

Contention 10 – FPL's Turkey Point 6 & 7 Environment Report of COL Revision 3  
Does Not Adequately Address The Impact of Extended Storage  
Of All Types Of AP1000 LLW

10CFR Part 2.309(f)(i)

Florida Power and Light has provided a plan for the storage of low-level radioactive waste (LLW\*) from the two proposed AP1000 reactors for Turkey Point 6 & 7. This new information, made available to CASE on January 3, 2012 when FPL filed Revision 3 to its FPL COL for Turkey Point 6 & 7, reveals that the applicant's plan is inadequate as described in (ii) below. The environmental impact of total site inundation and any resultant run off, on stored large radioactive components, on buried radioactive soil, and on radioactive sludge from steam generators are all inadequately resolved.

In FPL's January 3rd filing a new section on page 5.7-7 describes the scope of FPL's new plans for coping with the extended on-site storage of LLW as pointed out in CASE's Contention 9 filed on February 3, 2011, essential factors requiring additional environmental impact analysis are missing.

(ii) BASIS FOR THE CONTENTION

The Environmental Report of FPL's Revision 3 of the Turkey Point 6 & 7 COL is inadequate in that it failed to allow for:

**One: The impact on stored LLW of catastrophic climactic conditions with total site inundation**

CASE has, in many filings in this intervention, presented the matter of climate change and tropical storm impact unique to Turkey Point, Florida with respect to the applicant's plan to operate nuclear reactors far into the end of this century on a site that may not be hospitable for that activity. Also, the plan to elevate the reactors does not address the extended storage of LLW on the site. CASE offers the declaration of Diane

*\*LLW. CASE, for brevity, will use the abbreviation LLW for low-level waste but this is a serious misnomer since the readers of this document are well aware that some of the material is highly toxic and lethal.*

D'Arrigo (Attachment 1) wherein the need to consider extended storage now is affirmed; there will be no place to send it.

Also, the revised FPL plan does not consider information that CASE offered including expert testimony in the August 20, 2012 Revised Petition from Dr. Harold Wanless regarding the inevitable impact of climate change on Turkey Point before the end of the century and within the lifetime the proposed reactors. A comprehensive recent study *A Unified Sea Level Rise Projection for Southeast Florida* ( <http://www.southeastfloridaclimatecompact.org/documents/SLR.pdf>) states, at 6,

*"After thorough review and debate, the Work Group Members agreed that the U.S. Army Corps of Engineers Guidance Document curves (USACE 2009) offered a reasonable and defensible projection to use in the 2030 and 2060 time frames (Figure 2). The Work Group agreed that the curves should be illustrated through 2060, with the historical tidal data and extrapolation of the historical SLR rate to provide perspective. Based on the unified projection, Compact Counties must consider that sea level is projected to rise one foot from the 2010 level sometime between 2040 and 2070, but with a two foot rise possible by 2060. Table 3 shows the projected change in the rate of rise of sea level by decade, illustrating the acceleration of the rate with time. The average rate of rise of sea level at the Key West tidal station from 1913-1999 was 0.88 inches/decade. By 2060, sea level is projected to be rising by two to six inches per decade."*

CASE contends that the applicant's plan for storage of LLW does not provide sufficient physical safety measures to cope with such an aquatic environment. While the applicant plans to elevate the AP1000's, it does not describe, nor would it be feasible to, elevate the auxiliary extended waste storage structures. Even the minimum predicted rate of sea level rise will be problematical for equipment and stored materials not radically elevated; even then catastrophic or five hundred year events would be catastrophic.

The ER at 5.4.2 Radiation Doses to the Public (starts page 5.4-4) fails to include any consideration of radioactive waste being washed inland by a storm surge, or alternately sucked out into the Bay. The potential inundation of the site must be considered in sections on liquid pathways and human exposures. The

inclusion of large components like steam generators would change the projected source term.

## **Two: The storage and disposal of highly radioactive large components such as failed steam generators**

The prospect of early steam generator replacement raises the specter of unsecured contamination in large quantities, in addition to the source terms described in the DCD Table 11.2-7, the inclusion of large components like steam generators would change the projected source term. A typical steam generator weighs 250 to 400 metric tons and exceeds 15 meters in length and 6 meters in diameter. In a report, *Steam Generator Degradation and Its Impact on Continued Operation of Pressurized Water Reactors in the United States* by Kenneth Chuck Wade, Designated Federal Officer, U.S. Department of Energy, writing in the *Energy Information Administration/ Electric Power Monthly* August 1995 (Attachment 2) states, at ix, *“The issues associated with steam generator degradation have had a significant impact on nuclear power plant operation. As a result, utilities with degrading steam generators must make a tradeoff between either (1) continued operation with high operation and maintenance costs, high worker radiation exposures, increased risks of forced outage from tube ruptures, derating the plant, or (2) replacement.”*

Mr. Wade cites eight factors which contribute to early failure and degradation. He ends his article on a hopeful note that things would improve based on knowledge of what can go wrong but, recent statistics show that this has not been the case. An accounting of failed steam generators, *Steam Generator Replacements in the US, compiled 02/07/2012*. ( Attachment 3) shows that 32 have failed between 1982 and 2010. The net impact is a more rapid than planned and anticipated accumulation of LLW in the form of gigantic pieces of equipment which must be stored or decommissioned.

