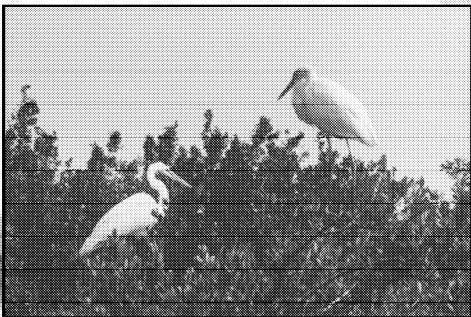
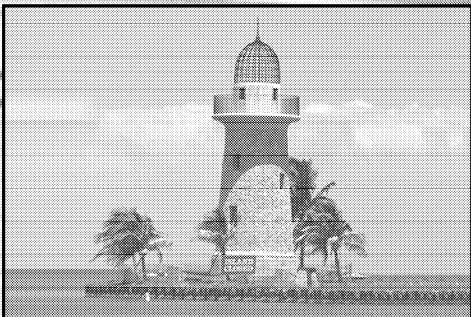


I CORRESPONDENCE ON TURKEY POINT PLANT





UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 26, 2000

Mr. Douglas J. Heady
SAF/GCN
1740 Air Force Pentagon
Washington D.C. 20330-1740

SUBJECT: POTENTIAL RISK ON TURKEY POINT PLANT OF THE PROPOSED CIVIL
AND GOVERNMENT AIRCRAFT OPERATIONS AT HOMESTEAD AIR FORCE
BASE (TAC NOS. MA8912 AND MA8913)

Dear Mr. Heady:

This acknowledges receipt of your letter dated May 2, 2000, addressed to the U.S. Nuclear Regulatory Commission (NRC) Document Control Desk. Your letter forwarded Mr. Oncavage's comments on the Draft Supplemental Environmental Impact Statement (SEIS), Disposal of Portions of the Former Homestead Air Force Base (HAFB), Florida. Mr. Oncavage believes that some of his comments should be addressed by the NRC because they relate to the above subject. The NRC staff activities regarding the above subject are summarized below.

The NRC staff is currently performing a review of Florida Power and Light Company's (FPL's) submittal, dated November 17, 1999, regarding the impact of a commercial airport at HAFB on the safe operation of Turkey Point. FPL based its analysis on the flight projections provided by the Air Force letter of August 23, 1999, (Heady to NRC Document Control Desk). Our review focuses on the probability of aircraft crashes damaging the safety-related facilities at the Turkey Point Nuclear Plant, Units 3 and 4. For this review, the staff utilizes the guidance provided in the enclosed NRC Standard Review Plan (SRP), Sections 2.2.3 "Evaluation of Potential Accidents," and 3.5.1.6 "Aircraft Hazards." 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 and 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 stated 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} /year.

The NRC staff will document its review of the potential risk to the Turkey Point Plant of the proposed civil and government operations at HAFB in a safety assessment. The staff is targeting the issuance of its assessment by early June.

In addition, your letter of August 23, 1999, stated that, "The SEIS is also examining an alternative to the proposed regional airport which would involve developing a commercial spaceport at former Homestead AFB. Very little is currently known about how spacecraft would operate from the spaceport. . . ." FPL's November 17, 1999, submittal stated that the potential impact of a spaceport at the base 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 can not determine the acceptability of FPL's conclusion. Hence, should the base be used as a commercial spaceport in addition to the military and government operations, the potential impact must be quantified in order to determine the risk for the safe operation of Turkey Point Units 3 and 4. Therefore, the NRC staff is not in a position, at this time, to assess

the potential risk of the proposed spaceport to the Turkey Point Plant. Also, for the same reason, the staff is not in a position to address Mr. Oncavage's comments related to the proposed spaceport.

The NRC staff will address Mr. Oncavage's other comments, as well as the Sierra Club's comments transmitted by a letter dated February 24, 2000, in its forthcoming safety assessment or by separate correspondence.

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 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) concur 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 believes that the spectrum of potential projects resulting from the disposal of the former HAFB 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 the Turkey Point Nuclear Plant.

If you have any comments related to this matter, please contact the NRC Project Manager for Turkey Point, Kahtan Jabbour, at (301) 415-1496.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard P. Correia".

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosures: As stated

cc w/enclosures: See next page

Ref: Homestead AFB

TURKEY POINT PLANT

cc:

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2.2.3 EVALUATION OF POTENTIAL ACCIDENTS

REVIEW RESPONSIBILITIES

Primary - Siting Analysis Branch (SAB)

Secondary - None

I. AREAS OF REVIEW

The applicant's identification of potential accident situations in the vicinity of the plant is reviewed to determine the completeness of and the bases upon which these potential accidents were or were not accommodated in the design. (See Standard Review Plan Sections 2.2.1 and 2.2.2.)

With respect to potential offsite accidents which could affect control room habitability (e.g., toxic gases, asphyxiants), those accidents which are to be accommodated on a design basis, as determined within SRP Section 2.2.3 review, will be addressed by the Accident Evaluation Branch (AEB) within SRP Section 6.4 review, in accordance with TMI-Related Requirement III.D.3.4 of NUREG-0694.

The applicant's probability analyses of potential accidents involving hazardous materials or activities in the vicinity of the plant, if such analyses have been performed, are also reviewed by the Applied Statistics Branch (ASB/MPA) on request by SAB to determine that appropriate data and analytical models have been utilized.

The analyses of the consequences of accidents involving nearby industrial, military, and transportation facilities which have been identified as design basis events are reviewed.

II. ACCEPTANCE CRITERIA

SAB acceptance criteria are based on meeting the relevant requirements of 10 CFR Part 100, §100.10 (Ref. 1) as it relates to the factors to be considered in the evaluation of sites, which indicates that reactors should reflect through their design, construction, and operation an extremely low probability for accidents that

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Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555.

could result in the release of significant quantities of radioactive fission products. In addition, 10 CFR Part 100, §100.10 indicates that the site location, in conjunction with other considerations, should insure a low risk of public exposure.

Specific criteria necessary to meet the relevant requirements of 10 CFR Part 100, §100.10 are described in the following paragraphs.

Offsite hazards which have the potential for causing onsite accidents leading to the release of significant quantities of radioactive fission products, and thus pose an undue risk of public exposure, should have a sufficiently low probability of occurrence and be within the scope of the low probability of occurrence criterion of 10 CFR Part 100, §100.10. Specific guidance with respect to offsite hazards is provided in Chapter 2, Section 2.2.3 of Regulatory Guide (RG) 1.70 (Ref. 2). As indicated therein, the identification of design basis events resulting from the presence of hazardous materials or activities in the vicinity of the plant is acceptable if the design basis events include each postulated type of accident for which the expected rate of occurrence of potential exposures in excess of the 10 CFR Part 100 guidelines is estimated to exceed the NRC staff objective of approximately 10^{-7} per year. Because of the difficulty of assigning accurate numerical values to the expected rate of unprecedented potential hazards generally considered in this SRP section, judgment must be used as to the acceptability of the overall risk presented.

