! Says plant would require 110 acres not 60-70 acres and "an additional 3600 acres for wells, collection stations and pipelines to bring the natural gas to the generating facility. Therefore, constructing a natural gas generation plant would not be an environmentally preferable alternative for the HNP site."

PE is including in the land use for a gas plant the gas field from which the gas comes from and the entire system of getting the gas to the plant. But there's already a pipeline right there, and PEC doesn't count the many acres of uranium mine, mine slag heaps, processing facilities, fuel fabrication, and so on and so forth, as part of the footprint of the new reactors, in fact they forget to mention flooding 4055 more acres.

Section 9.2.3.3 Combination of alternatives

Section 9.2.3.3.1

Wind and solar, combined with fossil fuel-fired power plant(s) could generate baseload power to be considered a reasonable alternative to nuclear energy produced by the HAR. however... environmental impacts, such as land requirements and aesthetics and lack of guaranteed reliability of wind and solar, make this not a viable combination of alternatives." Well is it a reasonable alternative or isn't it?

The land requirements for wind and solar are bogus, and natural gas could provide

back up, so eliminating this as a hybrid alternative is simply outrageous. It's environmentally preferable, and the lower costs of wind and solar could offset high gas prices.

"The ability to generate baseload power in a consistent, predictable manner meets the business objective of the HAR." The business objectives of PEC is not a concern of the EIS.

(p. 9-30) PEC admits that gas-fired generation is suitable as back up for wind /solar (quick start up and shutdown) "The operating characteristics of gas-fired power generation are more amenable to the type of load changes that could result from including renewable generation such that the baseload generation output of 2000 MWe is maintained."

But PEC says that "use of renewable [sic] in conjunction with fossil only marginally reduces fossil-fuel use and environmental impacts by the renewable's capacity factor." Incorrect. The use of renewable sources in conjunction with gas reduces gas use and its environmental impacts by the renewable capacity factor. PEC is trying to imply quite falsely by the use of "only marginally" that the contribution of proposed viable, large solar and wind capacity would be really tiny, ever.

Once again the artificial structure of the EIS and the way that PE reduces all waste issues into a little package called small, means that they can try to portray the hybrid combo of gas/wind/solar as less environmentally friendly, even though these 3 sources produce NO WASTE during operation.

However, waste disposal of both HLW, LLRW BRC waste, LLRW incineration, have impacts on water quality resources and not just at the Harris site but elsewhere, as does uranium mining, and LLRW incineration has significant AQ impacts.

LLRW and HLW waste treatment, incineration and disposal also have large socioeconomic impacts outside of the immediate Harris plant area. The disposal of LLRW removes land from other uses permanently, and in addition buffer zones are required, sometimes expanding to "contain" underground plumes of contamination (as at Barnwell). Groundwater aquifers are permanently removed from human drinking water resources and contamination can affect creeks.

p.9-31 PEC claims that the wind-solar-gas combination would cost more (so more profit for them, ha ha) but of course the comparison is to a bogus cost for new reactors, based on some old studies, not real costs such as those they had to file in Florida, which showed a \$7 to \$7.5 billion cost per reactor.

PEC does not cite any solar costs/requirements from current projects coming on line in the present, rather than the past. For instance, this solar project which is just a few miles from the Shearon Harris Nuclear Plant, not in the southwest USA:

*SAS Greenlights 1-Megawatt Solar Power Farm
June 24, 2008 Business Wire*

CARY, N.C.--(BUSINESS WIRE)--SAS, the leader in business intelligence and analytics software, working with Progress Energy Carolinas (NYSE: PGN) and SunPower Corp.

(Nasdaq: SPWR), will develop a solar electric power farm on the company's Cary, NC, headquarters campus. Scheduled to go online in late 2008, the project is the latest in the company's continuing sustainability efforts to conserve environmental resources.....

Covering five acres, the 1-megawatt photovoltaic (PV) solar array will feature SunPower® Tracker solar tracking systems. The Tracker tilts toward the sun as it moves across the sky, increasing energy capture by up to 25 percent over fixed systems while reducing land-use requirements. SAS' solar farm is estimated to generate 1.7 million kilowatt-hours (kWh) per year, reducing carbon dioxide emissions by over 1,600 tons annually. This is equivalent to the carbon dioxide emissions from the consumption of more than 167,000 gallons of gasoline....."

http://www.businesswire.com/portal/site/google/?ndmViewId=news_view&newsId=20080624006252&newsLang=en

Thus a 1000 MGW solar farm would require no more than 5,000 acres, which is considerably less than the land needed for two new Harris reactors (expansion of exclusion zone, expansion of Harris lake, and so on as noted elsewhere).

In addition, under a distributed model, no useful land need be sacrificed to add solar capacity in the form of either fixed or tracking panels, because PEC's service area contains more than enough rooftop area. Every rooftop where solar radiation is being intercepted for power generation would also have a commensurate drop in AC demand.

1000 MGW of solar thermal would require less than 5 acres per MGW.

Another very small solar project that is in NC and which uses rooftop is a Benson, NC sheet-metal fabrication company which has installed a 170 kW solar PV system, which produces 150-750 kWh a day. Capacity cost was \$4470.59, operational cost and land use cost, zero. (Source: Fayetteville Observer, July 21, 2008 *'Clean, simple and safe' energy grows in popularity* <http://www.fayobserver.com/article?id=299834>)

Local businesses are not investing in concentrated solar power/solar thermal, which is a baseload source because these power plants are larger megawattage and produce more power than these customers need.

Solar projects that not retrofitting but are designed in at the start of a building project can deliver PV energy at 5 cents/kWh (Source: Innovative Design)

It should also be noted that a combination alternative that is distributed might have few to no extra transmission costs. A Minnesota Department of Commerce study released 6/16/08 shows that distributed wind turbine power can be added to the existing grid with no additional high voltage power lines. Which is another favorable cost factor for the mixed alternative (solar, wind, gas).

News release: <http://www.commondreams.org/news2008/0617-03.htm>

Study: MN Dept. of Commerce at www.commerce.state.mn.us

"The Minnesota Department of Commerce released the findings of the first of two major powerline studies ordered by the Minnesota Legislature. The study's conclusions affirm

those of a previous utility study that found that significant amounts of wind energy can be injected into the existing transmission system at costs far lower than building new transmission lines to more distant wind farms....

The study found that 600 MW of dispersed, community-based wind projects could be integrated across Minnesota into the existing grid system with no additional costs for transmission," notes John Bailey of the Institute for Local Self-Reliance, a long time proponent of decentralized power generation. For comparison, the proposed 600 MW Big Stone II coal fired power plant would need to spend about \$250 million for new transmission infrastructure, just in Minnesota.... This new study complements a similar 2005 study in west central MN that indicated as much as 1,400 MW of dispersed wind energy could be injected into the existing grid just in the west central region with minimal upgrades. "This dispersed generation siting strategy has the potential to allow numerous new renewable generation projects to interconnect to the grid and not be constrained by transmission bottlenecks...."

Of course North Carolina does not have the same wind potential as Minnesota perhaps, but this reduced cost for distributed versus concentrated generation is a significant argument for more, smaller distributed generation, in addition to less margin required, and for some options considered here, a less concentrated public health risk.

Section 9.2.3.3.2 PEC cites a parabolic trough solar plant in the Mojave Desert (SEGS) which now has reduced costs to \$0.08 to \$0.10 per kwh. Uses gas as backup.

(p. 32) PEC claims that, given a gas and solar/wind combination, "if the renewable portion of the combination alternative has a potential output that is equal to that of the HAR, then the impacts associated with the gas fired portion of the combination alternative would be somewhat lower in terms of operation but the impacts associated with the renewable portion would be greater." But not if there are no operational impacts, only impacts from construction. Because many times zero is till zero.

About the only negative impact that PEC can come up with (apart from that mythical waste stream) is that for some reason they are supposed to be uglier than a nuclear plant, even when next to a nuclear plant. Besides the fact that that is not supported by any survey data, even if it were true, it wouldn't be affected by capacity factor etc.

With equally loopy logic, PE says that "Use of a gas-fired power generation facility combined with wind and solar facilities would reduce the land use and aesthetic impacts from the wind and solar power generation facilities."

It's really unclear what they are talking about. If they are talking about putting all these alternatives at the Harris site then one would have to say that the aesthetics of 3 reactors are worse than one, (Moderate-adverse) of a coal and nuclear combo, worse (Moderate-adverse), of adding a gas plant, probably an impact of NONE, and of a solar/wind/gas combo at the Harris site, quite possibly a Small to Moderate impact that is BENEFICIAL, because it would then be a local attraction, Progress Energy's Energy Park.

(In the UK there is at least one wind farm with an associated energy exhibition that is advertised as a family day out.)

For instance the hybrid alternative is supposed to have a greater impact on air quality,

produce more waste, remove even more land from use, be uglier, and have a worse effect on human health!!!! Opposite of the case.

This last outrage is added to Table 9.2-2 even though there is NO analysis or even discussion of the human health impacts of wind and solar, because THERE ARE NONE! Of course if they were to displace coal generation there would be a LARGE Beneficial impact on human health, but PE plans to add 2000 MWe (of nuclear) on top of polluting coal and nuclear plants.

How can water quality impacts from TWO more reactors at the Harris site be considered small, (and equal to that of a gas plant or gas/wind/solar combination) when this would triple the tritium discharge into the Cape Fear which is a drinking water source for multiple counties and towns--when tritium cannot be filtered out of water and has potential damaging effects on human and livestock health.

In addition, see my comments on Chapter 5: evaporative losses from the Lake could affect water quality there and for Cape Fear River downstream water users.

The case has definitely not been made that this combination alternative "is not environmentally preferable" to two new reactors. I would rather think that the case has been made to proceed with that instead, once the analysis is refigured to reflect reality.

Table 9-3-1 (pages 9-82-83) PEC is overstating adequate water supply for the Harris site (see comments on Chapter 5) and doesn't list anything wrong with the Brunswick site, which has access to ocean water. This site would appear preferable as an existing nuclear site with access to more reliable water, and without all the complicated relocation issues involved with raising Harris Lake.

Section 9.3 (page 9-42 onward)

The applicant is required to demonstrate no "obviously superior" site(s). However, with the serious questions about adequate water supply at the Harris site and ocean supply available to the Brunswick site, PEC has not demonstrated the superiority of the Harris site.

In addition the selected site must meet certain stated criteria:

- 1) Site must not cause significant adverse effects on other users
- 2) no further endangerment of listed threatened, endangered or candidate species (federal, state, regional, local and affected Native American tribal)
- 3) no potential significant impacts to spawning grounds or nursery areas of important aquatic species on etc. list
- 4) discharges of effluents into waterways should meet all regs and would not adversely effort efforts to meet WQ objectives
- 5) There would be no preemption of or adverse effects on land specially designated for environmental, recreational or other special purposes. [Harris Lake Park, Jordan Lake]
- 6) No potential significant impact on terrestrial and aquatic ecosystems, including wetland, which are unique to the resource area
- 7) population density and numbers conform to 10.CFR.100
- 8) There are no other significant issues that affect costs by more than 5% or that preclude the use of the site.

(pages 9-44 - 9-45) PEC states the "applicant's preference" for additional unrelated

siting criteria: suitable for proposed design, compatible with current transmission system, and "the selected site's expected licensing and regulatory potential must minimize the schedule and financial risk for establishing new baseload generation," none of which are special to the Harris site.

(p. 9-47) According to PEC, "bounding conditions" for site selection included: "The new nuclear baseload generation must reach commercial in-service status by mid 2015" but the HAR-2 and HAR-3 were never projected to make that target, but described as coming on line in 2018 or later and 2019 or later) "Site's expected licensing path and regulatory outlook must reduce PEC's schedule and financial risk for establishing new nuclear baseload generation" Which would be more an argument for the Brunswick site than Harris, where water supply issues are still unresolved.

