

**CASE**  
**Citizens Allied for Safe Energy, Inc.**

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8/31/2010  
75 FR 53352

①

October 21, 2010

TO: NUCLEAR REGULATORY COMMISSION  
United States Of America

Subject: Docket ID NRC-2010-0288

Reference:

ACTION: Notice of Issuance and Availability of Draft Regulatory Guide,  
DG-1247, "Design-Basis Hurricane and Hurricane Missiles  
for Nuclear Power Plants."

POSTION PAPER: Lack of Scientific Evidence That Turkey Point Experienced  
Category 4 Winds During Hurricane Andrew in 1992

**INTRODUCTION**

Citizens Allied for Safe Energy, Inc./CASE is a Florida non-profit corporation which advocates safe, renewable, sustainable energy sources and distributed energy production in South Florida. CASE has no paid staff; all work is done by active members, advisors and expert witnesses on a volunteer basis.

In response to the referenced request by the Nuclear Regulatory Commission, CASE is very concerned that statements published by the NRC that Turkey Point experienced Category 4 Hurricane winds during Hurricane Andrew in 1992 are not supported by facts. Published research by NOAA scientists indicates that winds no greater than Category 3 were experienced and that any conclusions regarding the damage at Turkey Point during that event cannot be attributed to a higher force wind. More recent research only indicates that might have experienced high winds but not with reliable and usable certainty.

RECEIVED

2010 OCT 22 AM 10:30

RULES AND DIRECTIVES  
BRANCH  
USA/NC

SUNSI Review Complete  
Template = ADM-013

FRIDS = ADM-03  
Call = B. Carpenter (902)  
m. Case (mjc)

Information Notice 93-53 referenced above was, as stated in the notice, prepared by an NRC/Industry team. The report was actually prepared by the Institute of Nuclear Power Operators/INPO.

## BACKGROUND

On July 20, 1993 the NRC issued  
INFORMATION NOTICE 93-53: EFFECT OF HURRICANE ANDREW ON  
TURKEY POINT NUCLEAR GENERATING STATION AND LESSONS  
LEARNED

The notice includes the following statement:

"On August 24, 1992, Category 4 (on a scale of 1 to 5, where 5 is the most severe) Hurricane Andrew hit south Florida and caused extensive onsite and offsite damage at Turkey Point. An NRC/industry team was organized to review the damage that the hurricane caused the nuclear units and the utility actions to prepare for the storm and recover from it, and to compile lessons that might benefit other nuclear reactor facilities. Results of the team review are presented in the report, "Effect of Hurricane Andrew on the Turkey Point Nuclear Generating Station from August 20-30, 1992," issued in March 1993. This report was distributed to all power reactor licensees by the Institute of Nuclear Power Operations on June 10, 1993.

### Discussion

Hurricane Andrew is historic because this is the first time that a hurricane significantly affected a commercial nuclear power plant. ***The eye of the storm, with sustained winds of up to 233 kilometers per hour (km/h) [145 miles per hour (mph)] and gusts of 282 km/h (175 mph), passed over the Turkey Point site and caused extensive onsite and offsite damage.*** (emphasis added)

### Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the lessons learned from the joint NRC/industry team review of the effect of Hurricane Andrew on Turkey Point Nuclear Generating Station. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems."

## ARGUMENT

The conclusions drawn in Information Notice 93-53 are not supported by any reliable scientific evidence and cannot be used to demonstrate how Turkey Point did or will be affected by a Category 4 or 5 Hurricane.

Research published (1, 2) by Dr. Mark D. Powell and Dr. Samuel H. Houston of the Hurricane Research Division, NOAA/AOML, shows that, during Hurricane Andrew, Turkey Point never experienced sustained winds higher than 123 MPH (55 meters per second (m/s) (2, Figure 7). Category 3 winds include winds between 111 MPH (49.62 m/s) and 130 MPH (58.115 m/s). Further, the highest wind gusts (2, Figure 13) were 70 m/s or 157 MPH. These figures are significantly different from and lower than those reported by the NRC on July 20, 1993.