The probability of occurrence of the initiating events leading to potential consequences in excess of 10 CFR Part 100 exposure guidelines should be estimated using assumptions that are as representative of the specific site as is practicable. In addition, because of the low probabilities of the events under consideration, data are often not available to permit accurate calculation of probabilities. Accordingly, the expected rate of occurrence of potential exposures in excess of the 10 CFR Part 100 guidelines of approximately 10^{-6} per year is acceptable if, when combined with reasonable qualitative arguments, the realistic probability can be shown to be lower.

The effects of design basis events have been adequately considered if analyses of the effects of those accidents on the safety-related features of the plant have been performed and measures have been taken (e.g., hardening, fire protection) to mitigate the consequences of such events.

III. REVIEW PROCEDURES

In some cases it may be necessary to consult with or obtain specific data from other branches, such as the Structural Engineering Branch (SEB) or Auxiliary Systems Branch (ASB), regarding possible effects of external events on plant structures or components.

The applicant's probability calculations are reviewed, and an independent probability analysis is performed by the staff if the potential hazard is considered significant enough to affect the licensability of the site or is important to the identification of design basis events.

All stochastic variables that affect the occurrence or severity of the postulated event are identified, and judged to be either independent or conditioned by other variables.

Probabilistic models should be tested, where possible, against all available information. If the model or any portion of it, by simple extension, can be used to predict an observable accident rate, this test should be performed.

The design parameters (e.g., overpressure) and physical phenomena (e.g., gas concentration) selected by the applicant for each design basis event are reviewed to ascertain that the values are comparable to the values used in previous analyses and found to be acceptable by the staff.

Each design basis event is reviewed to determine that the effects of the event on the safety features of the plant have been adequately accommodated in the design.

If accidents involving release of smoke, flammable or nonflammable gases, or toxic chemical bearing clouds are considered to be design basis events, an evaluation of the effects of these accidents on control room habitability should be made in SAR Section 6.4 and on the operation of diesels and other safety-related equipment in SAR Chapter 9.

Special attention should be given to the review of standardized designs which propose criteria involving individual numerical probability criteria for individual classes of external man-made hazards. In such instances the reviewer should establish that the envelope also includes an overall criterion that limits the aggregate probability of exceeding design criteria associated with all of the identified external man-made hazards. Similarly, special attention should be given to the review of a site where several man-made hazards are identified, but none of which, individually, has a probability exceeding the acceptance criteria stated herein. The objective of this special review should be to assure that the aggregate probability of an outcome that may lead to unacceptable plant damage meets the acceptance criteria of subsection II of this SRP section. (A hypothetical example is a situation where the probability of shock wave overpressure greater than design overpressure is about 10^{-7} per reactor year from accidents at a nearby industrial facility, and approximately equal probabilities of exceeding design pressure from railway accidents, highway accidents and from shipping accidents. Individually each may be judged acceptably low; the aggregate probability may be judged sufficiently great that additional design features are warranted.)

IV. EVALUATION FINDINGS

If the reviewer, after a review of the offsite hazards identified in SRP Section 2.2.1-2.2.2 and evaluated in the above SRP section, concludes that the probability of exceeding the 10 CFR Part 100 dose guidelines due to offsite hazards is within the acceptance criteria given in subsection II of this SRP section, then the staff concludes that the site location insures a low risk of exposure, in compliance with 10 CFR Part 100, §100.10. A conclusion of the following type may be prepared for the Staff's Safety Evaluation Report.

The staff concludes that the site location is acceptable and meets the relevant requirements of 10 CFR Part 100. This conclusion is based on the following. The applicant has identified potential accidents related to the presence of hazardous materials or activities in the site vicinity which could affect the plant, and from these the applicant has selected those which should be considered as design basis events and has provided analyses of the effects of

these accidents on the safety-related features of the plant. From the analyses, the applicant has demonstrated that the plant is adequately protected and can be operated with an acceptable degree of safety with regard to potential accidents which may occur as the result of the presence of hazardous materials or activities at nearby industrial, military, and transportation facilities.

V. IMPLEMENTATION

The following provides guidance to applicants and licensees regarding the NRC staff's plan for using this SRP section.

Except in those cases in which the applicant proposes an acceptable alternate method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

V. REFERENCES

1. 10 CFR Part 100, "Reactor Site Criteria," Section 100.10.
2. Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants."
3. Affidavit of Jacques B. J. Read before the Atomic Safety and Licensing Board in the matter of Skagit Nuclear Power Project, Units 1 and 2, July 15, 1976. Docket Nos. STN 50-522, 523.
4. Atomic Safety and Licensing Board, Supplemental Initial Decision in the Matter of Hope Creek Generating Station, Units 1 and 2, March 28, 1977. Docket Nos. 50-354, 355.
5. Section 2, Supplement 2 to the Floating Nuclear Plant Safety Evaluation Report, Docket No. STN 50-437, September 1976.



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3.5.1.6 AIRCRAFT HAZARDS

REVIEW RESPONSIBILITIES

Primary - Siting Analysis Branch (SAB)

Secondary - None

I. AREAS OF REVIEW

The staff reviews the applicant's assessment of aircraft hazards. The purpose of the review is to assure that the risks due to aircraft hazards are sufficiently low. Probabilistic considerations may be used to demonstrate that aircraft hazards need not be a design basis concern. Otherwise, design basis aircraft identification is made and the applicant's plant design is evaluated to assure that it is protected against the potential effects of aircraft impacts and fires.

The SAB reviews the applicant's assessment of aircraft hazards to the plant and determines whether or not they should be incorporated into the plant design basis. If the aircraft hazards are incorporated into the plant design basis, the SAB identifies and describes the design basis aircraft in terms of aircraft weight, speed, and other appropriate characteristics.

On request by SAB, the following branches with primary review responsibility will review specific aspects of aircraft hazards:

1. The Structural Engineering Branch (SEB), in the area of missile effects (SRP Section 3.5.3), with respect to aircraft impacts,
2. The Chemical Engineering Branch (CMEB), in the area of fire protection (SRP Section 9.5.1), with respect to aircraft fires, and
3. The Auxiliary Systems Branch (ASB), in the area of structures, systems, and components (SSC) important to safety (SRP Section 3.5.2), with respect to protection requirements against aircraft crashes.

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Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555.

4. For those areas of review identified above as being part of the primary responsibility of other branches, the acceptance criteria necessary for the review and the methods of their application are contained in the referenced SRP sections of the corresponding primary branches.
5. The Applied Statistics Branch (ASB/MPA) will provide technical review support with respect to aircraft accident statistics.

II. ACCEPTANCE CRITERIA

SAB acceptance criteria are based on meeting the relevant requirements of one of the following sets of regulations:

1. 10 CFR Part 100, §100.10 as it relates to indicating that the site location, in conjunction with other considerations (such as plant design, construction, and operation), should insure a low risk of public exposure. This requirement is met if the probability of aircraft accidents resulting in radiological consequences greater than 10 CFR Part 100 exposure guidelines is less than about 10^{-7} per year (see SRP Section 2.2.3). The probability is considered to be less than about 10^{-7} per year by inspection if the distances from the plant meet all the requirements listed below:
 - (a) The plant-to-airport distance D is between 5 and 10 statute miles, and the projected annual number of operations is less than $500 D^2$, or the plant-to-airport distance D is greater than 10 statute miles, and the projected annual number of operations is less than $1000 D^2$,
 - (b) The plant is at least 5 statute miles from the edge of military training routes, including low-level training routes, except for those associated with a usage greater than 1000 flights per year, or where activities (such as practice bombing) may create an unusual stress situation,
 - (c) The plant is at least 2 statute miles beyond the nearest edge of a federal airway, holding pattern, or approach pattern.