PEC's siting analysis considered everything in terms of what was most favorable to them and totally ignored what might be better for the environment and/or public health. So that the advantages of the Harris site for business and economic reasons is supposed to totally outweigh the tripling of tritium and other radioisotope discharges to water, tripling of air emissions, and tripling the accident threat to a large concentrated urban area downwind.

(p. 9-53 Harris is a "solid rock site" compared to other sites. However, the Harris site is actually one of fractured and compressed bedrock. The underlying geology of all three plant sites and Harris Lake, is one which has been demonstrated to be incapable of being characterized for groundwater modeling, and therefore monitoring. This is a significant issue given the new issue of tritium leakage into groundwater at nuclear power plant sites, or from the lake, issues which were not anticipated when the Harris site went through it's initial NEPA review.

(p.9-53) PEC says that "The HAR site has minimal transmission impact costs for the installation of an 1100 megawatt (MW) nuclear unit." But what about two? Elsewhere in the ER PEC states that an additional switchyard would need to be built for HAR-3 and both reactors would require seven or eight new transmission lines, and even if they parallel existing lines, additional ROWs would need to be purchased.

(p.9-54) The Harris site "had a higher population" than the other sites, yet it has no fundamental advantage, and some major disadvantages, like water supply.

Section 9.3.2

PEC states that "it can be expected that the effects of a new unit should be comparable to those of the operating nuclear plant." But what if the new plant is a radically different design, with no long term data on it's "effects"? In addition, three reactors at one site mean triple the radioactive air emissions (or greater, given the design of the AP1000)/

"Co-located sties can share existing infrastructure" so less construction impact. However, elsewhere in the ER it is clear that this particular site involves many additional large construction impacts that might not be involved at a different site, because of the many impacts of the enlargement of the lake system.

It seems somewhat incredible that PE would consider it valid to submit for an EIS an alternative greenfield site that is marshy with numerous wetlands and below the 100

year flood plain level. The applicant is supposed to compare the preferred site to one or several viable alternative sites, not "ringer" sites.

(page 9-59) PE says "environmental justice" not an issue at the Marion SC site (therefore presumably not at any site because "no significant impacts on any human populations are expected to occur." Proximity to any large industrial facility is a negative sociological impact.

The socioeconomic impacts on the Moncure area since the Harris plant was completed have been severe. The town continues to have no commerce to speak of, no laundromat, no sewer and lower house prices than elsewhere in the county, all this in spite of access to US 1 and a fast commute to Cary.

The reason is that the local government considers this an industrial sacrifice area. On the other hand, areas a similar distance to the east of the plant have housing marketed to people from outside the area who don't know the nuclear plant is there,.

9.3.2.2 Existing nuclear facilities

9.3.2.2.1 Existing HAR site

(p.9-60) "No surface faulting or deformation has been identified at the site. No areas of volcanic activity, subsidence..." This is not accurate. The entire Triassic Basin is full of faults and volcanic dikes, which is what makes it's groundwater impossible to predict.

9.3.2.2.1.1. Land Use

Impact on land use is not properly evaluated. It is not only the footprint of 2 new nuclear plants on "land that is currently owned by PEC" and so on, but the flooding of an additional 4,055 acres of land surrounding the current "main" (lower) reservoir. In addition there are numerous other land use impacts: new transmission lines, expanded access roads, relocated transmission towers, relocated roads, relocated recreational facilities, etc. etc.

9.3.2.2.1.2 Air quality

Effect of drift from cooling towers on local crops or plant nurseries "can be minimized with the use of drift eliminators on the cooling towers." Are these installed on the existing cooling tower and are they part of the design plans submitted by PEC or to be required by the NRC?

9.3.2.2.1.3

"The water metric evaluated for this site is the ability of a primary water source to provide adequate cooling water for a two-unit plant with cooling towers without significant permitting issues or operational restrictions." However,

- a) The water resource has to support THREE reactors
- b) The water supply is not only adequate within thermal limits

PEC claims that "at full development, [with four reactors] the reservoir was to be recharged by pumping from the Cape Fear River in addition to the natural recharge from the watershed." This seems most unlikely to be true, or that the NRC would have permitted a site that it knew to have an inadequate water supply and to require pumping from an adjacent river. It seems far more likely that the water supply to the lake was initially overstated, and that drought conditions have proved it to be

particularly unreliable.

This in effect seems to be PEC saying that the NRC already ruled on the concept of a pumped water source when it initially approved the Harris site permit.

It might be noted that when the two new reactors were first announced, there was some acknowledgment that at the Harris site the level of the lake might need to be raised, but not a word about filling it from the Cape Fear on a continuous basis. If this had been part of some originally approved plan, why not mention that too?

(p. 9-61) "Analysis of a 100 year drought in both Buckhorn Creek and Cape Fear River, in connection with a hypothetical 4-unit operation at 100-percent load factor, resulted in the lowest reservoir level of 62.7 M (205.7 ft) ... at which point the plant would shut down." So much for reliable baseload power, especially during a heat wave.

p. 9-61 -9-62 "During licensing ... the NRC concluded that the water supply was adequate for a two unit plant operation, including the Cape Fear River makeup system, and is also adequate in the event of a severe drought for both a one- and two-unit operation." Reference 9.3.001

Well what about a three-unit operation? It would appear that PEC is saying that the NRC ruled in the past that the "water supply" (inflow plus lake capacity) plus a pipeline from the Cape Fear, can't serve a third reactor.

(pp. 9-62 - 9.63) "The normal rate of 2.34 m³/s (84 ft³/s) or 37,248 gpm, for operation and water quality control, is approximately 3.6 percent (2.35/m³/s / 65 m³s = 3.6 percent) of the average daily flow reported at the USGS gauge at Lillington (USGS02102500). The rate at which water is withdrawn would be based on a set of operational rules designed to meet the target flows at Lillington as defined by the 1992 Water Control Manual for B. Everett Jordan Lake."

But surely the times when water is needed from the Cape Fear and the most water needed are going to be times of drought, when the flow is below average to both the Cape Fear River and the Harris Lake System. At those times, the percentage being withdrawn would be far higher than 3.6 percent. Drought would also mean more water being withdrawn elsewhere from every source upstream, and less of that water being returned as wastewater.

There are additional demands on Jordan Lake all the time, with much of the water going to irrigation or evaporation, and not being returned, and there is new drinking water reservoir for the Town of Siler City, being constructed on the Rocky River up stream, which will increase withdrawals that will not all be returned (especially during drought). The level of flow in the Cape Fear both at Lillington and the intake point needs to be calculated for drought conditions on the basis of current, and projected future, not old, data.

9.3.2.2.1.4 Terrestrial Ecology [Endangered Species]

PEC states that the forested land to be cleared for lake expansion is home to endangered red cockaded woodpeckers. It is not that easy for them to simply relocate as PEC states. These woodpeckers are shy, avoid human activity and human noise, and would inhabit older growth areas where there are decaying trees for food and nesting.

Destruction of known habitat of these birds appears to violate the site selection criteria that PEC lists.

9.3.2.2.1.5 Aquatic Ecology

Wetland areas created or modified during construction. These would be inundated, but new wetland areas would be created.

What about thermal impacts on any endangered amphibian species in wetlands? Triple the reactors means triple the heat discharged to the lake, and heating is most pronounced in shallow water, especially during the summer.

No aquatic species "in the HAR site that are included on federal or state lists of endangered or threatened species" but what about the effects of pumping water out of Cape Fear?" PEC details listed species and spawning grounds near the propose intake for the pipeline, and states they won't pump during spawning season. Would they actually shut the plant down if needed? It seems most unlikely and there is not going to be anyone posted to check when they are pumping. In many sections of this ER PEC states that pumping would be "continuous."

9.3.2.2.1.9 Environmental Justice

Table 9.3-5 Demographics for "several counties surrounding the HAR site." "Since no significant impacts to any human populations are expected to occur at the HAR site, there would not be significant disproportionate impacts on minority or low income populations..."

This is not correct. There would be significant health effects on customers of Harnett County water, both in Harnett County and other counties and municipalities that purchase water withdrawn from the Lillington intake on the Cape Fear.

Because tritium cannot be filtered out of water, the only way to avoid drinking tritiated water piped to one's home is to purchase bottled water, or to install whole house filtration systems. Thus lower income residents would likely receive higher exposures.

It is also seems hardly legitimate or even logical for PEC to argue that because there is an existing reactor "environmental justice impacts would be SMALL." That's like saying they have already done or are doing all the harm that can be done, and that the immediate area is already so negatively impacted that two more reactors won't hurt.

However, when it comes to the effect of radioactive pollution on the developing fetus three operating reactors are definitely worse than one.

9.3.2.2.1.10 Transmission Corridors

PEC estimates that upgrading for two new "1100-MWe" reactors would only cost \$ 1 million for the addition of each, but would require three new transmission lines. It seems a little curious that it is estimating \$2-3 billion for transmission line costs for the Levy County Florida site, but only \$1 million at Harris. In fact some current transmission towers and lines have to be relocated because otherwise they'd be flooded.

"The corridor areas are mostly remote and pass through land that is primarily agricultural and forest land with low population densities. It is anticipated that farmlands

that have corridors passing through them will generally continue to be used as farmland."

This is deceptive, the expanded ROWs won't be able to be used as farmland. Progress Energy specifically prohibits people from planting within the ROW and sprays herbicides along the ROW, and this could affect nearby cropland, pastureland and ponds and/or groundwater rendering a much wider area useless for agriculture.

(p. 9-75) 9.3.2.3 Evaluation of Population Density for Alternative Sites

"The NRC Standard Review Plan, NUREG-0800, Section 2.1.III.5, notes that if the population density of the proposed site exceeds, but is not well in excess of 500 people per square mile (PPSM) over a radial distance out to 32 km (20 mi) then the analysis of alternative sites should evaluate alternative sites having lower population density. The underlying regulation for this guidance is 10 CFR 100.21(h), which states:

Reactor sites should be located away from very densely populated centers. Areas of low population density are, generally preferred. However, in determining the acceptability of a particular site located away from a very densely populated center but not in an area of low density, consideration will be given to safety, environmental, economic, or other factors, which may result in the site being found acceptable."

Given that PEC has not provided the NRC with alternative viable sites for comparison, it is also the case that the Harris site, with its dense population, does not offer significant safety or environmental benefits, and it appears that none of its nuclear sites are in fact really suitable for additional reactors. (One has lots of water but is awfully close to sea level, one has water supply issues, and one has water supply problems and too few people.)

Since PEC apparently is not interested in expanding at the Brunswick site at this time, they don't bother to describe whether or not there is land at a greater elevation than 20 ft above sea level anywhere in the vicinity. It is good enough in Levy County Florida for a site to be near water, provided a channel is dug.

PE claims that 2000 density for 0-32 km/0-20 mi radius is 383 ppsm. But "Projections estimate a population density of 511 ppsm in 2010 and 574 in 2015 (before the new plants come on line) and they don't bother citing population density for the many decades of operation.

PE cites as compensatory factors, proximity to load (which is actually a function of dense population), "adequate water supply" (which we find is not the case) and factors that should apply to all viable sites, available land and minimal environmental impact. But then PEC claims "safety considerations" which turns out to be the AP1000 design, not particular to this site or any other.

Chapter 7 & tables 7.2-6 and 7.1-2 are referenced to try to claim that "site specific offsite exposures during the spectrum of design basis accidents is significantly below the NRC's guideline limits." and that "the significant margin provided diminishes the relevance of the 500 ppsm guidance." But safety margin doesn't mean no risk.

There seems some math deficiency in trying to argue that a postulated exposure x to more people is not relevant. Particularly if there being more of those people means it is harder for them to evacuate so that their hypothetical exposure turns into a great deal

more in real life.