Currently there is a rash of defective steam generators in the USA, which have only operated for two or three years and are now exhibiting dangerous levels of

tube breakage -- including San Onofre, Three Mile Island and Arkansas One. All of these are Westinghouse style reactors.

In a Submission to The Canadian Nuclear Safety Commission on *The Proposed Transport of 16 Radioactive Steam Generators to Sweden* by Bruce Power, September 28-29, 2010, (Attachemt 4), the Canadian Coalition for Nuclear Responsibility (document written by its president, Gordon Edwards, PhD) *opposes* the proposal. The proposal was to ship the reactors to Sweden for decommissioning. The paper vehemently opposes the shipment calling attention especially to the radioactive contaminants in the steam generator.. The paper states:

*“The characterization of the steam generators as “low level radioactive waste” and therefore suitable for decontamination and recycling is misguided and dangerously unrealistic. In fact, the very long-lived high-toxicity alpha emitters present inside the steam generators, all of them transuranic actinides, require that the SGs be classified as TRU [transuranium-contaminated wastes] or at least as GTCC [Greater than Class C] radioactive wastes. Such wastes are suitable only for isolation and perpetual storage under strict control. “*  
*At 9.*

A section titled: *Radioactive Contaminants in Steam Generator Tubing*, states:

*“The danger from transport of the old steam generators is not limited to the penetrating gamma radiation that they give off, which is a temporary and passing danger -- nevertheless a serious one -- but also includes the radioactive contaminants inside the steam generator vessel... Those same materials are present in the old steam generators, as well as other radioactive materials which are beta-radiation emitting or gamma radiation emitting materials. And it is well known that the alpha-emitting materials **are among the most dangerous of all radioactive materials once inside the body**, (emphasis added) though they are virtually harmless outside the body. That's because alpha radiation has very little penetrating power, but does about 20 times more damage (per unit energy) as gamma or beta radiation.”* At 28.

Dr. Edwards (Attachment 5, 29) calls attention to the comments of Dr. Frank R. Greening who worked for 23 years as a specialist in corrosion of metallic components in nuclear reactors:.

*"I was surprised to hear that alpha-emitting particulate was "accidentally" released to the vault air of Bruce Unit 1 in November 2009 during "routine" refurbishment operations. I was especially concerned when I read that this release of alpha-activity was caused by "grinding operations" on feeder pipes. I trust that Bruce Power is not claiming that such feeder pipe contamination was unexpected because OPG and AECL have been well aware of this issue for many years and its not long ago that Bruce Power nuclear reactors were operated by OPG.*

*I discovered alpha contamination on Pickering feeder pipe and pressure tube samples many times during my 23 -year career at OPG. Thus, in the early 1980s I reported surface concentrations of Pu-238, Pu-239, Am-241, Cm-242 and Cm-244 (in the nCi/mg range) in the oxide scale on several Pickering Unit 2 inlet feeder pipes -- see Ontario Hydro Research Division Report 84-262-K issued August 13, 1984.*

*I request that this information be passed on to the CNSC staff who are looking into this incident and ask them to please ensure that health physicists at Bruce Power are made aware of the level of alpha contamination that is to be expected on feeder pipes, pressure tubes and steam generator components removed from CANDU reactors here in Canada."*

The concern of Dr. Edwards and Dr. Greene due to the possible mishandling of this material is palpable. Should we be less concerned about the inadequate consideration by FPL in not only not addressing the issue of how to handle the highly radioactive failed generators and tubing but, also, the sludge which accumulates in them. Also, the connecting pipes are highly radioactive and must be dealt with. Should any of these components be subjected to inundation or to catastrophic weather conditions at Turkey Point, the consequences will be very serious indeed.

### **Three: The affect of the inundation on buried radioactive soil**

Contaminated radioactive soil buried as LLW at Turkey Point from past, present or future operations could become a problem if and when permanent or

temporary inundation occurs or if the soil is disturbed due to severe climactic conditions. On August 11, 1982 the Miami News reported: *Radioactive Soil Buried By FP&L* (Attachment 5). Reportedly a spill of 11,027 gallons of radioactive water on March 17, 1982 contaminated 2500 cubic feet of soil which was added to Turkey Point's "radioactive protected area yielding a total of 41,000 cubic feet of soil there. There is also contaminated soil resulting from buried pipes. How this material would be handled and how such material would be retrieved if carried away from the site or disturbed on the site due to the conditions possible described must be explained.