If the above proximity criteria are not met, or if sufficiently hazardous military activities are identified (see item b above), a detailed review of aircraft hazards must be performed. Aircraft accidents which could lead to radiological consequences in excess of the exposure guidelines of 10 CFR Part 100 with a probability of occurrence greater than about 10^{-7} per year should be considered in the design of the plant. If the results of the review do not support a finding that the risk due to aircraft activities is acceptably low, then the design basis acceptance criteria outlined in Item II.2 below applies.

2. General Design Criterion (GDC) 4 of 10 CFR Part 50 (Ref. 13), Appendix A, requires that structures, systems, and components (SSC) important to safety be appropriately protected against the effects of missiles that may result from events and conditions outside the nuclear power unit. GDC 3 of 10 CFR Part 50, Appendix A, requires that SSC important to safety be appropriately protected against the effects of fires. The plant meets the relevant requirements of GDC 3 and GDC 4, and is considered appropriately protected against design basis aircraft impacts (Ref. 6) and fires (Ref. 3) if the SSC important to safety are capable of withstanding the effects of the

postulated aircraft impacts and fires without loss of safe shutdown capability, and without causing a release of radioactivity which would exceed 10 CFR Part 100 dose guidelines.

The safety-related SSC to be considered with respect to the above acceptance criteria include those described in the Appendix to Regulatory Guide 1.117, "Structures, Systems, and Components of Light-Water-Cooled Reactors to be Protected Against Tornadoes." Other safety-related SSC, which may not be included in Regulatory Guide 1.117, will be considered on a case-by-case basis in accordance with the acceptance criteria of the appropriate branches having primary responsibility for their protection.

III. REVIEW PROCEDURES

The reviewer selects and emphasizes aspects of the areas covered by this SRP section as may be appropriate for a particular case. The judgment on areas to be given attention and emphasis in the review is based on a inspection of the material presented to see whether it is similar to that recently reviewed on other plants and whether items of special safety significance are involved.

The staff's review of the aircraft hazard assessment consists of the following steps:

1. **Aviation Uses.** Data describing aviation uses in the airspace near the proposed site, including airports and their approach paths, federal airways, Federal Aviation Administration (FAA) restricted areas, and military uses is obtained from Section 2.2.1-2.2.2 of the SAR. For many cases, no detailed analysis need be made as the probability can be judged adequately low based on a comparison with analyses previously performed (Refs. 5, 7, 8, 9 and 10). In general, civilian and military maps should be examined to verify that all aviation facilities of interest have been considered. In the process, the reviewer should develop an independent assessment of the aircraft hazards. Communications with agencies responsible for aircraft operations and the evaluation of aircraft operational data may be utilized.
2. **Airways.** For situations where federal airways or aviation corridors pass through the vicinity of the site, the probability per year of an aircraft crashing into the plant (P_{FA}) should be estimated. This probability will depend on a number of factors such as the altitude and frequency of the flights, the width of the corridor, and the corresponding distribution of past accidents.

One way of calculating P_{FA} is by using the following expression:

$$P_{FA} = C \times N \times A/w$$

where:

C = inflight crash rate per mile for aircraft using airway,

w = width of airway (plus twice the distance from the airway edge to the site when the site is outside the airway) in miles,

N = number of flights per year along the airway, and

A = effective area of plant in square miles.

This gives a conservative upper bound on aircraft impact probability if care is taken in using values for the individual factors that are meaningful and conservative. For commercial aircraft a value of $C = 4 \times 10^{-10}$ (Ref. 11) per aircraft mile has been used. For heavily traveled corridors (greater than 100 flights per day), a more detailed analysis may be required to obtain a proper value for this factor.

3. Civilian and Military Airports and Heli-Ports (Refs. 2, 4, and 14). The probability of an aircraft crashing into the site should be estimated for cases where one or more of the conditions in Item II.1 of the Acceptance Criteria are not met.

The probability per year of an aircraft crashing into the site for these cases (P_A) may be calculated by using the following expression:

$$P_A = \sum_{i=1}^L \sum_{j=1}^M C_j N_{ij} A_j$$

where:

- M = number of different types of aircraft using the airport,
L = number of flight trajectories affecting the site,
 C_j = probability per square mile of a crash per aircraft movement, for the jth aircraft,
 N_{ij} = number (per year) of movements by the jth aircraft along the ith flight path, and
 A_j = effective plant area (in square miles) for the jth aircraft.

The manner of interpreting the individual factors in the above equation may vary on a case-by-case basis because of the specific conditions of each case or because of changes in aircraft accident statistics.

Values for C_j currently being used are taken from the data summarized in the following table:

| Distance From End of Runway (miles) | Probability ($\times 10^8$) of a Fatal Crash per Square Mile per Aircraft Movement | | | |
|---|---|-------------------------------|-----------------------|-------------------|
| | U.S. Air Carrier ¹ | General Aviation ² | USN/USMC ¹ | USAF ¹ |
| 0-1 | 16.7 | 84 | 8.3 | 5.7 |
| 1-2 | 4.0 | 15 | 1.1 | 2.3 |
| 2-3 | 0.96 | 6.2 | 0.33 | 1.1 |
| 3-4 | 0.68 | 3.8 | 0.31 | 0.42 |
| 4-5 | 0.27 | 1.2 | 0.20 | 0.40 |
| 5-6 | 0 | NA ³ | NA | NA |
| 6-7 | 0 | NA | NA | NA |
| 7-8 | 0 | NA | NA | NA |
| 8-9 | 0.14 | NA | NA | NA |
| 9-10 | 0.12 | NA | NA | NA |

¹Reference 2.

²Reference 4.

³NA indicates that data was not available for this distance.

4. Designated Airspaces. For designated airspaces involving military or civilian usage, a detailed quantitative modeling of all operations should be verified. The results of the model should be the total probability (C) of an aircraft crash per unit area and time in the vicinity of the proposed site.

The probability per year of a potentially damaging crash at the site due to operations at the facility under consideration (P_M) is then given for this case by the following expression:

$$P_M = C \times A$$

where:

C = total probability of an aircraft crash per square mile per year in the vicinity of the site due to the airports being considered, and

A = effective area of one unit of the plant in square miles.

Where estimated risks due to military aircraft activity are found to be unacceptably high, suitable airspace or airway relocation should be implemented. Past experience has been that military authorities have been responsive to modification of military operations and relocation of training routes in close proximity to nuclear power plant sites. (Ref. 12)

5. Holding Patterns. Holding patterns are race track shaped courses at specified altitudes, associated with one or more radio-navigational facilities, where aircraft can "circle" while awaiting clearance to execute an approach to a landing at an airport or to continue along an airway. Holding patterns which are sufficiently distant from the plant need not be considered (See subsection II above). Otherwise, traffic in the holding pattern should be converted into equivalent aircraft passages taking into account the characteristics, including orientation with respect to the plant, of the holding pattern. The information in Item III.2 above should be used in this evaluation.
6. The total aircraft hazard probability at the site equals the sum of the individual probabilities obtained in the preceding steps.
7. The effective plant areas used in the calculations should include the following:
 - a. A shadow area of the plant elevation upon the horizontal plane based on the assumed crash angle for the different kinds of aircraft and failure modes.
 - b. A skid area around the plant as determined by the characteristics of the aircraft under consideration. Artificial berms or any other man-made and natural barriers should be taken into account in calculating this area.
 - c. The areas of those safety-related SSC which are susceptible to impact or fire damage as a result of aircraft crashes.