Once again the land use no-change argument is raised when in fact 4,055 acres would be flooded and much privately owned land forcibly taken for new transmission lines.

"Estimated costs of transmission upgrades for the HAR site were evaluated as negligible." Or one million, whichever is less.

Also the HAR site has "other applicable considerations related to PEC's business plans." This presumably is connection to high voltage transmission line connections to Richmond, VA and points north, and other factors that are not positives for the environment, the neighbors, or the ratepayers.

9.3.3 Summary

PEC says that "operation of a new unit at the site should have essentially the same environmental impacts" -- omits to say, times three, and with no operational history for the AP1000, no assurance that it wouldn't be more than triple for some effects, such as radioactive emissions to air and water, more heat dissipated to air, greater thermal discharges....

(p. 9-98) Section 9.4 Alternative Plant and Transmission Systems

PE calls the AP1000 a "certified nuclear plant design" but of course this is no longer really true, since it is going through significant revisions.

9.4.1. The condenser creates the low pressure required to draw steam through and increase the efficiency of the turbines. The lower the pressure of the exhaust steam leaving the low pressure turbine, the more efficiency is gained. The limiting factor is the temperature of the cooling water."

This explains the lower-efficiency-in-hot-weather phenom at power plants, and also demonstrates that two new reactors at the Harris site will not assure reliable 2000 MWe baseload power during heat wave/drought conditions when that power might most be needed.

(p: 9-109) To provide a basis of "single hot year" and average weather year PE used weather data from 1961 to 1990 and did not include the decade 1990-2000 (let alone 2000-2007). This is totally unacceptable.

9.4.2.1 Intake and discharge systems (alternatives)

Thermal discharges in NC are subject to limits under 15A NCAC 02B.0211 (3) (j) which limits thermal discharges to 2.8C (5.04 F) above natural water temp. However, if a shallow lake heats up, and water merely 5 degrees F hotter is added, this could still have a significant further effect on aquatic species, and does not prevent the lake from getting too hot to cool the reactor, and spent fuel.

"Short term changes in land use... will be associated primarily with impacts resulting from the increase in the water level of Harris Reservoir... would be minor and would include recreational areas, roads, HAR facilities, municipal facilities, and ecological issues."

These are not short-term changes. Flooding land is a long term impact, as are the construction of roads, buildings, and so on, and so is the destruction of habitat.

(p.9-116) "The increase in the water level of the reservoir will be relatively slow." Cape Fear will have to be dredged. Dredging would have a severe impact on the listed aquatic species and their spawning grounds, especially those species that are not speedily mobile, such as mussels.

There are inconsistencies in the ER as to whether PEC will be seeking a new NPDES permit (as stated here) or a revision of its existing permit, as stated elsewhere in the ER.

9.4.2.2. *Water Supply (Makeup Water System)*

PEC states that the Cape Fear River discharge to reservoir would be "well upstream" of the existing (and probable new) cooling tower blowdown pipe discharge." This is not what appears in Appendix 2 Figure 4-01, where it appears that the pipeline would discharge significantly downstream of the cooling tower discharges for the current reactor and two proposed reactors. The pipeline discharge point on the figure is also into the (currently lower level) larger reservoir, with the cooling towers appearing to discharge into the smaller (currently higher level) primary lake ("Auxiliary Reservoir").

Flooding would affect "county roads, NC game lands, transmission lines, boat ramps, emergency siren towers, Harris Lake County Park, the Wake County sheriff's firing range and several PEC facilities." Boat ramp and parking to be relocated. "PEC is committed to relocating the Harris County Park services affected by the increased level of the reservoir." (So overall acreage would decrease. No mention of compensatory added land.)

Affected roads could require the purchase of additional ROW (by whom, who pays? More hidden subsidies?)

If potable water for Harris plant is from Harris Reservoir, they apparently think it need special filters, not available to all customers downstream. p.9-122 "Potable water used throughout the plant typically will be processed through a reverse osmosis (RO) filtration system and, if necessary, will be treated with an antibacterial...such as chlorine." (And what about tritium which cannot be filtered out?)

(p.9-124) *Section 9.4.3 Transmission Systems*

"The existing HNP is connected to the PEC transmission grid by seven 230 kilovolt (kV) transmission lines.... These seven lines radiating in different directions from the plant connect to strong and diverse parts of the PEC system. " "Three new transmission lines would be constructed only if the HAR 3 is constructed and were required to distribute generated electricity." (not much point in building it otherwise!)

This is inconsistent with statements elsewhere in the ER that new routes would not be needed.

"A Regional Transmission Organization (RTO) or the owner, both regulated by FERC and the Southeastern Electric Reliability Council (SERC) will bear the ultimate responsibility for the following: defining the nature and extent of system improvements; designing and routing connecting transmission; addressing the impacts of such improvements."

Is this a way of saying the impacts of transmission lines doesn't have to be included in

the EIS? Nonsense. In addition, this omits the role of the North Carolina Utilities Commission in approving new generation plants and new transmission lines.

(Page 9-126) Current ROWS to be expanded 100 ft. which would require logging existing forested land along the ROW, and some farmland would be put out of production, with broader impacts on non-purchased ROW land from pesticide spraying which PEC doesn't list as an impact.

(p. 9-126-127) Offsite power would come to the plant(s) from a new 230-kv line. This presumably would require a new 200 ft ROW, but PE leaves this very vague. This is an additional land use impact of a new nuclear plant that PEC fails to calculate compared to (for instance) distributed solar generation.

Chapter 10.0 COST-BENEFIT

This entire section fails to accurately summarize even those few negative impacts that are listed elsewhere in the ER, let alone those that can be inferred. What has occupied many pages is either omitted or reduced to a phrase. On the other hand the applicant really goes to town in dredging up hypothetical economic benefits.

There is totally confusing terminology regarding geography. For instance, "plant site" is the area within the current EAB/fence line but HAR site includes that plus "Harris Reservoir" and its perimeter and dam, the proposed pipeline structure etc." The use of the word "site" to describe this larger area in this section, the ER and in other contexts tends to create the (possibly desired) impression that the new reactors are to be constructed on the footprint of the originally planned additional reactors.

Most people would understand "site" to mean a much smaller area than the current EAB, and certainly not to encompass Harris Lake and its surrounds, and a location some distance away on the Cape Fear River, and to be more akin to "construction site."

The applicant should be required to adopt clearer terminology identify among other things:

"SHNPP site: The area encompassing the current reactor (Harris 1) footprint including reactor, turbine building, fuel handling building, switchyard"

"SHNPP EAB: The exclusion zone around the current reactor and the area within it

"Harris Lake: the area currently consisting of two impoundments, a northern smaller impoundment (Auxiliary Reservoir) at 240 ft elev., and a larger impoundment (Main Reservoir) at 220 ft,"

Harris Lake Perimeter: the current and future perimeter of both impoundments

HAR 2 site [see SHNPP site]

HAR 3 site [see SHNPP site]

HAR 2 EAB [see SHNPP EAB]

HAR 3 EAB [see SHNPP EAB]

Harris Nuclear Facilities and Lake: the future area of Harris 1 "HAR 2 and HAR 3", their EAB(s), the visitor center/lab building, and Harris Lake and perimeter.

Current definitions are completely mad: for instance the "Harris Reservoir Perimeter" is the area that will be flooded. But there is a current perimeter and then there is a future perimeter.

"Transmission corridors" If PE is claiming that no new transmission corridors will be needed, just widening of existing ones, why does this definition include "new transmission corridors." New transmission corridors need to be clearly identified now and throughout the ER.

Why is the "vicinity" only 6 miles? What about the 10 mile radius area?

Section 10.1 Unavoidable Adverse Environmental Impacts

These are defined as only those impacts that "cannot be avoided and for which there are no practical means of mitigation."

Curious that this section and ER only considers the construction (and "regular" operation) of two new reactors, but not the destruction of one or both. Since this section is supposed to be a summary of all the costs and benefits of previous chapters, why is there no discussion of the unavoidable environmental impacts of both design basis accidents and beyond design basis accidents. This is a draft EIS after all. It should face facts. Though of course with a reactor design with no operational history, facts are somewhat thin on the ground. Nevertheless the economic impacts of a core meltdown could far outweigh the largest economic benefit, additional property taxes to Wake County.

The AP1000 could have a far worse impact from a catastrophic accident than from a previous generation PWR, since it has no "containment dome."

Section 10.1.1 Construction impacts

Land Use: There is no mention of flooding 4,500 plus acres!

Water-Related: "Construction-related effects to surface water resources are relatively small but represent a natural resource that may no longer be available for use. However, as part of the natural hydrological cycle, this water is eventually recycled through the ecosystem." (Taking how long, decades? centuries? millennia? and exactly what is meant here?)

How can PE make a statement like this and then say that impact will be small. This should be categorized as a LARGE long-term operational impact, as well.

"Temporary loss of habitat" is simply unacceptable. There is no such thing as temporary loss of habitat. It is equivalent to expecting humans to raise their kids on the moon, without oxygen.

Habitat would need to be continuously maintained for nesting water fowl. There is absolutely no assurance by PE that new habitat will be created in a timely manner, and

nature would take a long time to recreate it, if in fact its possible given a different topography at a different elevation.

Much more important is the permanent destruction of red-cockaded woodpecker habitat.

10.1.2 Operational impacts

Increase in impervious surfaces, and "increased operating level of Harris Reservoir." "100 acres of land are committed for fuel cycle activities" see Table 10.2.2 (See note (b) to table, this is apparently for a 100 acre-site reprocessing plant.) This is a pretty poor summary of the many land use changes itemized elsewhere in the ER in piecemeal fashion.

Water related: PE says that effects on the Cape Fear would be "minimized" from abstaining from water withdrawals during periods of drought" which means during an extremely hot dry summer the water supply for 3 reactors would not be adequate and thus not available to serve what PE says is needed baseload, which means that this alternative is not the best choice for reliable electricity supply. Of course elsewhere in the ER PEC states that pumping from the Cape Fear would be continuous.

Obviously only one of these statements is true: either

Drought and the small watershed for Harris Lake is not an issue because water will be pumped from the Cape Fear whenever needed to maintain the level of the lake. This could cause significant adverse effects on the Cape Fear River (and its downstream water users/customers) as well as to fish and aquatic organisms.

or

Rather than cause adverse effects to the Cape Fear, PE will only pump water when its least harmful, which could be when its least needed. The three units would not be able to operate during certain drought conditions as a reliable baseload supply, unfortunate for a "summer peaking utility." This in turn would increase carbon emissions from other sources used to make up the downed nuclear plants.

It doesn't matter what is in the NRC license or in the state water permits, because no-one is going to stand there 24 hours a day and check. So chances are that if a license is granted, severe adverse effects will occur.

Even though the water use consumption rate is routinely given as 28,122 gpm (for two additional reactors) it apparently doesn't include an additional 11,377 "gallons of water" (per minute? it doesn't say) for "fuel cycle activities" (p. 10-6). Hopefully this refers to offsite activities.

PEC states that permanently flooding 4055 acres of wildlife habit has only a small impact, whereas under the criteria cited and used, this would have to be considered LARGE. For one thing it's a permanent and total loss and for another a large area of land is involved. And not just any land but mostly forested wildlife habitat with access to water, which has remained virtually or totally unchanged for the last 25 years or so. And home to at least one federally listed species if not more.

(Page 10-7) Radiological: "Unavoidable adverse radiological effects with the fuel cycle are insignificant in comparison to background radiation." No, actually they are not and are not comparable. Now that atmospheric testing of nuclear warheads has been stopped for many decades most background radiation is not inhaled, ingested, eaten or drunk.

Most people near a nuclear plant or affected by its emissions through crops, game food, fish, water, milk, will all receive doses that are significantly different and more to the point, in addition to background radiation.

