

June 19, 2000

Mr. Thomas F. Plunkett
President - Nuclear Division
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: SAFETY ASSESSMENT OF POTENTIAL RISK TO TURKEY POINT PLANT OF
THE PROPOSED CIVIL AND GOVERNMENT AIRCRAFT OPERATIONS AT
HOMESTEAD AIR FORCE BASE (TAC NOS. MA6249 AND MA6250)

Dear Mr. Plunkett:

By letters dated June 15, 1998, November 17, 1999, and May 1, 2000, Florida Power and Light Company (FPL or the licensee) provided information in response to the U.S. Nuclear Regulatory Commission (NRC) staff letters of April 14, 1998, September 16, 1999, and March 8, 2000, respectively. The information provided was related to the conversion of the Homestead Air Force Base (HAFB) site to a regional commercial airport, in addition to its support of military and government operations.

FPL performed a risk assessment which focused on the probability of aircraft crashes damaging the safety-related facilities at the Turkey Point site. FPL concluded that the results indicate that the risk to the safe operation of Turkey Point Units 3 and 4 associated with the proposed commercial operation, in addition to its use for military and government operations, is within the guidelines of NRC Standard Review Plan (SRP), Sections 2.2.3, "Evaluation of Potential Accidents," and 3.5.1.6, "Aircraft Hazards."

The NRC staff has reviewed the licensee's assessment methods and finds that they are acceptable and that the estimated risk associated with potential on-site aircraft crashes is within the acceptance criteria of SRP Sections 2.2.3 and 3.5.1.6. However, the staff notes that the margin between the estimated aircraft crash frequency and the acceptance guidelines of SRP 3.5.1.6 is relatively small. Hence, the staff believes that FPL would need to monitor the aircraft operations (i.e., air traffic and flight track information) at the airport on a regular basis. Should the actual aircraft operations exceed those projected for the year 2014, a reassessment of the aircraft risk would need to be made. Please inform us of your plans to monitor air traffic and flight tracks at the HAFB site on a periodic basis after it becomes operational as a commercial airport, and to reassess the risk as stated above.

With respect to the alternate option of the HAFB site being developed into a commercial spaceport, the licensee did not quantify the risks. However, the licensee indicated that the potential impact of a spaceport at the site would be bounded by the impact associated with a commercial airport. In the absence of specific data and an analysis of potential spacecraft mishaps, the staff cannot, at this time, determine the acceptability of this conclusion. Hence, should the site be used as a commercial spaceport, the potential impact would have to be quantified in order to determine the risk to the safe operation of Turkey Point Units 3 and 4.

T. Plunkett

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Emergency preparedness issues, including the evacuation of potentially increasing populations in the Emergency Planning Zone, are being addressed by FPL and the State of Florida in conjunction with Dade County. FPL stated, in its letter of June 15, 1998, that they will continue to discuss this matter with local and state authorities in order to ensure that any issues emerging from the commercialization of the base are identified, that the offsite emergency preparedness program to address these issues is adequately evaluated, and that the Federal Emergency Management Agency (FEMA) concurs with any changes to the offsite emergency preparedness plan. FEMA is the lead Federal Agency for assessing emergency preparedness around nuclear power plants, and provides its findings to the NRC for the NRC's use in making regulatory decisions concerning plant operation.

Based on the currently available information, the NRC staff notes that the spectrum of potential projects resulting from the disposal of the former HAFB site is still under examination and development. As the potential projects become more defined, the NRC staff will continue to assess any aspects related to the safe operation of Turkey Point Nuclear Plant.

If you have any comments related to this matter, please contact me at (301) 415-1496.

Sincerely,

/RA/

Kahtan N. Jabbour, Senior Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosure: NRR Safety Assessment

cc w/enclosures: See next page

T. Plunkett

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SAFETY ASSESSMENT BY THE OFFICE OF NUCLEAR REACTOR REGULATION
FLORIDA LIGHT AND POWER COMPANY
TURKEY POINT UNITS 3 & 4
DOCKET NOS. 50-250 and 50-251

1. INTRODUCTION

The former Homestead Air Force Base (HAFB) site, situated about 5 miles from the Turkey Point Plant, Units 3 and 4, was determined to be surplus property by the U.S. Air Force (USAF). The USAF is seeking to dispose of the property in accordance with the requirements of the Defense Base Closure and Realignment Act. Miami-Dade County has been designated as the Local Reuse Authority responsible for a reuse plan of the former base property. Currently the plan involves the proposed conversion of the surplus property into a commercial airport in addition to its use for military and government operations. The above actions will lead to a new flight pattern and aircraft mix being serviced by the combined facility.