IV. EVALUATION FINDINGS

The reviewer drafts an introductory paragraph for the evaluation findings describing the procedure used in evaluating the aircraft hazards with respect to the safety-related SSC. The reviewer verifies that the site location is acceptable and meets the requirements of 10 CFR Part 100, §100.10.

The basis for the above findings may be strictly in terms of the probabilities associated with potential aircraft crashes onsite. If the aircraft crash statistics applicable to the onsite facilities are such that SRP Section 2.2.3 criteria are met without explicit consideration of plant design features, then conclusions of the following type should be included in the staff's safety evaluation report:

The staff concludes that the operation of the _____ plant in the vicinity of _____ does not present an undue risk to the health and safety of the public and meets the relevant requirements of 10 CFR Part 100, §100.10. This conclusion is based on the staff's independent verification of the applicant's assessment of aircraft hazards at the site that resulted in a probability less than about 10^{-7} per year for an accident having radiological consequences worse than the exposure guidelines of 10 CFR Part 100.

In addition, plant sites reviewed in the past which had equivalent aircraft traffic in equal or closer proximity were, after careful examination, found to present no undue risk to the safe operation of those plants. Based upon this experience, in the staff's judgment, no undue risk is present from aircraft hazard at the plant site now under consideration.

In the event that the staff evaluation of the aircraft hazards does not support the above basis, i.e., if SRP Section 2.2.3 criteria are not met, then the basis for acceptance is derived from applying GDC 3 and GDC 4 criteria. If the protection against aircraft impacts and fires is such that the plant safety-related SSC meet GDC 3 and GDC 4 criteria, then 10 CFR Part 100 requirements are considered to be met and conclusion of the following type may be included in the staff's safety evaluation report:

The staff concludes that the operation of the _____ plant in the vicinity of _____ does not present an undue risk to the health and safety of the public due to aircraft hazards and meets the relevant requirements of General Design Criteria 3 and 4. This conclusion is based on the staff having independently verified the applicant's assessment of aircraft hazards, including aircraft fires and impacts, at the site and that if the appropriate safety-related structures, systems, and components are designed to withstand the aircraft selected as the design basis aircraft, the probability of an aircraft strike causing radiological consequences in excess of the exposure guidelines of 10 CFR Part 100 is less than about 10^{-7} per year.

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, and method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

Implementation schedules for conformance to parts of the method discussed herein are contained in the referenced regulatory guides and NUREG.

VI. REFERENCES

1. 10 CFR Part 100, "Reactor Site Criteria."
2. D. G. Eisenhut, "Reactor Siting in the Vicinity of Airfields." Paper presented at the American Nuclear Society Annual Meeting, June 1973.
3. I. I. Pinkel, "Appraisal of Fire Effects from Aircraft Crash at Zion Power Reactor Facility," July 17, 1972 (Docket No. 50-295).
4. D. G. Eisenhut, "Testimony on Zion/Waukegan Airport Interaction" (Docket No. 50-295).
5. USAEC Regulatory Staff, "Safety Evaluation Report," Appendix A, "Probability of an Aircraft Crash at the Shoreham Site" (Docket No. 50-322).
6. "Addendum to the Safety Evaluation by the Division of Reactor Licensing, USAEC, in the Matter of Metropolitan Edison Company (Three Mile Island Nuclear Station Unit 1, Dauphin County, Pennsylvania)," April 26, 1968 (Docket No. 50-289).
7. Letter to Honorable J. R. Schlesinger from S. H. Bush, Chairman, Advisory Committee on Reactor Safeguards, "Report on Rome Point Nuclear Generating Station," November 18, 1971 (Project No. 455).
8. Letter to Mr. Joseph L. Williams, Portland General Electric Company, from R. C. DeYoung (in reference to Mr. Williams' letter of May 7, 1973), November 23, 1973 (Project No. 485).
9. "Aircraft Considerations-Preapplication Site Review by the Directorate of Liensing, USAEC, in the Matter of Portland General Electric Company, Boardman Nuclear Plant, Boardman, Oregon," October 12, 1973 (Project No. 485).
10. Letter to Mr. J. H. Campbell, Consumers Power Company, from Col. James M. Campbell, Dep. Chief, Strategic Division, Directorate of Operations, U.S. Air Force, May 19, 1971 (Docket No. 50-155).
11. H. E. P. Krug, "Testimony on Aircraft Operations in Response to a Question from the Board" (Docket Nos. 50-275 and 50-323).
12. Letter to Mr. J. H. Campbell, Consumers Power Company, from Col. James M. Campbell, Dep. Chief, Strategic Division, Directorate of Operations, U.S. Air Force, May 19, 1971 (Docket No. 50-155).
13. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."
14. NUREG-0533, "Aircraft Impact Risk Assessment Data Base for Assessment of Fixed Wing Air Carrier Impact Risk in the Vicinity of Airports."



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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

- 2 -

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,

A handwritten signature in dark ink, appearing to read "Kahtan N. Jabbour".

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

Mr. T. F. Plunkett
President - Nuclear Division

TURKEY POINT PLANT

cc:

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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 their 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.

Principal contributor: Kazimieras Campe, NRR

Date: ~~June~~ 19. 2000



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

July 18, 2000

Mr. Douglas J. Heady
SAF/GCN
1740 Air Force Pentagon
Washington D.C. 20330-1740

SUBJECT: TURKEY POINT UNITS 3 AND 4 - HOMESTEAD AIR FORCE BASE
PROPERTY DISPOSAL

Dear Mr. Heady:

Enclosed is a copy of Mr. Oncavage's letter dated June 9, 2000, related to the May 26, 2000, letter from Richard P. Correia, U.S. Nuclear Regulatory Commission (NRC), to you regarding the above subject. In Mr. Oncavage's June 9, 2000, letter, he stated with regard to the assessment of the potential risk to Turkey Point of the proposed spaceport, that the "Sierra Club - Miami Group realizes very little is currently known about the proposed spaceport operations." However, he requested that a detailed statement by the "responsible official" be made of any adverse environmental effects which cannot be avoided should the proposal be implemented. Mr. Oncavage stated that this request is in accordance with the National Environmental Policy Act of 1969 (NEPA). Mr. Oncavage believes that this requirement has not been met by NRC.

We are in the process of responding to Mr. Oncavage's other comments. However, his comment regarding the "detailed statement by the responsible official" should be addressed by you, as we note that the U.S. Air Force and the Federal Aviation Administration are the Federal agencies preparing the Supplemental Environmental Impact Statement. We will inform Mr. Oncavage that you will be dealing with this issue as appropriate.