The eye of a hurricane does not contain the highest winds in the storm. Usually, and as seems the case for Hurricane Andrew, the upper right or northeast quadrant of a hurricane has the strongest winds; this is borne out by the referenced research data. The strongest winds were several miles north of Turkey Point in the Perrine area. (2, Figures 3 & 7). In his email to me of August 9, 2010 (below), Dr. Powell states: "The peak wind speed is still on the North side of the storm but the winds are increased substantially from our earlier estimate published in 1996." However, the 2009 paper referenced (citation 3), to this writers understanding, only makes a global conclusion that winds were *higher than previously estimated but does not relate* wind speed to any specific point on the ground. Therefore, as has and will be noted elsewhere in this letter, no conclusive statements can be made regarding winds at Turkey Point during Andrew apart from the findings in citations 1 and 2.

The high water mark at Homestead of 2.04 meters while further north in Cutler Ridge the mark was as 5.15 meters (2, Figure 11) which would indicate that the force of the wind and related storm surge were greater miles above Turkey Point.

In Part 1 (reference 1, Table 1) of Dr. Powell and Houston's study, they show that 74% of the anemometers in the area failed completely or partially. Further, in Part 1 (reference 1, Figure B1. Wind tunnel calibration results of three anemomters) it can be seen that all three devices analyzed significantly over stated wind speeds above 100 mph so even the partial measurements they made are unreliable.

Here is the Abstract for Part 2:

**Hurricane Andrew's Landfall in South Florida. Part II: Surface Wind Fields and Potential Real-Time Applications** MARK D. POWELL AND SAMUEL H. HOUSTON

Hurricane Research Division, NOAA/AOML, Miami, Florida (Manuscript received 10 April 1995, in final form 8 February 1996)

**ABSTRACT**

All available wind data associated with Hurricane Andrew's passage were analyzed for periods corresponding to landfall south of Miami and emergence from southwest Florida. At landfall in southeast Florida, maximum sustained 1-min surface wind speeds VM1 reached just over 60 m s<sup>-1</sup> in the northern eyewall over land; by the time Andrew exited the Florida peninsula, the peak value of VM1 over land decreased to 40–45 m s<sup>-1</sup>. Radar reflectivity observations from Tampa and Melbourne could not support an obvious correlation of convective cell development with coastal convergence during landfall on the southeast coast. On the southwest coast, however, convective cell development in the southern eyewall was supported by a coastal convergence maximum. Comparison of the wind swath with two independent Fujita-scale damage maps indicated that peak swath speeds compared well with damage-derived speed equivalents in the worst damaged areas but were higher than equivalents in moderately damaged areas. Comparison of the analysis maximum wind swath with an engineering survey of damaged homes suggests that homes exposed to a wide range of wind directions while subjected to high wind speeds suffered the most damage. Potential real-time applications of wind field products include warning dissemination, emergency management, storm surge and wave forecasting, and wind engineering. Development of damage assessment models for disaster mitigation is addressed from the viewpoint of an electrical utility.

Dr. Powell was consulted in the preparation of this letter. In emails to this writer, he said:

Monday, August 9, 22010 4:23 PM

"On my web site ([www.aoml.noaa.gov/hrd/Powell/index.html](http://www.aoml.noaa.gov/hrd/Powell/index.html)) you will find two publications from 1996 and a recent one in 2009 that are relevant. Also Landsea et al. published a revised Andrew peak wind estimate in 2004 that was published in the Bulletin of the American Meteorological Society. Based on new information and understanding of the surface wind distribution in hurricanes, our 2009 paper estimated a higher wind speed for Hurricane Andrew at landfall in South Florida. The peak wind speed is still on the North side of the storm but the winds are increased substantially from our earlier estimate published in 1996. (Reference 2)

(Please refer to ) some research by the Florida Solar Energy Center:  
[http://www.floridaallianceforrenewableenergy.org/FARE\\_2010\\_Conference.php](http://www.floridaallianceforrenewableenergy.org/FARE_2010_Conference.php)

Tuesday, August 10, 2010, 9:11 AM:

"The wind speed reported for Turkey Point on Wikipedia was not substantiated in our visit to the site. Our 1996 papers have the most comprehensive analysis of Andrew's wind reports (see pages 315-324). FPLs station winds are listed in Table A3 and winds do not go above hurricane strength probably due to a combination of sensor failure and power loss to the data recorder. Wikipedia is known to have errors in many topics."