Those individuals working at the plant, or being born to a mother who has worked at a nuclear plant or a father who has worked recently at a nuclear plant, can experience in the first case higher rates of cancer and in the second and third cases an elevated rate of birth defects and cancer.

Once again it has to be pointed out that monitoring no matter how frequently done does not prevent discharge, but only measures it after the fact.

In addition the lack of a full scale and long-term operating prototype of the AP1000 reactor means that its lack of a containment dome and its passive air cooling features, mean that its radiological emissions can only be assumed in the absence of hard data to be way in excess of a conventional PWR.

It seems virtually criminal for the NRC to set up procedures to unleash an entire wave of new reactors of this design onto the US public and our ecosystem without such a long term monitoring (as well as safety) record.

This is particularly serious when in this case the reactors are to be sited in an area that PE admits has population density and density growth projections in excess of NRC requirements.

Table p. 10-11. To "mitigate" impact on listed red-cockaded woodpeckers PE lists as a "mitigation measure" this inadequate suggestion "avoid interfering with red-cockaded woodpeckers (federally protected) by limiting timber harvesting near nesting areas and educating timber harvesters."

Firstly, the idea of educating "timber harvesters" (a fancy word for logging crews) is no easy feat and this is just complete nonsense. The woodpeckers are going to abandon their nests as soon as logging and land-clearing noise disturbs them, and just leaving a few trees is pointless, they need the whole forest for both food and habitat and they need a large area free of human disturbance. The land is going to be flooded but chances are the woodpeckers would have been chased out by then.

So it doesn't really matter what PE says its going to do, these federally listed woodpeckers are going to lose almost 3,000 acres of forested habitat to water if the NRC approves this project. There is no assurance that nearby land is appropriate habitat, and none of it is protected land. What is forested is all commercial land.

As for the blue heron rookery, PE obviously considers that if they aren't on the verge of extinction AND federally listed, they don't count. PE just says they will "consider limiting construction activities near the existing blue heron rookery during nesting season."

Well excuse me but the only places usually that you see blue herons at all are places that are extremely quiet and free of noisy and destructive and sediment producing activities (because herons need to see underwater to fish). PE doesn't define what near is and it's pretty clear that they are not committing to give a hoot or to protect the herons, who are, in any event going to lose their current habitat. It would be years before the activities at the lake settle back down into relative quiet and even if there were shallows for them at the higher lake elevation level, it is pretty much guaranteed that they will be gone.

PE does not mention bald eagles which began to migrate over to Harris Lake from Jordan Lake in the 1985-1987 period. PE doesn't say anything about protecting their nests.

The woodpeckers, herons, and numerous other species are not going to be "mitigated" by PE posting signs prior to extremely noisy construction activities like pile driving as mentioned on p. 10-12 (as something that only affects people). As serious as the noise impacts on people living near by could be, the impact on wildlife could be more drastic in terms of loss of habitat.

(page 10-14) Table 10.1-1 sheet 7 of 7

PEC cites the potential for radiation exposure to construction workers because they will be within the restricted area boundary, and potentially exposed "to direct radiation and the radioactive effluents from ... routine operations." How about expanding the existing administrative controls and plant procedures for current plant workers to all these construction workers and loggers and whoever?

Instead PEC mentions the 16 thermoluminescent dosimeter (TLD) fence line locations and says that this will be the basis for assessing worker exposure, which proves beyond a doubt that they will not be issuing TLDs to construction workers, and that individual exposures will be essentially unknown.

PEC says incorrectly that for the majority of time during construction workers would be further away than the fence line, which is not true for actual construction of the reactors and associated buildings.

Does Progress Energy have radiological exposure records for the construction workers, some of them reported as recent immigrant labor, who worked close to the existing and operating reactor when PE relocated various functions from the unused area of the fuel handling building, and built a new facility to house those activities?

Does anyone anywhere even know who they were?

Yet, on the very same page (as elsewhere) PE states that "there is no disproportionate high impact to minority or low income populations."

Page 10-15 Table 10.1-2 Sheet 1 Operation related unavoidable impacts

Land Use: The flooding of 4,055 acres (which is not specified here) is an impact of both construction and operation, and has no suggested mitigation measures, and is not merely a "change in land use," nor can it be considered a "small" impact.

In addition, the potential for radioactive sediment (especially heavy metals) from three reactors and their associated discharges including human waste building up in the lake means this land would be essentially lost to productive use. Even after decommissioning the lake can likely not be drained and put back into use, and draining or dredging would just send more contaminants downstream. So this a very long term loss of land, plus a long term negative in terms of the resource as a water body.

(p. 10-16) There is a "mitigation measure" listed that is not clearly tied to a specific activity or adverse impact which states "Replace the affected infrastructure features with similar infrastructure in non-affected areas nearby" with the result of "no net loss in the resource area or associated function value." (emphasis added).

This is vague for a reason, because PE C plans to only move, raise, rebuild, or relocate vital infrastructure such as roadways, transmission lines, some of its own facilities (not specified), and apparently some of the facilities at Harris Lake Park, possibly such things as toilets, water fountains, playground, parking areas, and the rerouting of paved trails. However nowhere in the ER is there any offer to expand the boundaries of the park to replace the land that will be flooded, so in this case there will be net loss in the "resource area and its functional value."

There is no mention under either construction or operational impacts on Land Use of the loss of close to one third of forested NC Game Lands, and no mention anywhere of any "mitigation measures" meaningful or otherwise.

No mention of wild turkey habitat loss.

There is no mention of the potential impact on Jordan Lake if additional releases have to be made to maintain flow in the Cape Fear River because of water withdrawn and evaporated by two new reactors.

(Page 10-17) After the aforesaid facilities have been relocated "Long term land use impacts are expected to be insignificant." Well this is just typing for typing's sake.

The current Energy and Environmental Center would apparently end up below the level of the lake or in an new a flood plain since PEC says that it would need to be surrounded by a new flood dike. This is not mentioned as an additional cost.

Transmission line rerouting due to flooding would have more than small land use impacts and mitigating measures such as using existing ROWs simply may not be feasible.

It seems curious that if PE is going to cut all the trees before flooding 4,550 acres that they wouldn't remove the old transmission towers, and would instead mark them with buoys. This seems dangerous for boaters, especially as the towers could outlast the buoys. Maybe our famous metal thieves will take care of that problem.

In addition, regarding Harris Lake County Park (again) PEC tries to say there will be no land use impact from cutting down forest to build new facilities, parking, roads and all the rest of it, claiming that this would be "temporary until the permanent locations can be established." No it wouldn't, pavement, roof and other man-made stuff is going to

replace forest, for the entirety of the operating life of the reactors and beyond.

(p. 10-19) was the 2002 drought as bad as the 2007 drought? PE should be required to provide data on flows in the Cape Fear River for the entire historical period (for which data is available).

If there are any mussels left alive after the construction of the new water intake/pipeline, and its operation, PE says that these "protected mussels and fish" will be fine because PE won't withdraw water during spawning periods. Do they even know when those are? What if the water is needed? Once again PE says of course it won't pipe water from the Cape Fear during drought. Then what's the point?

In addition, turbid conditions could persist.

"During severe drought periods, plant water use requirements would be met for a period of time by using available reservoir storage." But during prolonged drought that "storage could be inadequate, and is going to get hotter and hotter from the combination of plant cooling and fuel pool cooling, plus possibly prolonged heat wave and high pressure system/no rain conditions. Even if the reactor is shut down it is still going to need constant cooling, and even if all the fuel were removed. the fuel pools of three reactors are going to need to be constantly cooled.

Has PEC actually provided a credible thermal analysis of three reactors, with six fuel pools, all densely packed, a prolonged drought and a prolonged heat wave????

(p. 10-20) Regarding the NPDES permit, elsewhere in the ER it is stated that HAR-2 and HAR-3 would discharge to the lake using the same outfall and PEC says here they intend to simply add these reactors to the current NPDES permit.

However, one question which would be worse, having excess heat or radioactivity (or other pollutants) discharged from one point without an easy way to determine where they are coming from or having three outfalls (minimum). Currently I understood that there was more than one discharge point for the current reactor, turbine building, fuel pool, etc. etc.

(p. 10-21) PEC says that a mitigating measure for water related impacts is to "coordinate with USFWS and NCWRC to identify other federally or state listed species within HAR site and vicinity." This is not a mitigating measure.

(p.10-22) Terrestrial and Aquatic Ecology

PEC says that flooding of an additional 4,055 acres will have MODERATE impact, but isn't the permanent loss of habitat (flooding then contamination) LARGE?

There is no mention here of the impact on both terrestrial and aquatic ecology of pesticide spraying along expanded, relocated transmission line ROWs. This could be significant where ROWs cross forested land as some birds prefer open edges of this type and could consume sprayed berries etc. There is an even greater potential impact from pesticide spraying and that is spread to cropland or pastureland or ponds.

(p.10-23) Monitoring is no protection against harm when it consists of samples taken once or even a few times a year. It can only document harm after it is done.

PEC says it will "collect aquatic vegetation, fish and sediments to detect the presence of any radioisotopes related to the operation of the HAR." What about waterfowl eggs? This is where radioactivity could concentrate,

(p.10-24) Re wetlands, it appears that wetlands could be "impacted" by transmission line crossing. This could mean that in addition to those wetlands that would be flooded, some wetlands could be filled in to create transmission tower concrete footings.

(p.10-26) Radiological impact of operation & decommissioning = small (!!!!) no, LARGE.

Section 10.2 Irreversible and irretrievable commitments of resources

Page 10-29 Irreversible means can't be restored, irretrievable means can't be recycled afterwards.

10.2.1 Irreversible Environmental commitments (see Table 10.2-1)

10.2.1.1 Land Use: "The proposed location of the site [sic] is currently in partial use by HNP." This is contradicted by photographs submitted with seismic analysis as NEI workshop on Harris site status, 3/1/2007. This shows (as do other maps/figures in the ER) that HAR-2 site is open cleared area with no activity, and HAR-3 site is more recently cleared, with no plant activity. It's only current use is as part of the exclusion zone.

In spite of statements to the contrary elsewhere in the ER, PEC says here there would be NO additional irreversible commitments of land, but in the comparison of alternatives, PEC says that the two new reactors would require 192 acres not currently paved or roofed over. This of course is just the footprint of the reactor buildings.

As stated elsewhere in my comments: Land acreage permanently lost to the two new reactors would have to include all new road area, expanded lake acreage, and all other associated changes that would remove land from being able to be productive in future.

Elsewhere in the ER, PE states that two new reactors would be served by existing transmission line corridors, with expanded ROWs. However, it would appear that HAR-3 would require three new transmissions lines, to Wake, Fort Bragg, and Erwin.

PE states disingenuously that "farmlands that have [transmission line] corridors passing through them generally continue to be used as farmland." This, however, is not true for the ROW. The company prohibits structures in the ROW, in wooded areas it clears and subsequently sprays pesticides, and the landowner is affected economically by having to give up the right to retain that land for future use. In addition there can be off site effects from pesticide spraying (and possibly by electrical fields).

(p.10-3)1 Land use change from increased water level. "The process of lowering the lake and restoring the land around Harris Lake to the original forested habitat would be impractical to implement due to conditions on the perimeter of the lake and vegetation recovery would take decades." Not clear what they are talking about when they refer to "conditions on the perimeter of the lake" but draining the lake and returning it to agriculture etc. will not be possible given the high probability of contamination in the lake bed.

PE mentions the "large areas of forested habitat" existing "in proximity" to the site (which site, the ER has many confusing site definitions). The fact is that the lake raising project would destroy almost one third of the forested NC game lands adjacent to the lake(s). There is no habitat, forested or otherwise, nearby, owned by PE or others, which is permanently dedicated wildlife habitat, and much of it lacks access to the lake (and thus year round water supply) and is commercial timber land, or future housing developments.