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

Sincerely,

Kahtan N. Jabbour

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: Mr. Oncavage's letter of June 9, 2000

cc w/enclosure: See next page

Ref: Homestead AFB

TURKEY POINT PLANT

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SIERRA
CLUB



Miami Group

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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

June 9, 2000

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Homestead AFB Property Disposal

Sierra Club, Miami Group would appreciate the opportunity to comment on the Nuclear Regulatory Commission ("NRC") letter by Richard P. Correia, Chief, Section 2, dated May 26, 2000 to Mr. Douglas Heady, SAF/GCN, United States Air Force ("USAF").

Mr. Correia states: "Therefore, the NRC staff is not in a position, at this time, to assess the potential risk of the proposed spaceport to the Turkey Point Plant." Sierra Club, Miami Group realizes very little is currently known about the proposed spaceport operations. However, the National Environmental Policy Act of 1969 ("NEPA") requires a detailed statement by the responsible official of any adverse environmental effects which cannot be avoided should the proposal be implemented. We believe this requirement has not been met. We feel the NRC cannot suspend its obligation to provide a safety assessment of Turkey Point operations in close proximity to spaceport operations. If the information provided by the USAF on spaceport operations cannot be used to demonstrate safe operation of Turkey Point, then the assessment must be decisively negative.

The Mission Statement of the NRC (see attachment) reads in part "...to ensure adequate protection of the public health and safety..." If the NRC cannot demonstrate adequate public health and safety concerning Turkey Point operations in relation to the spaceport operations, then again, the assessment must be decisively negative. This assessment will most likely be included in the Final Supplemental Environmental Impact Statement ("FSEIS") which will most likely be used by the decision makers to convey or not convey portions of the former Homestead Air Force Base to the spaceport developers. We expect the decision on conveyance to be made shortly after the publication of the FSEIS. The Mission Statement does not

Recycled paper

"Not blind opposition to progress, but opposition to blind progress."

SOY INK

provide for a suspension of the NRC's obligations to the health and safety of the public.

The Sierra Club, Miami Group would also appreciate the opportunity to comment on the "Response to Request for Additional Information" by R.J. Hovey, Vice President, Turkey Point Plant, dated May 1, 2000.

Response 2

The twin 400' chimneys (413' above mean sea level) need to be factored into the calculation of the effective area since their presence may cause a crash of a wayward low flying aircraft that otherwise might have cleared all the other plant structures. The height of the twin chimneys (232' taller than the containment buildings) likely increases not decreases the probability of air crashes. The effective area needs to be recalculated.

As to the notion that the chimneys offer a form of protection for the nuclear site, it is not likely that a B-767 weighing 450,000 lbs. or a MD-11 weighing 633,000 lbs. (see attachment) would be stopped by a chimney. It is far more realistic that such a collision would create missiles in the form of chimney pieces that could impact the nuclear site in addition to the crashing aircraft. There is also a remote possibility that an aircraft could strike both chimneys bringing them both down. The mass and velocity of chimney pieces as missiles needs to be factored into the calculations.

Response 3

Omitted from the target building data table were Unit 1 smokestack, fire fighting equipment, all fuel tanks (including the tanks associated with fossil units 1 & 2), and the switchyard. The on-site crash frequency needs to be recalculated encompassing all the safety related structures.

Response 4

Attached is a copy of a letter from Bernice U. Constantin, U.S. Dept. of Agriculture to Lt. Col. Dunaway, dated March 4, 1996. The letter describes the seriousness of bird hazards, site specific to Homestead Air Force Base. A quantitative multiplier needs to be incorporated into the air crash probability calculations.

Response 5

Increasing the crash frequency of commercial carriers by a factor of 10 to account for 80 % of operations connected with Latin America, the Caribbean, or other international locations disregards the 56,771 operations of general aviation. According to NUREG-0800, general aviation has a crash frequency 4.44 higher than commercial aviation. An assumption can be made that 80 % of the general aviation operations will have an international connection.

Question 5 quotes a crash frequency of 0.5 major accidents per million departures for U.S. commercial carriers and 5.7 for Latin American carriers. Using a factor of 10 appears to significantly underestimate the risk of a major air crash for Latin American carriers.

Omitted from the hit frequency table were unit 1 smokestack, unit 2 smokestack, fire fighting equipment, all fuel tanks (including the tanks associated with fossil units 1 & 2), and the switchyard.

The hit frequency table data for CCDP and CCFP for spent fuel building units 3 and 4 appear to imply a catastrophic radiological accident independent of the nuclear steam supply system, yet still able to cause core damage and containment failure. The radiological consequences of an aircraft impacting the spent fuel buildings needs to be addressed along with core damage and containment failure. We are extremely concerned about a catastrophic failure of the spent fuel pools in relation to air crashes. We estimate that Turkey Point houses in excess of 300,000 spent fuel rods.

In conclusion, we hope this letter will help clarify our positions for the

NRC staff. We apologize for its lateness. We urge the NRC to revisit the letter of February 24, 2000 from the Sierra Club, Miami Group and request that the information is incorporated into the Safety Evaluation Report.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Oncavage", written in a cursive style.

Mark Oncavage
Energy Chair



Mission and Organization

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Mission

THE mission of the U.S. Nuclear Regulatory Commission (NRC) is to ensure adequate protection of the public health and safety, the common defense and security, and the environment in the use of nuclear materials in the United States. The NRC's scope of responsibility includes regulation of commercial nuclear power reactors; nonpower research, test, and training reactors; fuel cycle facilities; medical, academic, and industrial uses of nuclear materials; and the transport, storage, and disposal of nuclear materials and waste.

Statutory Authority

The NRC was created as an independent agency by the *Energy Reorganization Act of 1974*, which abolished the Atomic Energy Commission (AEC) and moved the AEC's regulatory function to NRC. This act, along with the Atomic Energy Act of 1954, as amended, provides the foundation for regulation of the nation's commercial nuclear power industry.

NRC regulations are issued under the *United States Code of Federal Regulations*, (CFR) Title 10, Chapter I. Principal statutory authorities that govern NRC's work are--

- Atomic Energy Act of 1954, as amended
- Energy Reorganization Act of 1974, as amended
- Uranium Mill Tailings Radiation Control Act of 1978, as amended
- Nuclear Non-Proliferation Act of 1978
- Low-Level Radioactive Waste Policy Act of 1980
- West Valley Demonstration Project Act of 1980
- Nuclear Waste Policy Act of 1982
- Low-Level Radioactive Waste Policy Amendments Act of 1985
- Diplomatic Security and Anti-Terrorism Act of 1986
- Nuclear Waste Policy Amendments Act of 1987
- Solar, Wind, Water and Geothermal Power Production Incentives Act of 1990
- Energy Policy Act of 1992

The NRC and its licensees share a common responsibility to protect the public health and safety. Federal regulations and the NRC's regulatory program are important elements in the protection of the public. NRC licensees, however, have the primary responsibility for the safe use of nuclear materials.