Tuesday, October 19, 2010, 9:30 AM:

"More recent work we have published (Reference 3) on how to estimate winds at the surface from reconnaissance flight level data at 10,000 ft indicates that Andrew was stronger than we had originally analyzed and reported in those two 1996 papers. No surface wind observations survived at Turkey Point to substantiate how strong the winds may have been, but given the winds measured by the recon aircraft, and new work (attached) based on new measurement techniques, all indications are that Andrew was indeed a Category 5 storm. The storm center passed directly over Turkey Point so it is likely that Cat 5 winds were experienced at that location. I am including our paper published in 2009 which examines Andrew's peak wind in a Table near the end of the paper.

Tuesday, October 19, 2010 11:24 AM

"The more recent paper (reference 3) indicates that even if the max wind at flight level is on the right (north) side of the storm (looking in the direction of storm movement), the max wind at the surface can be in another quadrant. So the peak winds over land could have been in the western eyewall with Northwest winds that would be pushing water out of southern Biscayne Bay. The winds would then go calm in the eye and the backside of the eyewall would contain southeast winds that would push water into the bay contributing to a peak water level north of Turkey Point as

observed. Unfortunately, our exhaustive effort to locate surface wind observations after the storm did not find complete records that could establish what may have happened at Turkey Point.”

## CONCLUSION

The purpose of this submission to the NRC is not to present an exhaustive scientific analysis of the issues raised by CASE. Rather, it is CASE's intention to call the NRC's attention to the existence of the research referenced and to point out that the conclusions drawn from incorrect data in the published NRC report published in NRC Information Notice 93-53 should be tempered and redefined in accordance with the findings of Dr. Powell and his associates in determining the strength of structures related to energy production in a hurricane zone.

It should be noted that Dr. Powell's email statement on October 19, 2010 makes no conclusive statement. He only says “*all indications are* that Andrew was indeed a Category 5 storm.” And ... “*it is likely* that Cat 5 winds were experienced at that location.” (emphasis added). These guarded statements hardly constitute a statistically significant basis for meaningful conclusions. And the earlier studies and information reported in Parts 1 and 2 of Drs. Powell and Houston's work.

One can only conclude: *There is no scientific evidence that Turkey Point experienced greater than moderate Category 3 winds during Hurricane Andrew. Therefore, NRC INFORMATION NOTICE 93-53 cannot be used to demonstrate otherwise.*

Respectfully submitted,

Barry J. White  
Treasurer/Director  
Citizens Allied for Safe Energy, Inc./CASE

References:

1. Hurricane Andrews Landfall in South Florida. Part I: Standardizing **Part I**: Standardizing. Measurements for Documentation of Surface Wind Fields. MARK D. **POWELL** AND SAMUEL H. **HOUSTON**. Hurricane Research Division, NOAA/AOML, [www.aoml.noaa.gov/hrd/Powell/Andrew1.pdf](http://www.aoml.noaa.gov/hrd/Powell/Andrew1.pdf) ►
2. Hurricane Andrews Landfall in South Florida. Part II: Surface Wind ... **POWELL AND HOUSTON**  
[www.aoml.noaa.gov/hrd/Powell/Andrew2.pdf](http://www.aoml.noaa.gov/hrd/Powell/Andrew2.pdf)
3. Powell, Mark D., Eric Uhlhorn, and Jeffrey D. Kepert, 2009 :  
"Estimating Maximum Surface Winds from Hurricane Reconnaissance Measurements", *Wea. Forecasting*, 24 No. 3, p.868-883