10.2.1.2 Hydrological and Water Use

(page 10-31) PEC says "impacts of the heated water discharge to the reservoir.... are not irreversible ... because [they]... will be localized and only occur during operation of the cooling towers." This is misleading because surely there would of course continue to be some thermal discharges from the reactor when shut down, and continuously from the fuel pools.

As to irreversibility, over time the thermal effects on Harris Lake over 60 years, added to 70 years of global warming effects from 2008 could well mean a combination of oxygen deprivation and algae that is not easily reversible.

(p. 10-32). PEC says that there will be no groundwater withdrawn for use at the site, so there will be no impacts to groundwater. But this ignores the fact that Harris Lake will receive tritium and other discharges from three reactors and their numerous chemical as well as radioactive processes. Harris Lake is located in a zone of fractured rock, the Durham-Triassic Basin, which was extensively studied as a potential site for a multi-state LLRW "disposal facility," but which could never be satisfactorily modeled, let alone monitored.

The hydrology of the site is such that:

- a) multiple hydrological connections are possible between near surface points and deep aquifers (and back again);
- b) many years and millions of dollars could not characterize the hydrology of a mere 500 acre site;

What cannot be characterized cannot be adequately monitored and so there is every expectation that new reactors at Harris would increase contaminant impacts on hydrological (groundwater) resources in the vicinity, and that no amount of added monitoring wells is going to detect, let alone prevent this. (And as noted above, monitoring wells only detect harm after it has occurred.

The hydrology of this area is such that groundwater cannot effectively be "remediated."

In addition, raising the lake level of 4055 more acres could create new areas of intersection between lake water and groundwater, creating new routes of contamination, and also possibly new discharge points.

10.2.1.3 Ecological

p. 10-32 In spite of the information to be gleaned elsewhere in the ER regarding the permanent habitat loss for listed and endangered species and other wildlife, PEC feels free to state in this section that there will be only a "minimal short- or long-term effect on terrestrial ecology. This should not be allowed to stand.

Once again we have the incorrect assertion that "the area where the units will be located is already disturbed" whereas the sites of HAR-3 was cleared land, and HAR-2 grassed over. In what way is this "adapted to anthropogenic disturbance" ? As is shown in NEI/PEC preliminary seismic work photographs (March 1 2007) regardless of what PEC has done to the land since. The aerial view in Figure 4.00-03 also shows cleared but vegetated land and not the uses that PEC refers to (parking lot etc.)

(p. 10-33) Similarly, PE refers to the pipeline site as "edge habitat" as if that meant marginal at best, whereas water edge habitat is itself a specialized habitat for particular species, as is the river itself. The pipeline doesn't have just a site, it has an intake point and pumphouse, a discharge point into the lake system, and a new route in between which appears to cross privately owned land as well as PEC land.

Surprisingly PEC does admit, however, that in flooding an additional 4055 acres, "fauna of the area will be displaced and the flora will become submerged" (though they don't mention that actually the flora will first be logged, burned and crushed, as will no doubt be some species.

Once again PE posits the totally unrealistic notion that there is somewhere else for all this flora and fauna to relocate to. As stated above, there is nowhere protected for them to go.

And once again, the applicant states that nothing in the Cape Fear will be affected in spite of the fact that withdrawals from the Cape Fear to Harris Lake will be most needed during drought when they would have the greatest impact on the river, and for the three reactors to time withdrawals with spawning and low flows and droughts rather makes a mockery of the claim that nuclear is the best option for reliable baseload power.

In addition, whether year round or not, long periods of continuous pumping from the Cape Fear, or even shorter, intermittent ones, are going to create a constant state of turbidity in the Cape Fear at that location, which will add sediment to the river downstream, which could decrease its "assimilative capacity" and stir up contaminated sediments.

PEC says it will need to dredge the Cape Fear, though it not entirely clear if this is only prior to construction/installation of the intake, or as a maintenance measure. In either event this would be a sufficiently destructive activity that an area of the Cape Fear near the intake point will be an irreversible loss of habitat.

This dredging also raises the question of whether the intake is to be placed low enough to be able to withdraw water even during low flows.

This is just another reason why the NRC should not be actively reviewing the license at this time when state approval has not been obtained for the many alternative water supply stratagems suggested in this ER, none of which is without serious environmental (and public health) impact.

(p. 10-34) *Socioeconomic*

"The HAR will provide a new source of reliable electricity to the region, which may result in the introduction of new industries in the region or expansion of existing

industries." This is not a logical assumption for a claimed beneficial socioeconomic impact. Currently, "industry" is declining in NC and SC, and so there is baseload supply to spare for new industry to replace old.

Availability of electrical power is a factor in industrial relocations only in terms of sufficient voltage delivered to the industrial site. Competitive rates for large blocks of power may be a consideration, but adding two new \$7 plus or higher nuclear plants into the rate base is going to increase those rates.

On the other hand, the addition of two new expensive nuclear plants will raise rates, and so reduce the service area's competitiveness in what has become a global race to the bottom.

The tax impacts go to Wake County only, and would be expected to disappear, not "persist" after the plant is shut down.

10.2.1.7 Commitment of Underground Geological Resources for Disposal of Radioactive Spent Fuel

If there is no reprocessing, there would be a need for isolation for "thousands to tens of thousands of years." PEC did not quantify the impacts of reprocessing correctly, because it failed to account for the reprocessing waste. PEC also does not account for transportation (fossil fuel use, air impacts, costs) either to and from reprocessing site, or to a temporary or permanent repository.

(p. 10-35) 10.2.1.8 Destruction of Geological Resources during Uranium mining and Fuel Cycle

PEC blithely mentions the "pollution of surrounding soil. Impacts to surrounding lakes, streams and groundwater...." from uranium mining, yet fails to include these in its summary of impacts from two proposed new reactors, and does not include them in its comparison of impacts from the various alternatives considered.

Data used for this ER on the impacts of uranium mining are for the readily available, easy to mine, and higher concentrated ore which is in insufficient supply for the anticipated 60 year operational life of HAR-2 and HAR-3. Future demand for uranium could increase all the impacts of uranium mining.

Future impacts should be based on future, not past resource availability, conditions and impacts. It is not appropriate to reference a 14 year old GEIS for license renewals, because that document (out of date) was to cover future operations of only 20 years. However new reactors undergoing COLA review and EIS scoping now would operate up to 70 years from now.

10.2.2 Irretrievable material commitments of resources

10.2.2.1 Construction Materials

"The amounts and types of material required should be comparable to those that would be necessary for the construction of any type of power plant.... including materials such as concrete, steel and other metals, glass and several forms of plastics...."

This is totally wrong. A nuclear reactor and associated construction would require the irreversible commitment of considerably more materials than even a large coal plant, and a great deal more than would be required for the wind/solar/gas alternative. But

more importantly, a nuclear plant alone would require the use of many rare and expensive metals not required by the other alternatives, and not just in construction, but in the fabrication of fuel.

In addition it is only a nuclear plant that would render those metals, useless for any form of future reclamation, creating irradiated metal parts and reactor fuel cladding that must be disposed of as High Level Waste or Class C waste, etc., and isolated for tens of thousands of years or longer to prevent human scavenging.

10.2.2.2 Water resources

Although PEC points out that some of the cooling water would be lost through evaporation, they claim that impacts to water would not only be "small" but be "replenished through the natural hydrologic cycle."

- a) not without constantly withdrawing water from the Cape Fear downstream, and
 - b) there is ample evidence that "natural hydrologic cycle" in future cannot be assumed to remain the same
 - c) wouldn't be "replenished" downstream in the Cape Fear River.
- Furthermore, water evaporated into hot dry air does not return as rain.

10.2.2.3 Uranium Fuel and Energy Consumption

"A study of available uranium by the World Nuclear Association projects the availability of a 50-year supply of low-cost uranium." (Reference 10.2-002)
For how many reactors? And is low-cost current cost?

The "study" "also projects that increased market prices will drive additional exploration and could result in a tenfold increase in available uranium." So it appears that you can have low cost or availability but not both.

Firstly, this is not a "study" which implies academic rigor, sourcing, peer review, the scientific method, and one hopes an absence of polemic. Instead this is merely an undated web page, with no authors, no footnotes, and no scientific credibility. (The month that appears on this web page is the month that you are accessing it.)

World Nuclear Association, "Supply of Uranium," www.world-nuclear.org/info/inf75.html

However, WNA is including uranium found in "most rocks" and sea water. This has been shown to be neither practically nor economically feasible, and is not what the typical reader expects uranium supply to mean, which is accessible high-grade ore.

In addition this entire effort appears to be mere polemic and obfuscation:

"From time to time concerns are raised that the known resources might be insufficient when judged as a multiple of present rate of use. But this is the Limits to Growth fallacy, a major intellectual blunder recycled from the 1970s, which takes no account of the very limited nature of the knowledge we have at any time of what is actually in the Earth's crust. "

The amount of money being spent on uranium exploration is a function of its increase in price, which is an indication of its scarcity, not its abundance, and funds spent on exploration are not an indication of increase in total available resource.

Increasing funds spent on oil exploration have not produced an increased supply. for

just one example: see here:

<http://www.commondreams.org/archive/2008/06/28/9943/>
Foreign Policy in Focus, June 28, 2008

Another dubious assumption is that extracting uranium from coal ash would provide a future source of fuel. For one thing, it's not likely that we will be here if we continue to burn coal. Secondly, there is no mention of the energy required to develop fuel from all these low-grade sources, which would be far in excess of the eventual output.

The appendix (article) implies that the price of uranium has consistently declined by citing a "late 1970s" price of \$40/lb, even though prices have risen significantly since that time.

Another bizarre assumption is the one that regards the earth's crust as having no value in sustaining life (rotation of the earth, protection against volcanic eruptions and goodness knows what) other than short-term exploitation for monetary profit:

"It is meaningless to speak of a resource until someone has thought of a way to use any particular material. In this sense, human ingenuity quite literally creates new resources, historically, currently and prospectively."

There is no comparison of uranium (or other fuels) to energy that does not require a constant supply of fuel.

All estimates that there is a 60-70 year supply of uranium are "reserves-to-production ratios" (current reserves divided by current annual production), not future demand. But currently of the 65,000 tonnes of total demand, 10,000 comes from military stockpiles, 15,000 from varied sources, and only 40,000 from mines, the only predictable future source. Thus there is a current deficit, which will only get worse as more reactors are built.

There is also no acknowledgment here that some (if not most) areas with significant uranium reserves and/or production are also those either at risk of drought or experiencing it, and uranium mining takes large amounts of water.

Table 10.2.1 (page 10-38)

Land Use: the entire lake is an irreversible environmental commitment (4055 acres on top of current acreage of lake).

a) Lake sediment contaminated with metals could mean the land could be unusable if lake is drained; Harris Lake currently receives human wastewater discharge from the plant and Holly Springs, could possibly receive from a third WWTP (Western Wake Partners) serving several towns; Harris Lake also receives various types of "treated" process water from the plant; 180 operational years (3 reactors) is likely to make the lake bed unsuitable for agriculture -- literally forever in human terms.

b) The discharge of these wastes and radioactivity from three reactors could make Harris Lake unusable for fishing, so that both recreational and aquaculture offsets from flooding cannot be guaranteed in future, during operation or after decommissioning of three reactors.

c) The risk of a nuclear accident is increased rather than decreased by adding two new reactors; this increases the possibility of discharge to the Lake of even greater levels of chemicals, metals and radioactivity, and other contaminants. No matter how low the risk of accident it is not zero, and so there is no cast-iron guarantee that the land to be inundated can be retrieved or reversed.