Licensing and Regulatory Responsibilities

The NRC fulfills its responsibilities through a system of licensing and regulatory activities that include--

- Licensing the construction and operation of nuclear reactors and other nuclear facilities, such as nuclear fuel cycle facilities and test and research reactors, and overseeing their decommissioning
- Licensing the possession, use, processing, handling, and export of nuclear material
- Licensing the siting, design, construction, operation, and closure of low-level radioactive waste disposal sites under NRC jurisdiction and the construction, operation, and closure of the geologic repository for high-level radioactive waste



commercial jetliner

Background Info

Technical Specs



Specifications



SPECS



EXTERIOR



INTERIOR



FACTS

Passengers

Typical 3-class configuration 245
Typical 2-class configuration 304
Typical 1-class configuration up to 375

Cargo

4,580 cu ft (129.6 cu m)

Engines

maximum thrust Pratt & Whitney PW4000
63,300 lb (28,713 kg)
General Electric CF6-80C2
62,100 lb (28,189 kg)

Maximum Fuel Capacity

24,140 U.S. gal (91,380 l)

Maximum Takeoff Weight

450,000 lb (204,120 kg)

Maximum Range

6,480 statute miles (10,428 km)
Typical city pairs: London-Tokyo

Typical Cruise Speed

0.80 Mach
530 mph (854 km/h)

Basic Dimensions

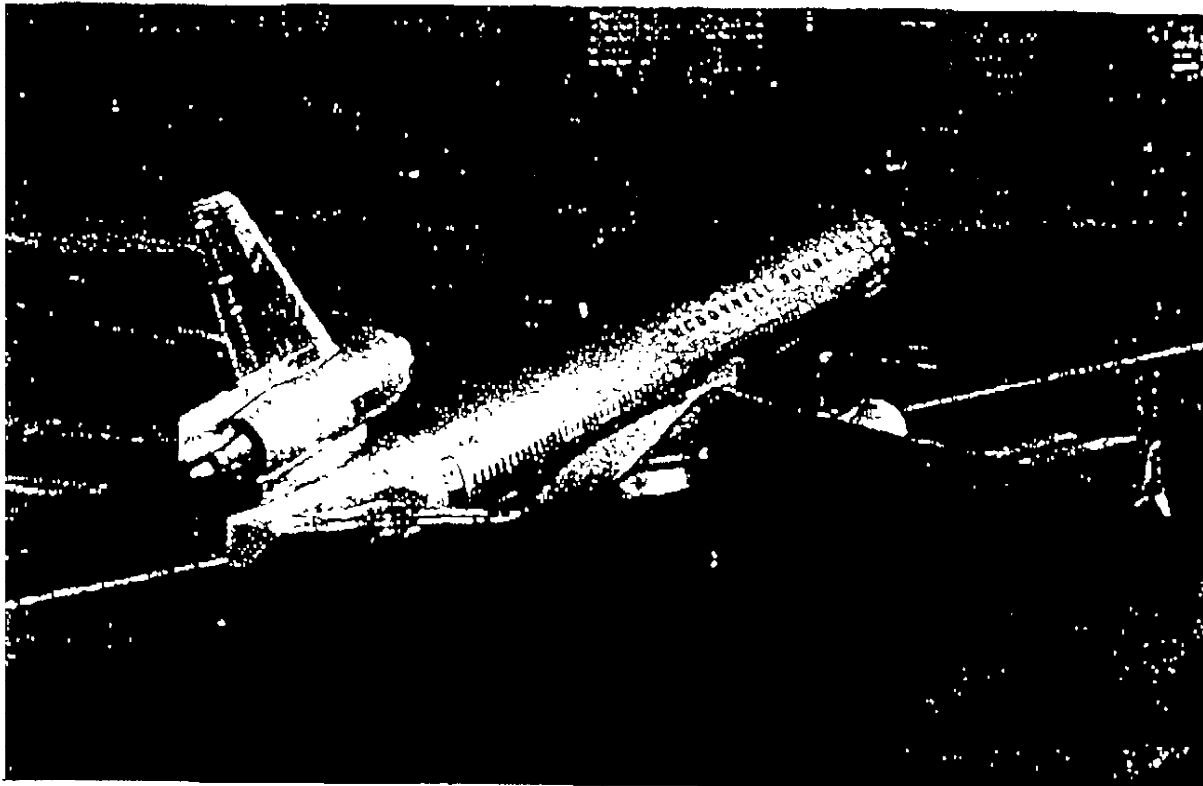
Wing Span 170 ft 4in (51.9 m)
Overall Length 201 ft 4in (61.4 m)
Tail Height 55 ft 4in (16.8 m)
Interior Cabin Width 15 ft 5 in (4.7 m)

Specifications



Search

The McDonnell Douglas MD-11



Some Quick Stats

Passenger Capacity: 295-410

Length: 61.6m

Wingspan: 51.7m

Engines: P&W 4000's, GE CF6-80C2D

Maximum Take-off Weight: 602-633,000lbs.

Fuel Capacity: 148,000 litres

Max. Range: 13,240km

Cruise Speed: 882km/h

Cargo Capacity: Passenger: 6,850 cubic ft. Freighter: 22,000 cubic ft.

Attachment 1



United States
Department of
Agriculture

Animal and
Plant Health
Inspection
Service

Animal Damage
Control

2920 Sage Parkway
Gainesville, TX
904/777-3333

March 4, 1999

Col. Col. Joe Dunaway
422nd SE
Homestead AFB, FL 33033-1333

Dear Col. Dunaway,

It was a pleasure getting together with you. Flight Chief John Mitchell and Environmental Specialist Andy Sobick to review the bird situation at Homestead AFB as it relates to air traffic safety. I appreciate the opportunity to comment on the need for bird control at the base.

The cursory inspection tour of the airbase and part of the surrounding area gave me an indication of the magnitude and cause of the bird problems you are experiencing. Though I did not see large numbers of birds on the airbase, I noted several reasons for the reported extensive bird activity there. The main reason is that a county operated landfill located three miles north-northeast of the end of the runway is attracting large numbers of birds. Landfills are artificial attractants to birds because of the constant supply of available food and the large expanse of open land for roosting. As you are aware, we observed hundreds of vultures and gulls on the face of and soaring above the landfill. These two groups of birds are especially hazardous to aircraft because of their size and soaring habits. Vultures weigh from 4 to 8 pounds and will soar at great heights for several hours at a time. Gulls weigh 1 to 1.5 pounds and also soar for long periods of time. This situation is exacerbated by the fact that gulls using the landfill roost in an area just south or southeast of the airbase. According to base O&S personnel, hundreds of gulls fly through the runway area each morning and evening going to and from the landfill and roosting area. This will be hard to prevent unless gulls are deterred from using the landfill.

Ring-billed gulls were observed using a water puddle on the base. Gulls habitually use standing water on runways, parking lots and other concrete surfaces after a rain. Serious problems occur when this happens on or near runways. Gulls and wading birds will also frequent puddles in grassy areas in search of frogs, worms, insects and other small animals.

Other birds of concern at the airbase are wading birds (e.g. egrets, herons, etc) and diving birds (e.g. cormorants, anhingas,



and.). Some of these were observed using the drainage ditch and marshy area that parallels the runway. The standing water and marshy grasses in this area should be eliminated and measures taken to keep drainage ditches open to facilitate water flow and keep water from ponding.

Another concern is the reported congregating of cattle egrets and gulls around the tractor-mowers during grass cutting. This commonly happens as birds are attracted to the large number of insects, frogs and other small prey that become available when grass is cut.