In response to a December 9, 1997, letter from the Friends of the Everglades, the U.S. Nuclear Regulatory Commission (NRC) staff requested, by letter dated April 14, 1998, Florida Power and Light Company (FPL or the licensee) to provide information regarding the proposed HAFB site conversion to a commercial airport. In a June 15, 1998, letter to the NRC, FPL provided the requested information which focused on the probability of aircraft crashes damaging the safety-related facilities at Turkey Point Units 3 and 4. The risk estimate provided by FPL was based on the available flight data at that time.

Subsequently, On August 23, 1999, the USAF notified the NRC staff that a Supplemental Environmental Impact Statement was being prepared for the HAFB site conversion project to reflect updated air traffic information associated with the proposed civil aircraft operations at the HAFB in addition to its continuing support of military and government operations. The USAF letter provided information to support the assessment of the potential risk to the Turkey Point units. By letter dated September 16, 1999, the NRC staff forwarded the above information to FPL and requested that FPL assess the impact of the proposed changes and update the Turkey Point Final Safety Analysis Report and other related documents when the proposal becomes more defined. By letter dated November 17, 1999, FPL submitted its response to the NRC staff request. Also, by letter dated May 1, 2000, FPL responded to the staff request for additional information dated March 8, 2000.

2. ASSESSMENT

The NRC staff review of the subject aircraft activities and the associated risk to Turkey Point is based on the acceptance criteria and review procedures in Sections 2.2.3, "Evaluation of Potential Accidents," and 3.5.1.6, "Aircraft Hazards," of the NRC Standard Review Plan (SRP), NUREG-0800, Revision 2, July 1981. The acceptance criterion stated in SRP Section 2.2.3 is that the probability of initiating events resulting in radiological consequences greater than

Title 10, *Code of Federal Regulations* (10 CFR), Part 100 exposure guidelines is acceptable if it is about 10^{-6} /year provided that reasonable qualitative arguments can be made to show that the realistic probability estimate is lower (i.e., in the range of about 10^{-7} /year). The acceptance criterion in SRP Section 3.5.1.6 is that the probability of aircraft accidents resulting in radiological consequences greater than 10 CFR Part 100 exposure guidelines be less than about 10^{-7} per year. The staff review has led to the assessment below.

As indicated above, the staff had requested FPL to provide information regarding the proposed conversion of the HAFB site. FPL's responses, dated June 15, 1998 and November 17, 1999, as well as the response to the staff request for additional information, dated May 1, 2000, were reviewed by the staff and the findings are described below.

FPL used DOE methodology in its estimate of the risk. This methodology is similar to that described in SRP 3.5.1.6, "Aircraft Hazards." The results of the analysis documented by letter dated June 15, 1998, indicate that the probability of exceeding 10 CFR Part 100 guidelines associated with the proposed aircraft operations did not meet the SRP 3.5.1.6 criterion. The on-site aircraft crash frequency was based on projected aircraft operations (commercial and military) for the year 2014, and was conservatively estimated to be about 8.11×10^{-7} /year. The corresponding on-site aircraft crash frequency based on the 1994 military operations was conservatively estimated to be about 4.91×10^{-7} /year. Hence, the new estimate represented an increase of a factor of about 1.6 over what had been projected previously.

Since the estimated crash frequency exceeds SRP 3.5.1.6 acceptance criteria, further analysis normally would be appropriate in order to address some of the conservatism inherent in the estimated frequency. For example, the estimate is based on the simplifying assumption that each and every on-site aircraft crash leads to a release in excess of 10 CFR Part 100 dose guidelines. This is conservative, since taking into account the presence of minimum structural strength requirements associated with safety-related structures would tend to reduce the chances of a release in excess of 10 CFR Part 100.

Subsequently, on August 23, 1999, the USAF notified the NRC staff that a Supplemental Environmental Impact Statement was being prepared for the proposed HAFB site conversion to reflect updated air traffic information, alternate flight track configurations, and to evaluate environmental impacts associated with the optional use of the base as a commercial spaceport. As a result, by letter dated September 16, 1999, the NRC staff requested FPL to assess the impact of the new information on the previous risk estimate.

In a November 17, 1999, letter to the NRC, FPL provided a reassessment of the proposed air traffic changes. The principal changes in the projected operations consist of two opposing trends. Specifically, the military traffic is projected to decrease sevenfold for large aircraft and about 28% for small aircraft, the opposing trend is the projected increase in commercial jumbo jet operations by a factor of three. The net effect is a 55% reduction in the frequency of aircraft crashes that would lead to exposures exceeding 10 CFR Part 100 guidelines. On the basis of the revised air traffic projections, FPL's results indicate a decrease in the estimated risk. Specifically, the previously estimated value of 8.11×10^{-7} /year was revised to 3.63×10^{-7} /year.