Thus this finding should be that there is an irretrievable and irreversible loss of an additional 4055 acres. (In addition, adding two new reactors increases the likelihood that the original area of the Lake will be an irreversible land use loss.)

In this summary PEC also fails to mention all the other acres that would be lost to other uses;

(a) The footprint of two new reactors: grading, compacting and foundations render this land unsuitable for forest or agriculture afterwards, and future likely higher prices for energy make it unlikely that the plants foundations would be removed. (In the case of a certain types of accidents, plant might have to be entombed.) Future energy prices, economic conditions might also lead to entombment rather than decommissioning. All in all, no guarantee this land can be retrieved.

(b) The acreage that would go under new roads (expansions, re-routings) is also going to be lost to useful use, because of removal of topsoil, and compaction, as well as paving.

(c) The acreage required for new transmission line ROWs or ROW expansion is also going to be lost because of herbicide spraying along the ROW. This would render the land unsuitable for agriculture for many years.

(c) Water use: PE totally fails to discuss the potential impacts to groundwater at a particularly complex site, either from leaks at the plant site, or from Harris Lake.

(d) Uranium mining: In addition, PE has failed to glance over at the sites where that uranium and those metals have been mined, where soil, streams, and lakes and areas downwind have been left contaminated for all foreseeable time. It has been noted that proper remediation of uranium mining sites would price the fuel beyond use for many power customers. If remediation costs and operations are not built into mining and use then one cannot assume that future dollars would be available to go back and clean up the problem.

(e) Atmospheric and Meteorological: PEC has failed here to acknowledge the gigantic contribution nuclear power has made to global warming:

i) the vast amounts of fossil energy used to mine, and transport uranium ore, to enrich and fabricate and transport the fuel;

ii) the fossil energy used to power the nuclear plant so it can produce power;

iii) the energy used to construct the plant; with much onsite energy coming from diesel equipment or generators'

iv) most importantly, the decades of emphasis by the applicant on meeting increasing demand rather than encouraging wise use of resources in building design and installation of fuel-free appliances like solar hot water;

v) until recently, denial of the impacts of coal plants and energy use on global warming;

Thus, adding two new reactors will have a devastating effect on our climate, globally,

nationally and locally.

Table 10.2-2 Fuel Cycle

PEC relies on an old GEIS for license renewal for its fuel cycle data (NUREG-1437). This GEIS was not supposed (nor could) it anticipate conditions 80 years into the future.

(p. 10-43) 10.3 Relationship between short term uses and long-term productivity of the human environment.

"For the analysis of long-term impacts, it was assumed that the Harris reservoir and all appurtenant infrastructure and facilities will be maintained in the operating conditions set forth for the proposed Shearon Harris Nuclear Power Plant Units 2 and 3 (HAR)."

However, we don't yet know what operating conditions PEC is actually proposing since water supply issues are totally up in the air, and the reactor design is undergoing revisions, so no-one knows for sure what the operating requirements will be.

10.3.1.1 Land use

"The proposed construction site is composed of areas that are impervious to water infiltration (e.g. parking lots, laydown area, crushed stone, and some tree-covered areas)."

However,

a) gravel parking lots or storage areas are permeable not impervious surfaces, as well as the "tree-covered areas."

b) if parking lots etc. were to become part of the footprint of HAR 2 or HAR 3, then presumably PEC would have to create new ones, this means that there is an additional affected acreage that PE is not counting in relation to its land use calculations when considering alternatives.

c) the photo submitted to NRC as part of "Progress Energy Harris Site Status: NuStart-NEI Seismic Workshop, March 1, 2007," page 4, shows that the sites for both HAR 2 and HAR 3 are cleared vegetated area, and neither paved nor graveled.

The sites shown for HAR 2 and HAR 3 with this ER, on Figure 4.00-03 also show vegetated and not industrialized or paved areas.

If they are paved over now one has to question what geological features have been thus obscured, particularly in a geologic region (The Durham Triassic Basin) where faults and volcanic dikes can be found on the surface, but less easily under large paved areas.

(p. 10-45) PEC states that "The perimeter of Harris Reservoir and the surrounding area are currently placed in the timber production use category. A recent land use coverage analysis indicates more than 70 percent of the land contained in the watershed is forested (Reference 10.3-001). However, it seems unlikely that NC Game Lands, Harris Lake Park and some of the other area in the entire watershed is currently being logged. Elsewhere PEC identifies thousands of acres to be inundated as NC Game Lands.

In addition, PE has confusing terminology regarding what the public calls Harris Lake since it currently consists of two conjoined impoundments at two elevations.

Nowhere does PE mention the impact on the recreational use of Harris Lake when all this logging and bulldozing is going on. It is going to be noisy and upsetting and the area being cleared will have to be off limits to the public.

PEC admits here that some of the wetlands to be flooded predated the creation of the lake for Shearon Harris.

Under the definitions for impact being used, land use impacts will not be small but LARGE.

(p. 10-45) 10.3.1.2 Appurtenant Infrastructure

PEC states her that additional water from Cape Fear to Harris Reservoir "if natural fill is not adequate" and also to maintain 240 ft elevation and to support "operation of the HAR" as if its going to be just an occasional thing, even though elsewhere in the ER the Cape Fear River is identified as being a continuous source (or a continuous source with some paper restrictions).

"The intake structure will be constructed immediately upstream of the Buckhorn Dam within the Cape Fear River channel. The pump house will be on the northern bank of the Cape Fear River adjacent to the existing discharge canal and remnants of the abandoned hydropower system that was located on the Buckhorn Dam."

Is the dam still intact? There is not a single dam in Chatham County (for instance) that does not have a FERC applicant for hydropower generation. If the Buckhorn dam has a current applicant or licensee, did Progress Energy notify them that the company planned to take part of someone else's energy supply?

(p. 10-46) 10.3.1.3 Relocated Infrastructure

PEC states that relocated infrastructure includes; "structures within Harris Lake County Park, the Wake County Fire Training Facility, the Shearon Harris firing range, several Progress Energy Carolinas, Inc. (PEC) facility buildings, four boat launches, multiple segments of roadway, and transmission towers... Relocation areas above the ... 240 ft. ... contour have not been determined yet."

PEC has not included the land use impacts of all these relocations in its comparison of alternatives. Secondly, these are additional hidden costs. Thirdly, PEC needs to provide more detail about what PEC "facility buildings" would need to be relocated (where are they now, what are they, where to be moved to, and the cost).

It is not possible for the NRC to determine EIS impacts if the applicant submits incomplete, inconsistent, and/or inaccurate information.

10.3.1.4 Air

"Currently timber is being harvested near the HAR site" Are they trying to chase out the woodpeckers in advance? Are they doing all the mitigation measures they said they'd take in future?

(p.10-47) 10.3.1.6 Terrestrial and Aquatic Ecosystems

"Biologists conducting an ecological survey in August 2006 at the HAR sites observed no

important vegetative or wildlife species."

However this is in the context of a discussion of the construction footprint area only, with no indication that the 2006 survey covered the entire area to be affected. logged, flooded, dredged etc. etc.

Elsewhere in the ER there are numerous mentions of "important", indeed *listed* endangered or threatened species and their habitat, including red-cockaded woodpeckers (habitat to be razed and flooded) and mussels (spawning grounds near proposed water intake on Cape Fear River, etc. What does PEC mean by important and how extensive was this survey? Shouldn't the NRC insist on an independent survey of the entire affected area, rather than depending on that by a contractor who is paid by the applicant, and to do all kinds of unrelated work. (Which means no way of telling who did what, whether they were qualified, or whether they just drove past, or what.)

(p. 10-48) 10.3.1.7 Noise

PEC considers significant and prolonged noise from construction to only impact humans, even though it can have a far more significant impact on wildlife. (See Section 10.3.1.6) PE seems to think that wildlife will relocate to "adjacent" undeveloped land, however, there is no assurance that land PE doesn't own won't be timbered, or developed, if it hasn't been already, and construction noise will further disrupt adaptation of some species, most significantly woodpeckers, of which listed red cockaded woodpeckers are among those projected to lose habitat. That noise could apparently travel far beyond the area being cleared.

(p. 10-49) 10.3.1.8 Transmission lines

The ER states in several places that PE will only be widening ROWs of existing transmission lines, but here is one of the places that they mention that "Three new transmission lines will connect the new HAR 3 switchyard to the PEC grid." It appears to not be settled whether these lines would use expansion of current line ROWs or new routes.

10.3.1.9 Cultural Resources

There is no mention in this section of the many local recreational effects: the loss of most of Harris Lake Park to flooding, and the inundation of two historic mill sites.

10.3.1.10 Socioeconomic

10.3.1.10.1 Transportation

PEC states here that there would be 3,150 construction workers traveling to and from the site daily, during the peak period of construction (when "HAR is 50-70-percent complete," But which one? Or does that peak occur twice, and for how long?). If PEC builds two reactors staggered by 2 years, and needs those workers for 2 years, that could mean 4-5 years of those extra vehicle trips, during rush hour. That is going to be a pretty significant impact on two lane country roads.

PEC cites only two highways as affected, US 1 and Old U.S. Highway 1 (which is a narrow 2-lane country road). However, traffic to the plant would also add congestion to US 64, Hwy. 42, Hwy. 55, and many other roads.

PE only mentions here that "the construction schedule at times could span 24 hour days, up to 7 days a week" so that traffic impacts could occur 6 times a day not just 2,

and noise impacts could be 24/7 on both humans and wildlife.

Train lines to the plant currently utilize some crossings without gates where locals are used to zero train traffic. This is a significant safety issue, and PEC must be required to specify whether large shipments would come by rail or road, and what they plan to do to ensure public safety in both cases.

10.2.1.10.3 Labor

Is PE committing to use unionized labor? Local labor? To only hire contractors who will provide adequate wages, benefits and workmen's comp coverage? If so, they don't say so. This would cut down on both injuries and environmental impacts.

(p.10-51) 10.3.1.10.4 Tax revenues and economic characteristics

"Sales taxes will be levied on materials purchased for the HAR as well as on goods and services purchased by workers..... there may be SMALL direct and indirect beneficial economic impacts from sales tax revenue generated from goods and services purchased by workers who do not currently work in the region."

Three bogus points here.

- 1) The bulk of the money spent on "materials" will go out of state to Westinghouse for all the modular components, and out of the local region or state for rebar etc.
- 2) Workers who live here would likely be spending little more than they normally do so there would be no additional sales tax revenue locally.
- 3) Workers who move in may end up paying sales tax here rather than somewhere else, but anyone who thinks local jurisdictions can provide services to new residents based on sales taxes knows nothing about how local budgeting works in this state. The only new residents who aren't a drain are rich people who build million-dollar mansions pay their property taxes on time, and don't have lots of children in the local schools.

A temporary influx of new workers is likely to have a net detrimental effect and do so also in another area that of putting additional pressure on limited rental housing stock, reducing availability and raising rents. This will disproportionately affect local low income residents.

PEC on the other hand thinks this is not a problem because (p. 10-52) "the number of available year-round housing units" and "because housing units in the region are abundant" but that is overall units, not affordable ones. The typical rent for a small family home in Chatham County for instance is \$1,200, and there are only a handful of rentals available at any one time.

It is not possible to believe that the majority of workers moving here for temporary work are going to buy a home, even if they are financially able, because of the uncertainties of the future housing market. Much of the housing stock that PEC cites, even if rental rather than expensive homes for sale, is expensive rentals far away from the work site.

10.3.1.10.5 Recreation

PEC claims that 279 acres of "recreation facilities at Harris Lake County Park and four

boat ramps will be displaced by the rise in the reservoir's water level." Is the total acreage of Harris Lake County Park or just those portions considered "recreation facilities"? It's the totality of the acreage at the park that counts because there are numerous trails and in addition the pine woods are open enough to walk in.