→ As previously stated, the county landfill located north-northeast of Homestead AFB presents a major problem for air traffic using the base. The course of the runway directs air traffic almost directly over the landfill where bird activity is very heavy. Also, bird numbers in the area will always be artificially high because of the birds attracted to the landfill. The soaring habits of most of these birds inadvertently bring them over the airbase and into air traffic lanes. Controlling bird activity at the airbase will be difficult unless bird management is also implemented at the landfill.

Because of the complexities of bird usage at Homestead AFB, and the urgent need to reduce bird activity in the aerodrome, I recommend that a biological assessment and hazard action analysis be conducted concurrently with an operational hazard control program. This program would determine pertinent factors relative to bird use at Homestead AFB such as species composition, bird numbers, daily and seasonal activity and habitat factors that attract wildlife. It would also implement new control strategies based on observations and evaluate the effectiveness of the current bird control program. An assessment/operational program would allow us to develop long-range bird management plans for Homestead AFB. This assessment/operational program would be in compliance with the EASA Reduction plan for Homestead AFB.

Another benefit that can be realized from a bird control program at Homestead AFB is controlling birds in hangers and other open buildings. Birds using hangers for roosting and nesting can cause problems when their manure and nesting debris gets into engine parts or on airplane surfaces. Bird manure, because of the high acidic content, tends to corrode the body and canopy of airplanes, and manure and debris can contaminate sensitive mechanical and electrical equipment. In fact, it was stated during our meeting when discussing this problem that repainting areas where bird manure has corroded the paint can be quite a lengthy and expensive process.

I want to make you aware that I met with the Environmental Engineer for the Florida Air National Guard, Major David Youmans,

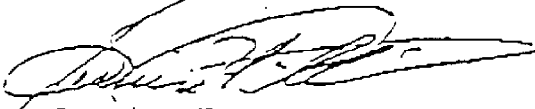
and informed him of the situation at Homestead ARB. Major Youmans said that he would recommend that the Air National Guard support any bird hazard management operations at Homestead.

As mentioned at our meeting, the USDA, AIC, Wildlife Services has Wildlife Biologists who are trained at assessing wildlife damage problems and implementing operational programs at airports and military air installations. I would be happy to provide assistance to your agency for implementing a bird hazard assessment/operational program.

I have enclosed the "Wildlife Hazard Prevention and Control" section of the AIC Airport Safety Manual. This section expounds on the principles and guidelines set forth in the BASH Reduction Plan for Homestead ARB. I have also submitted a draft Work Plan and budget for the USDA, Wildlife Services to conduct an assessment/operational program for Homestead ARB for your consideration.

Contact me should you have any questions or want to discuss the subject of this letter. I look forward to hearing from you soon. This office remains ready to serve you should you need our assistance.

Regards,



Bernice U. Constancia
State Director

Enclosure:

cc: John B. Mitchell, Flight Chief, Homestead ARB
Andrew L. Schick, Environmental Specialist, Homestead ARB
→ Bart Vernace, District Office FAA, Airports



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

July 25, 2000

Ms. Barbara Lange
Messrs. Mark Oncavage and Alan Farago
Sierra Club - Miami Group
Post Office Box 43-0741
South Miami, Florida 33243-0741

SUBJECT: TURKEY POINT UNITS 3 AND 4 - HOMESTEAD AIR FORCE BASE
PROPERTY DISPOSAL

Dear Sierra Club Representatives:

This is in response to your letter of February 24, 2000, as supplemented by letters dated March 3 and 27, and June 9, 2000, from Mark Oncavage. The above letters contained comments regarding the proposed commercial operations at the Homestead Air Force Base (HAFB) site, and the potential risk to Turkey Point Units 3 and 4 from these operations. You requested that the U.S. Nuclear Regulatory Commission (NRC) staff address these comments in its safety assessment (SA) of the above subject. By letter dated April 26, 2000, the staff informed you that these comments will be addressed in the staff's SA or in separate correspondence. Additionally, as stated in our letter to you dated April 4, 2000, we have added your individual names to our distribution for the documents related to this subject sent by the NRC to FPL and the U.S. Air Force (USAF).

The staff issued its SA on this subject by letter dated June 19, 2000, to Thomas F. Plunkett, President of the Nuclear Division, Florida Power and Light Company (FPL). Sierra Club's (SC's) comments stated in the February 24, 2000, letter regarding the crash risk from bird strikes and the foreign aircraft operations were addressed in the SA. Also, the SA, as well as our May 26, 2000, letter to Douglas J. Heady, USAF, provided the reason (i.e., the lack of information, at this time, on how spacecrafts would operate from the spaceport) for not addressing Mr. Oncavage's comments as stated in his letter dated March 3, 2000, related to the proposed spaceport (i.e., Comments #4, 5, 6, 7, 8, 13, 14, 15, and 18). Mr. Oncavage's Comments #25, 28, 29, 30, and 34 are addressed herein. It should be noted that Mr. Oncavage's April 17, 2000, letter requested the USAF and the Federal Aviation Administration (FAA) to address the remaining comments (i.e., Comments #1, 2, 3, 9, 10, 11, 12, 16, 19, 20, 21, 22, 23, 26, and 32 to be addressed by the USAF, and Comments #17, 24, 27, 31, and 33 to be addressed by FAA).

In the June 9, 2000, letter, Mr. Oncavage stated with regard to the assessment of the potential risk to Turkey Point of the proposed spaceport that the "Sierra Club, Miami Group realizes very little is currently known about the proposed spaceport operations." However, he requested that a detailed statement by the "responsible official" be made of any adverse environmental effects which cannot be avoided should the proposal be implemented. Mr. Oncavage stated that this request is in accordance with the National Environmental Policy Act of 1969 (NEPA). Mr. Oncavage believes that this requirement has not been met.

The USAF and the FAA are the Federal agencies preparing the Supplemental Environmental Impact Statement. This comment should be addressed by them. In this regard, by our letter of July 18, 2000, to Mr. Heady, we forwarded this comment to the USAF. Also, in the June 9, 2000, letter, Mr. Oncavage discussed the Mission Statement of the NRC which reads in part

“... to ensure adequate protection of the public health and safety. . . .” He added that “If the NRC cannot demonstrate adequate public health and safety concerning Turkey Point operations in relation to the spaceport operations, then again the assessment must be decisively negative.” The staff understands that for a spaceport there is a need for a separate Environmental Impact Statement which focuses on this issue. Therefore, the staff is not able to make a safety finding on the adequacy of the spaceport operations until sufficient information is available. At that time, the staff will ensure that its finding meets the Commission regulations and that there is reasonable assurance that the activities can be conducted without endangering the health and safety of the public. The staff is of the opinion that it is fulfilling its Mission Statement by not making a finding at this time.

The excerpt below taken from the June 19, 2000, SA, and the subsequent paragraphs discuss each of the remaining comments.

Excerpt from the staff's SA of June 19, 2000

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 [Standard Review Plan] 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.

SC's comment on public record (February 24, 2000, letter)

. . . . a significant amount of information seems to be missing from the public record including the Draft Supplemental Environmental Impact Statement [DSEIS].