In the course of the staff's review of the licensee's analyses, the licensee was requested to provide additional information regarding some site-specific aspects with respect to the projected

aircraft activities at the Homestead Air Force Base. In particular, the licensee was asked to estimate the potential for bird strikes causing aircraft mishaps in the vicinity of the airport. The licensee has indicated that, on the basis of data in the U.S. Department of Transportation Federal Aviation Administration report "Wildlife Strikes to Civil Aircraft in the United States," the fraction of civil aircraft accidents caused by bird strikes is about 0.175%. With respect to military aircraft, the licensee estimates (on the basis of USAF aircraft mishaps due to bird strikes reported for the period 1/85 through 2/98) that the fraction of military aircraft mishaps caused by bird strikes is about 4.1%. These estimates were based on nationally averaged data. The licensee adjusted the fractions to reflect the bird strike frequency characteristic of Florida. The adjusted fractions are 0.875% for civil aviation and 20.5% for military aircraft. Hence, 20.5% represents an upper bound on the increase in the aircraft crash rate at Turkey Point.

The licensee also was asked to address the effect of the projected high fraction (more than 80%) of the civil air traffic flights being from Latin America, the Caribbean, or other international locations. The intent was to determine the effect of using U.S. civil aviation crash rates for an aircraft mix that has a high fraction of foreign aircraft. Some reports indicate the possibility of substantially higher air mishap rates for aircraft of foreign origin. For example, the Commercial Aviation Safety Strategy Team has issued a report wherein the aircraft mishap rate for Latin America is estimated to be about 5.7 major accidents per million departures, compared to 0.5 for the U.S. The licensee performed a sensitivity analysis by increasing the crash frequency for commercial air carriers by a factor of 10 to approximate the effect of a high fraction of the aircraft being from Latin America, the Caribbean, or other foreign locations. The result of the above increase was estimated to raise the overall aircraft crash rate only by about 5%, since the projected total air traffic is dominated by military aircraft.

Taking into account the above effects of potential bird strikes and the adjustment for foreign carriers from Latin America, the estimated aircraft crash frequency is increased by a factor of 1.22, changing the 3.63×10^{-7} /year to 4.43×10^{-7} /year which meets the SRP 3.5.1.6 acceptance criterion of about 10^{-7} /year. In addition, FPL's estimate is within the guidelines of SRP 2.2.3, wherein the acceptance criterion of 10^{-6} /year is applicable if reasonable qualitative arguments can be made to show that the realistic probability estimate is lower. Actual configurations or situations at the plant for which qualitative arguments can be made regarding the fact that they may decrease the risk estimate, do not readily lend themselves to modeling and analysis due to the complex nature of the configurations or situations. Therefore, sound engineering judgment is utilized in determining the acceptance criteria for the probability estimate. Specifically, FPL has qualitatively identified some conservatism inherent in its analysis which indicates that the actual risk from on-site aircraft crashes is lower than the estimate of 3.63×10^{-7} /year. For example, FPL notes that shielding by adjacent structures or heavy machinery, as well as the canal and the adjacent fossil units are not fully credited. Moreover, the structural capability of safety-related structures (e.g., containment building) against missile impacts has not been taken into account when considering conditional core damage probability and conditional containment failure probability. Based on its review, the staff concludes that the risks associated with on-site aircraft crashes for Turkey Point are acceptable.

It should be noted, however, that the margin between the estimated aircraft crash frequency and the acceptance guidelines of SRP 3.5.1.6 is relatively small. Hence, the staff believes that FPL would need to monitor the aircraft operations at the proposed airport on a periodic basis.

Should the actual aircraft operations exceed those projected for the year 2014, a reassessment of the aircraft risk would need to be made. It is necessary for the licensee to inform the staff of its plans to monitor the air traffic and flight tracks at the HAFB site on a periodic basis after it becomes operational as a commercial airport, and to reassess the risk as stated above.

Regarding the potential for the base to be used as a spaceport for handling vehicle launches and landings, the licensee has not performed an analysis of the associated risks. FPL indicates that the potential impact is bounded by the impacts associated with a commercial airport. However, with no supporting data or analysis, the staff cannot, at this time, make a finding of acceptability regarding potential spaceport operations. Hence, if the base conversion leads to the implementation of spaceport operations, FPL would need to address the associated risk by providing a risk assessment for staff review and evaluation.

3. CONCLUSION

Based on its review, the staff finds the risk analysis submitted by FPL meets the acceptance criteria of SRP Sections 2.2.3 and 3.5.1.6, and, therefore, is acceptable. The staff cannot, at this time, make any conclusion with respect to the spaceport. Emergency preparedness issues will be addressed after the potential project becomes more defined.

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Date: June 19, 2000

Mr. T. F. Plunkett
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TURKEY POINT PLANT

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