PEC mentions but does not include in its land use impacts (additional acres affected by new/relocated buildings) or its costs, those "PEC facilities [that] will need to be relocated: storage and maintenance facilities, picnic areas, a restroom, a playground; and a ball field. If these are facilities at Harris Lake County Park, this includes some facilities not itemized in the relevant portion(s) of the ER, and omits parking lot(s) mentioned elsewhere.

No mention of the impact of noise, traffic, logging, sediment, and other construction impacts on recreational use of the entire lake and its surrounds, nor the long term effect on fishing. These detrimental effects could reduce the value of housing nearby without this adjacent resource, even if only for 10 years. Nevertheless, for a home-seller that could seem a lifetime.

10.3.1.10.6 Educational system

For some reason PE doesn't think that an influx of new workers would have an impact on the local Wake County school system, because the county is planning an expansion, but presumably this expansion was planned to meet current growth rates, not the influx of new construction workers for two new reactors. If these workers are only here for a few years, their families could create a shortage of school places and then a surplus, which would be a net financial loss for affected counties.

In addition, there is no guarantee that workers will either come from or live in Wake County, so extra strains could be put on school systems in Harnett, Lee, Chatham, and Durham Counties as well. Chatham County is struggling to expand its school system for current projected needs without an additional several thousand families.

Generally speaking, financing of additional school space per pupil is predicated on the concept of a family residing in the same jurisdiction over most of a lifetime and paying for public schools over a lifetime through property taxes. (Most of those of us who are childless don't object to paying for schools because we don't want to live in a society of yahoos.)

A temporary influx of a large number of workers for a large project means a bulge in demand for school places without the long-term revenue to pay for it. Sales taxes won't make a dent. So the economic impact of an imported construction force might sound good to some, but it would have an overall negative economic impact.

10.3.1.11 Radiation

"The radiological environmental data indicate that HNP operations in 2004 had no significant impact on the environment or on public health and safety..."

In twenty years of operation, is this the only year for which PE feels comfortable making this claim? In its earlier years, tritium build up in the lake was of significant concern and tritium is still discharged.

Section 10.3.1 OPERATIONS PREEMPTIONS AND PRODUCTIVITY (p. 10-53)

"The HAR site has been developed as a location for major energy generation facilities." This is a ridiculous statement when PEC defines the HAR site as including all the land around the lake, the lake, the pipeline route (which crosses private land) and down to the dam on the Cape Fear River.

10.3.2.3 Air

"Additional air emissions from increased vehicular traffic from the new operational workforce may contribute to deteriorated air quality in Wake County. This increase in traffic from the new workforce would result in increased ozone emission on roadways and could affect whether attainment status could be maintained in the future."

Curiously, this is not mentioned as an impact of construction when there would be ten times the amount of increased traffic to and from the plant.

This is a very serious impact in several aspects of the EIS that PEC has failed to include. It is a construction impact on air quality and human health.

If Wake County or Chatham County loses its ozone attainment status because of increased emissions then the additional industry that PEC claims would be attracted by the increased supply of electricity is not going to be able to come, and numerous other projects will either not be able to proceed or have to go through significant delays and additional costs.

And by the way, regarding traffic impacts and AQ impacts from traffic, there's not much point in PE responding that it will look into running buses to and from the site during construction unless they are going to also build a gigantic complex to house those workers and their families all in one (or two) places.

10.3.2.4 Water (p. 10-55)

Why is the "small" land use impact of flooding 4055 acres, which out to be "large" impact, described in the water section rather than a land use section?

The water impacts involve evaporating vast amounts of water, polluting discharges, and effect on downstream flow (and on Jordan Lake, which would be required to discharge water during low flows in the Cape Fear.

Once again PE makes the obviously insincere or practical assurance that "the facility (sic) will adhere to applicable.... regulations and permit requirements with regard to water usage to avoid removal of water from Cape Fear River and Buckhorn Creek during sensitive spawning periods and/or during draught(sic) conditions."

But PEC has not obtained those permits yet, so these assurances are meaningless.

The likelihood of Progress Energy relying for baseload needs on two additional 1,000 reactors, but timing water supply to these needs is not realistic. If these reactors were actually needed, as PEC claims, but has not demonstrated, the hotter the weather the more the plants would be needed in operation, and during a drought, the more water from the Cape Fear would be needed, as supply to the (currently two) impoundment(s) would be drastically reduced, and evaporation from the lake surface increased.

PEC further states that water withdrawals would be "limited to only the minimum required for plant operation during periods of normal operation and low flow conditions and reduced to zero during severe drought conditions. During these severe drought periods, plant water use requirements would be met for a period of time by using available reservoir storage."

What ever happened to the concept of an adjacent heat sink? It is not only normal operating conditions that water supply is needed for, and the water supply has to serve three reactors, one of which also has many years of spent fuel from four reactors in densely packed fuel pools. There's a pretty big heat sink requirement at the site at present, and more so when adding two more reactors, no matter what design.

(p. 10-56) 10.3.2.6 Noise

"As stated in Section 5.8, there will be no physical noise impacts from operation of the HAR or appurtenant facilities outside of the ... 6-mi...radius of the vicinity."

What about inside that radius? There are many residences, churches, and farms, inside that zone.

10.3.2.7 Transmission

(p.10-56) PE points out that it would control land use within transmission line ROWs including "mechanical clearing, hand cutting, and herbicide application."

However PE only cites prohibition of "virtually all residential and industrial uses of the transmission corridors" and fails to include agricultural (or timber) uses. The impact of herbicide spraying on adjacent agricultural or residential land could be significant because of run off. Adjacent land could not be used for livestock (or horse) pasture, ponds could be contaminated, and any adjacent crops could be affected by air drift or run off.

This is thus a moderate to large impact on that acreage, not small as PE claims.

In addition, PE claims that they would need to construct new roads for access and maintenance, and other landowners would be "affected." Having the power company take part of your land for a power line is bad enough, but then if they run a road across the rest of your land to get to it, I'd say you'd be more than affected, you'd be economically and emotionally devastated.

10.3.2.9 Socioeconomic

10.3.2.9.1 Transportation

"As discussed in Section 5.8, roads and highways in the vicinity will not be significantly impacted by operation of the HAR." Presumably this is because the roads would be so impacted by extra traffic during construction that PEC will have arranged with DOT to expand and modify local roads, as they say they will do.

As I have commented elsewhere, PE is incorrect to state that traffic impact would only be on U.S. 1 and Old US 1. PEC claims that the traffic count for both roads is identical, 1800 AADT, which seems statistically impossible.

"The existing workforce for HNP consists of 764 employees. It is anticipated that [it will take] approximately 773 people to operate the HAR facility." So after the surge of construction workers has finally come and gone, the traffic to the site during operation

of two additional reactors would be double what it is at present.

10.3.2.9.3 Labor

PE claims that an potential influx of new employees is not significant because they would most likely live in the largest city in the area. But PEC can't dictate where they live. They may prefer shorter work commutes, especially if they have children who would have long school bus rides no matter where they live, which appears to be the case with the Wake County school system.

10.3.2.9.4 Tax revenue and economic characteristics

The beneficial impacts of some extra jobs is not offset by the state's many road costs (road improvements for extra traffic, and road relocation), local school costs, and most importantly, the increase in electric rates for all sectors of the local economy from two new reactors, which PEC fails to mention anywhere in its ER.

As I have noted elsewhere, the only materials purchased locally would be concrete and any tools that workers are supposed to provide themselves, a tiny amount compared to the total planned investment.

(The reactor vessel for instance has to be manufactured in Japan.)

Sales taxes paid by new workers do not cover their demands on local services, in fact nor do their property taxes unless they are in very expensive homes.

PEC's current real and personal property tax to Wake County is only 2.3 per cent of the county's total revenue. Curiously, PEC doesn't point out how much more in tax they would pay if HAR 2 and HAR 3 are built because they don't want anyone working backward to figure out that the plants would have a \$20 billion price tag, or maybe far, far higher.

10.3.2.9.5 Recreation

PEC can't seem to make up its mind whether plant employees will be people who already live here or people who move here. It depends on the section and whether new or current looks better. So for sales taxes (above) it'll be new workers paying more sales taxes, but here, impact on recreational needs, its all current residents, so no new or additional demands would be made.

Whereas you would get the impression from elsewhere in this ER that PEC is going to pay to physically rebuild recreational facilities that would be flooded (boat ramps and the many flooded facilities of Harris Lake County Park) it also appears that they may not. "PEC is committed to mitigating these losses by re-creating or designating recreational areas at higher elevations."

PEC wants to claim that the increased area of the lake would so completely offset the loss of a large amount of Harris Lake County Park to the point that this would be a moderate long-term beneficial impact. In fact this would be a moderate long term negative impact.

Boating and fishing are the only "water-related activities" allowed at the lake and with no beach areas and no swimming (or camping) allowed, it is the trails for walking and running, the woods, and the picnic areas of the park that serve the vast majority of

local users. You have to own your own boat and trailer, there are no boat rentals, so doubling the size of the lake which is usually close to empty of boats, does not really double the fun as PEC would like to claim.

10.3.2.9.6 Education

PEC claims that there would be no impact on local school systems from the families of new plant workers, just as they do for the influx of new construction workers, by projecting that all those workers would live in Wake County (which is a totally unreasonable assumption, because both construction and plant workers will live where they want or where they can afford.)

Secondly, it is extraordinarily unlikely that the Wake School expansion plan to accommodate anticipated growth included growth from the construction of new reactors, any more than plans for new schools in Chatham do. These plans are based on projected new housing more than projected new jobs. In addition, PEC has been assiduously saying at every turn in the press and public that they are still just "preserving their options to build new reactors as part of a diversified etc. etc."

10.3.2.9.7 Environmental Justice

This is a new argument about how there will be no disproportionately high or adverse impact on minority and low income populations as a result of the operation of the facility--because it will comply with federal state and local regulations!!!!

If that were the case federal and state governments wouldn't have had to (reluctantly after pressure was applied and documentation aired) institute consideration of environmental justice in siting facilities such as this.

The fact is that siting 2 new reactors at the Harris site increases the concentrated exposure from routine operations and the concentrated risk of an accident, to an area of low to moderate income residents, including significant numbers of lower income and minority residents, to benefit the affluent living further away, developments of extremely large homes, unneeded overcooled and overlit shopping centers and so on.

A nuclear plant is intrinsically an environmentally unjust installation because the risk of accidents means potential evacuations and potential exposures, so the siting preference is for areas of lower density population. Yet these areas would typically show not only a lower energy use per acre, but most probably per capita as well, with the growth in both population and electricity use occurring elsewhere.

All the rural residents living near the plant in Chatham, Lee and Harnett Counties will not even get the purported indirect benefit of increased tax revenue to their county if two new reactors are built (and of course payments of any kind never go to the people who are actually hurt, in health, loss of property value or other harm.)

(p. 10-60) 10.3.2.9.8 Public Facilities

There is an implication here no new emergency response plan is needed. However, wouldn't local first responders need to be trained in the complete different design of the AP1000 for firefighting or radiological emergencies?

(p. 10-61) Radiation

Although PEC says that operation of the new reactors "will not contaminate the HAR property or surrounding land" are they willing to say the same for the air and more importantly, the lake and downstream river, and fish?

10.3.3 SUMMARY OF RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Once again PE C fails to consider the increased Harris Lake area as a potential long-term loss. As stated above, it is unlikely that the Lake could become a future drinking water source, nor that it could be drained and used for agriculture as there would be heavy metal contamination of the silt, from discharges from three reactors, and past discharges from a Holly Springs WWTP and (a PEC-) proposed discharge from a larger Western Wake WWTP.

As stated elsewhere in my comments, PEC has stated or implied elsewhere in the ER widespread loss and disruption of habitat, so cannot claim that "The HAR does not result in any significant long-term detrimental disturbance to biota or their habitats."