#### **Four: Liquid Pathways Analysis Not Provided**

The full impact of potential inundation of the site must be considered in sections on liquid pathways and regarding potential human exposure. In the ER, at 5.4.1.1 (beginning page 5.4-1) Liquid Pathways includes a discussion of the potential for someone to drill a water well into the deep boulder layer where FPL plans to inject liquid radioactive wastes. The inundation of the Turkey Point site is, during the period of license, and during the most likely license extension period, as likely as someone drilling a well into the boulder zone, but is not included in the liquid pathway analysis. Therefore the Environmental Report analysis of the potential impact of radioactivity in liquid is not adequate. Without the inclusion of these potential situations in the ER analysis, it is not possible to have confidence in the doses to the public reported by FPL.

#### **Five: Inaccurate statement regarding LLW which can go to Clive, Utah**

In the Revised ER at 5.11.7 WASTE, FPL states:

*"Units 6 & 7 would generate radioactive and nonradioactive wastes as described in Sections 3.5, 3.6, and 5.5 and implement waste minimization programs and recycling opportunities whenever feasible. The waste management impacts of Units 6 & 7 wastes were characterized as SMALL.... The radioactive waste generated by Units 6 & 7 as well as Units 3 & 4 would be disposed of in a permitted disposal facility such as a facility in Clive, Utah, that accepts waste from all states. **This facility accepts low-level and mixed radioactive wastes.**"*

*The facility disposed of 3.9 million cubic feet of low-level waste in 2005 (NRC Mar 2007) and the mixed LLW disposal area is 963,020 cubic yards with additional land for development of future mixed LLW disposal cells (UDEQ May 2005). The cumulative impact from management of low-level and mixed radioactive wastes would be SMALL.”*

The highlighted statement above is only partially true. Clive, Utah only accepts Class A LLW. All B and C would have to remain on site until off-site storage is available and, as the Declaration of Diane A'rrigo (Attachment 1) that will not be for a long time, if ever. Provision will have to be made to keep it on site permanently. The problem will not go away.

(iii) SCOPE OF CONTENTION

10CFR PART 52.79 still requires the Commission to make a safety finding before granting a COL. The consideration of site-specific features of LLW storage has been established by the Commission and other ASLB Panels. It is important that the applicant not only have an extended storage plan for radioactive LLW, but it is not sufficient to merely have a plan; it must be a plan that will deliver a basis for a safety finding before granting a COL, therefore it is within scope.

(iv) CONTENTION IS MATERIAL TO NRC FINDINGS

In the Revised ER, at 5.4.2 RADIATION DOSES TO MEMBERS OF THE PUBLIC, FPL makes this statement: “As stated above, there is no dose due to liquid effluents during normal operations. 5.7.1.6 Radioactive Waste.” One must ask, “what provision has been made for such effluents in an *abnormal* situation, such as one caused by the climatic and geologic situations we are postulating in this Contention. For LLW disposal, the NRC notes in 10 CFR 51.51(b) **that there will be no significant radioactive releases to the environment.** (Emphasis added). It is CASE's contention that this means what it says, no releases. Can FPL guarantee this following total inundation of the site? How do you handle a situation where the reactors could be suspended on an island surrounded by

water? How do you contain or retrieve water and solid run off from a compromised radioactive storage facility? This has not been addressed.

(v) EXPERT OPINION AND REFERENCES<sup>Issue</sup>;

CASE has provided expert opinion and references for each part of this contention.

(vi) DISPUTE WITH ER REPORT EXISTS

Nowhere in the Revised FPL ER are the issues raised above addressed. The applicant extensively address the normal and routine handling of LLW but concludes, at 5-7-7 that “..the impacts of constructing and operating additional on site LLW storage facilities would be small”. CASE contends that the generally cavalier treatment of LLW denies its true nature especially in catastrophic and challenging climatological and a geologicla events.

(vii) REASONABLE ASSURANCE OF PUBLIC SAFETY

At several points in the discussion above CASE has presented a serious lack of concern for the not-ordinary and not-routine occurrences which can challenge FPL’s ability to properly and fully protect the enviorenment and, by extension, the health and safety of citizens in the area. These requirements must be addressed.

## CONCLUSION

The total inundation of Turkey Point before the end of this century is scientifically assured but no where in the FPL filing of July 3, 2012 is this addressed or even noted as a possibilty. Ignoring this impending situation, as well as denying, as described above, the impact of actuarially assured climactic events, as the authorities did at Fukushima Daiichi exactly eleven months ago tomorrow, such as storm surge, sea level rise, and the strike of a Category Five Hurricane at Turkey Point which, despite FPL’s assertions elsewhere that it has,



has NEVER in recorded history occurred there, makes those of us living within walking distance of the site quite uneasy. The applicant for this license has not addressed these serious issues. For these and many other reasons, on behalf of the residents of the area, do not license Turkey Point 6 & 7.