Response

In accordance with 10 CFR 2.790 of the NRC's "Rules and Practice," a copy of this letter is available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (the Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room). Our understanding from Mr. Heady is that the DSEIS was widely distributed in December 1999, and at the public hearings that the USAF and FAA held in February 2000 in the vicinity of the HAFB site. Also, by letter dated June 8, 2000, Mr. Heady sent a copy of the DSEIS to the NRC Document Control Desk and, therefore, it is now available in ADAMS with an accession number ML003723827.

SC's comment on the equations used to estimate the aircraft crash probability (Comment #1 of February 24, 2000, letter)

FP&L's [sic] response (ref. 4 and ref. 7) utilizes formulae that appear to be inconsistent with NUREG-0800 [SRP 3.5.1.6].

Response

The NRC staff's SA stated that FPL used the Department of Energy (DOE) methodology which is equivalent to the SRP methodology. The SRP does not require the use of the formulae stated in Section 3.5.1.6. The staff accepts equivalent methodologies in the review of documents submitted by its licensees.

SC's comment on calculations (Comment #2 of February 24, 2000, letter)

We request that a line-by-line, calculation-by calculation probability analysis . . . be included in the SER, as specified by NUREG-0800.

Response

The SRP does not specify that a line-by-line, calculation-by-calculation be included in the staff's SA. The staff's SA dated June 19, 2000, conformed to the SRP recommendation for addressing safety issues and is in congruence with the standards that have normally been followed by the staff for SAs and evaluations.

SC's comment on flights to all the countries of the Caribbean, Central America, and South America (Comment #3 of February 24, 2000, letter)

. . . by 2015, of these 51,220 operations, more than 80% are estimated to be Latin American

Response

The staff's SA dated June 19, 2000, addressed this concern on page 3. This results in an increase of the risk probability by about 5%.

SC's Comment on the distance between HAFB and Turkey Point (Comment #4 of February 24, 2000, letter)

. . . maps and diagrams appear to show that portions of Homestead Air Force Base lie within a 5-mile radius of the plant

Response

The distance criterion is based on the proximity of an airport runway rather than the property boundary. In any case, the distance between the Turkey Point facility and the runway is a factor that is accounted for when using the DOE or the SRP methodology. In addition, in response to an NRC comment, FPL stated in its letter of May 1, 2000, that the estimated distance from the Turkey Point site (Units 1, 2, 3 and 4) to the HAFB runway is 4.9 miles with an estimated uncertainty of ± 0.2 miles.

SC's comment on the flight path over Turkey Point (Comment #5 of February 24, 2000, letter)

In an addendum to the DSEIS, on the flight path chart named "HST EAST FLOW," it appears that the following flight paths over Turkey Point How do these over flights meet acceptance criteria, II.1.c of NUREG-0800?

Response

The listed flights are part of the total air activity in the vicinity of the Turkey Point site that is addressed in assessing aircraft risk for the site. The first step is the application of the proximity/operations screening criteria of SRP 3.5.1.6, Part II. If these are met, the risk is considered to be within the acceptance criteria. If not, appropriate air crash estimates are made to estimate the risk. Specific equations are used to estimate aircraft operations in connection with an airport, as well as aircraft activities associated with commercial and military air routes.

SC's comment on the critical structure for risk assessment (Comment #6 of February 24, 2000, letter)

FP&L [sic] lists the critical structures for risk assessment . . .

Response

As shown in the staff's SA (please refer to the SA excerpt stated above), the aircraft crash risk is acceptably low. SRP Section 3.5.1.6 states that the safety-related structures, systems, and components (SSC) to be considered with respect to the screening criteria include those described in the Appendix to Regulatory Guide (RG) 1.117, "Structures, Systems, and Components of Light-Water-Cooled Reactors to be protected Against Tornadoes." Other safety-related SSC, which may not be included in RG 1.117, will be considered on a case-by-case basis. Some of the items listed in this comment such as all firefighting equipment, the fuel tanks for Turkey Point Units 1 and 2, and the switchyard, are not classified as safety-related equipment. The fuel tanks for the Turkey Point Unit 4 diesel generators (DGs) are housed inside the Unit 4 DG building. The day tanks for the Unit 3 DGs are housed inside the Unit 3 DG building. The 7-day tank for Unit 3 DGs is located outside the DG buildings and is classified as safety-related. However, the area of the tank is very small in relation to the total area that was considered. Hence, its inclusion in the estimated total target area would not change the total area significantly.

SC's comment on the Brookhaven National Laboratory (Comment #7 of February 24, 2000, letter)

In a study by Brookhaven National Laboratory (ref. 8, p. 4-2) the worst-case scenario of an accident at a spent fuel pool

Response

As shown in the staff's SA (please refer to the SA excerpt stated above), the aircraft crash risk is acceptably low. The SRP does not require addressing this structure if the risk is acceptable.

SC's Comment on bird strike hazards (Comment #8 of February 24, 2000, letter) and Mr. Oncavage's comment on bird strikes (Comment #25 of March 3, 2000, letter), also Response 4 from Mr. Oncavage's letter dated June 9, 2000

Attached is a copy of a letter from Bernice U. Constantin

Response

As shown in the SA excerpt above, the bird strike effect was considered and led to an increase of the crash risk. The combined effect of potential bird strikes and the adjustment for foreign carriers from Latin America led to an increase of 22% of the crash risk.

Mr. Oncavage's comment on air crash probability (Comment #28 of March 3, 2000, letter), also Response 5 from Mr. Oncavage's letter dated June 9, 2000

How does the NRC quantify the air crash probabilities for Turkey Point for air carriers from the Caribbean, Central American, and South American Countries?

Increasing the crash frequency by a factor of 10 to account for 80% of operations

Response

To address the effect of South American flights, the crash frequencies for commercial aviation presented in SRP 3.5.1.6 were increased by a factor of 10 for all commercial aviation using the Homestead airport. On this basis, the factor of 10 is more than sufficient to account for South American flights which are projected to be 80% of the total.

Mr. Oncavage's comment on the consequences of a worst-case accident (Comments #29 and #30 of March 3, 2000, letter), also Responses 2 and 3 from Mr. Oncavage's letter dated June 9, 2000

What would be the consequences of a worst-case accident crashing into the Turkey Point control building?

What would be the consequences of a worst-case accident crashing into the Turkey Point spent fuel pool buildings?

The twin 400' chimneys need to be factored

Omitted from the target data

Response

As shown in the staff's SA (please refer to the excerpt stated previously), the aircraft crash risk is acceptably low. 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. The low crash risk probability provides reasonable assurance that no release exceeding 10 CFR Part 100 will occur.

Mr. Oncavage's comment on statistical probability (Comment #34 of March 3, 2000, letter)

What is the NRC's statistical probability of an airplane crash at Turkey Point from the Homestead Airport?

Response

The FPL's statistical probability is as stated in the staff's SA, which is 4.43×10^{-7} /year. The staff finds that the methodology used to generate this probability is acceptable.

If you have any comments regarding this matter, please contact Kahtan Jabbour, Project Manager for the Turkey Point Plant. Mr. Jabbour may be contacted at 301-415-1496.

Sincerely,



Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

cc: See next page

Ref: Homestead AFB

TURKEY POINT PLANT

cc:

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