As for materials and energy use, PE states that "the new reactors provide far more energy than is consumed in their construction." This assumption has been shown to be essentially not true when everything is taken into consideration, and isolation of the long lived waste is included. Plus it would not be true for the first 20 years no matter what assumptions you use.

"PEC states that "The project stimulates economic growth and productivity in the local area." However, two new reactors will increase electric rates which will make the area less competitive, and could put the final nail in the coffin of any local business that has survived the rise in transportation costs. This impact could be greatest on small businesses.

(p.10-71) Section 10.4.2 COSTS

10.4.2.1 PEC is using for a cost estimate for two new AP1000 reactors, four studies referenced as 10.4.004-10.4.007, from U of Chicago, MIT, EIA, OECD.

"The four studies identified ... estimate overnight capital costs that range from \$1100 per kilowatt ... to \$2300 per kW, with \$1500 to \$2000 per kW being the most representative range." ... "The estimates are not based on nuclear plant construction experience in this country, which is more than 20-years old. Actual construction costs overseas have been less than most recent domestic construction, [so PEC elects to use this wider data field to skew its estimate downward] suggesting that the industry has learned from the domestic experience."

This is going an awfully long way around to avoid talking about the fact that there are already cost estimates for other AP1000 projects, in the USA, which are 3 to 4 times the estimate that PEC is using.

Progress Energy-Florida (PEF) was required to submit costs to state regulators in Florida and PEF projected a cost of \$17 billion for two AP1000 reactors (\$8,500 per kW). \$2-3 billion of this was stated to be transmission costs.

See here: http://www.sptimes.com/2008/03/11/Business/Price_triples_for_Pro.shtml
Transmission costs at the Harris site are not so much lower as to justify using a \$2.2 billion estimate pulled out of old and inapplicable projections.

The value of the contract PE has signed with Westinhouse/Toshiba is more than that, \$3.45 billion per reactor:

<http://www.reuters.com/article/marketsNews/idUST1817920080410>

*UPDATE 1-Toshiba eyes \$6.9 bln Progress Energy order
Wed Apr 9, 2008 11:54pm EDT*

TOKYO, April 10 (Reuters) - Toshiba Corp (6502.T: Quote, Profile, Research, Stock Buzz) said on Thursday its Westinghouse unit is in talks to build two nuclear reactors in Florida for Progress Energy Inc (PGN.N: Quote, Profile, Research, Stock Buzz), in a deal estimated to be worth 700 billion yen (\$6.9 billion).

Along with other projects Toshiba is finalising, the Progress Energy deal would raise the value of nuclear orders Toshiba could win in the United States to roughly 2.8 trillion yen.

Progress Energy signed a letter of intent with Westinghouse Electric Co and Shaw Group Inc's (SGR.N: Quote, Profile, Research, Stock Buzz) Power Group to buy key components for up to two reactors, Reuters reported on Monday. [ID:nWNAS7024]

Other estimates have been even higher:

*Nuclear Cost Estimates, By Pam Radtke Russell, June 23, 2008
http://www.energycentral.com/centers/energybiz/ebi_detail.cfm?id=525*

"Company estimates that have been released show costs for an individual unit could be as high as \$12 billion, and one consultant expects those estimates could rise if material prices continue to escalate.

"Florida Power & Light told the Florida Public Service Commission late last year that the cost for building new units at Turkey Point in south Florida could be up to \$8,000 per kilowatt -- or \$24 billion for two units. Earlier this year, Progress Energy pegged its cost estimates for two new units on Florida's west coast at about \$14 billion plus \$3 billion for transmission and distribution. While Progress' estimates are lower than FPL's, they are more than twice as much as the \$2,000 per kilowatt that industry contractors promised for new nuclear plants just two years ago.

"There's a lot of sticker shock," says Jim Harding, an energy consultant who helped the Keystone Center develop its June 2007 report, Nuclear Power Joint Fact-Finding. That report concluded that overnight estimates for a new reactor would be \$2,950 per kilowatt, or between \$3,600 and \$4,000 per kilowatt with interest. That estimate, generated with the input of 27 participants, including power companies and nuclear contractors, is already outdated because of the rapidly rising cost of metals, forgings, other materials and labor needed to build a new nuclear unit, Harding says.

"In October, Moody's Investor Service estimated total overnight costs of a new nuclear plant, including interest, would be between \$5,000 and \$6,000 per kilowatt. But even those numbers are only guesses, Moody's notes in its report, New Nuclear Generation

in the United States. "We believe the ultimate costs associated with building new nuclear generation do not exist today and that the current cost estimates represent best estimates, which are subject to change."....

"Yet consultant Harding says that he estimates that operating cost per kilowatt-hour for a new nuclear plant will be 30 cents per kilowatt-hour for 12 or 13 years until construction costs are paid down, at which point operating costs will drop to 18 cents. Harding adds those costs are a tough sell when concentrated solar power and wind power can be had for about 14 cents per kilowatt-hour. He said he believes that those renewable resources, as well as natural gas, and perhaps LNG, might prove competitive to a new nuclear plant."

10.4.2.4 External costs

(p.10-75) How curious that PE is available to come up with cost estimates for cooling towers, road reconstruction, transmission lines and so on, but NOT THE COST OF THE TWO NUCLEAR PLANTS! "Rough order of magnitude costs for road amendments just due to the flooding is \$20 million. Plus \$6 million for "protecting the the area at the Harris Training Facility, and for new switchyard, parking, roads inside facility, \$18 million.

These are NOT EXTERNALIZED COSTS and need to be factored in by PEC to an actual, realistic cost estimate for two new reactors. Yet even these costs are apparently not remotely accurate since they may not include "actual labor and material cost, competitive market conditions, implementation schedule and other variable factors."

PEC nowhere mentions the value of the land that they own that would be pulled into the rate base if these two new nuclear plants are built, because that could be equivalent to land purchased for transmission or generation etc., in added cost, and should be part of the comparative cost analysis with other alternative strategies and sources.

Section 10.4.2.4.6 Socioeconomic

Elsewhere in the ER, PEC brushes off the impact of new construction workers and new operating phase workers on the infrastructure of the vicinity, area, region. However, in this section PE admits that "it is anticipated that additional infrastructure and services would be needed to meet the demands of the people moving into the area to support the construction and operation of the new facility [sic]."

However, PEC claims that this would be "offset by the increased tax revenues and economic input from those individuals and families." As I have already commented, services provided by counties are only fully paid for by property taxes on the most expensive houses.

This assessment of additional demands on infrastructure is repeated in the summary also. It is likely therefore that this is the correct assessment, and that different findings elsewhere in the ER are wishful thinking or manipulation of data and conclusions.

Although the text of the summary (Section 10.4.3) says that the table includes mitigation measures, and the costs of various impacts, after mitigation measures, this is not true. The table includes no costing for impacts, and no costs for most mitigation measures (unless you count roadway raising and such).

PE curiously states that "there is a growing baseload demand and growing baseload supply shortfall in the region of interest." This first statement is not fully demonstrated in Chapter 8, and the second one is nowhere else asserted or demonstrated.

It is also not true that the immediate local counties who receive local tax revenues from the plant would see an increase. The current and new nuclear plants are physically located in Wake County. Wake would receive more revenues on the new plant through property taxes, less the lower valuation on the newly flooded land. Chatham County receives tax revenue only from land and lake, not buildings, and the drop in tax revenue would be likely be sharp in the change from land to water.

Table 10.4-1

Sheet 3 Land Use: "The new reactors will be co-located with the existing nuclear facility" This is misleading since the new reactors will not utilize the existing footprints for 3 additional reactors. The only infrastructure that would be utilized by the new units is the current switchyard, by HAR-2, with HAR-3 requiring a new switchyard.

Nor does this land use impact summary mention the additional changes in land use detailed in this ER for two new reactors: additional land to be purchased/taken for expanded ROW's for new transmission lines, additional land used for new roads, road expansion, and new internal roads. relocation of transmission lines that would be flooded, road work related to new lake level, the flooding of an additional 4055 acres, new land uses for relocated Harris County Park Facilities, new land uses for relocated PEC buildings, etc. etc.

Table 10.4-1 Sheet 5 "Construction and operation activities should not have long term adverse adverse impacts to recreational use of the Harris Reservoir and the surrounding area" (This is totally contradicted by the more detailed text of the ER which identifies but does not quantify the loss of land at Harris Lake County Park, but does quantify the loss of almost one third of forested game lands to flooding. (Sheet 6 indicates that this includes wild turkey habitat. As ground nesters wild turkeys are disappearing from our state at a rapid rate chased out by development, logging and human encroachment.)

Sheet 6 "Environmental enhancement" "benefit" is falsely stated as "reduction of carbon emissions." New nuclear plants to meet increasing demand will not "reduce" carbon emissions. These emissions would be increased for at least the first 20 years of operation by the carbon emissions associated with plant manufacture and construction (nationally and internationally) and fuel fabrication. In addition, land clearing prior to flooding will undoubtedly be accompanied by burning of waste wood, brush, stumps etc. (more carbon emissions), more workers driving to the site, more LLRW incineration and a hosts of other impacts.

(p.10-85) Sheet 7: "Using the capital cost estimate value of \$2000 per kW results in a HAR per unit construction cost of approximately \$2.2 billion."

This is totally unreasonable. See my comments above on cost estimate. It is not clear at this time if PEF's Levy County site will use cooling towers, but it will involve a new channel for ocean cooling water. On the other hand, at the Harris site, there are numerous things that have to be demolished and rebuilt that are potentially additional costs not involved in PEF's Levy County project.

Sheet 8: PEC lists a \$1 million transmission line cost for each new unit, this seems artificially low.

(p. 10-87) *Sheet 9:* PEC gives an anticipated operating cost of 3.1 - 4.6 cents per kWh. Of course of more interest in comparing with alternative sources and strategies is busbar cost.

What uranium price is this operating cost based on? Operating cost needs to include future dollar pricing taking into account rises in uranium price, increased energy prices for fuel fabrication and transport and rise in all applicable operating costs.

Even if the NRC is not going to require pricing to predict 2018 to 2078 pricing (60 year operation), PE must be required to accurately project start up date operating costs, not costs that are many years old a decade before start up.

Land use: PEC claims that "construction at the HAR site is not expected to have long term impacts on land use," although the ER as a whole demonstrates that many more acres than the 4055 would be permanently rendered useless.

PEC continues: "Siting of a new unit at the HAR site would not require significant land use changes for construction since the majority of the site has already been disturbed." However, the majority of the new nuclear plants' footprints were merely been cleared of trees before late 2007, and the rest of the affected thousands of acres is what it is, gamelands, wildlife habitat, forest, and some of it, private land (that affected by road relocations, widening of ROWs or new transmission routes, etc. etc.

(p-10-89) *Sheet 11, Water use:* "The consumptive water use from the Harris Reservoir for the HAR facilities is approximately... 28,122 gpm. The Harris Reservoir will supply adequate surface water for plant use."

Not without building a new, higher dam it won't, not without pumping water continuously from the Cape Fear River it won't. And maybe not without an additional WWTP discharge that the state has not, and may never approve.

Sheet 14, Socioeconomic: Only Wake County is cited, and "the largest towns near the HAR site" are Cary and Raleigh, says PE, 13 mi and 21.7 miles, ignoring Apex, Holly Springs, Fuquay-Varina, and also ignoring Sanford and Pittsboro. Holly Springs is currently undergoing a building and business boom as it is at the bottom end of a new outer-outer-loop express tollway around Raleigh, Cary etc.

Sheet 17 "loss of resources " will be "mitigated" although it is clear, that the loss of some resources cannot be mitigated, one of which is the 28 thousand gallons a minute of freshwater that will be evaporated.