Nuclear Information and Resource Service

1424 16th St. NW, Suite 404, Washington, DC 20036; 202-328-0002; Fax: 202-462-2183; E-mail: nirsnet@nirs.org; Web: www.nirs.org

April 12, 2005

Peter Tam
Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. Tam:

On behalf of the Nuclear Security Coalition, I am enclosing additional documents as supplemental material to the emergency enforcement petition (10 CFR 2.206) of August 10, 2004 which regards the vulnerability of the elevated General Electric Mark I & II irradiated fuel pools.

The attachments contain calculations prepared by Stephen Lazorchak, P.E., who formerly worked as a structural engineer at Oyster Creek nuclear generating station, the first GE Boiling Water Reactor Mark I in the United States. Mr. Lazorchak's calculations indicate that a 1000 lb. object moving at 300 mph striking the refueling deck floor of a Mark I at a 30° angle exceeds the Reactor Building's strongest floor beam capacity at Elevation 119' by more than 500% and the weakest beam capacity by 8000%.

Additional attachments include letters from Mr. Lazorchak to NORAD/USNORTHCOM expressing his professional concern about the vulnerability of the supporting structures around the Mark I refueling deck and "spent" fuel pool.

Thank you,

Paul Gunter, Director
Reactor Watchdog Project

Attachments:

1) Calculation-Demonstrating Structural Vulnerability of Oyster Creek's Reactor Building Refueling Floor at Elevation 119'3", Steven M. Lazorchak, P.E., Consulting Structural Engineer (11 pages)
2) Letter from S. Lazorchak to Admiral Keating (NORAD/USNORTHCOM), regarding Oyster Creek Nuclear Station- Structural Vulnerability to Terrorist Attack, Lacey Township, NJ dated February 7, 2005 (3 pages)

ZZZZ See attached page per Peter Tam

3) Letter from S. Lazorchak to Admiral Keating (NORAD/USNORTHCOM), regarding Oyster Creek Nuclear Station- Structural Vulnerability to Terrorist Attack, Lacey Township, NJ, dated February 10, 2005 (2 pages)

Cc:
Roy Zimmerman, NSIR
Glenn Tracey, NSIR

Calculation

Demonstrating Structural Vulernability of Oyster Creek's Reactor Building Refueling Floor at elevation 119'-3"

(11 sheets)

Prepared by:

Stephen M. Lazorchak, PE
Consulting Structural Engineer
20 Dorchester Drive
Toms River, New Jersey 08753
Phone/fax 732-255-1972
(Past employee of GPU Nuclear/Oyster Creek)

1.0 PROBLEM STATEMENT:

A sensitivity analysis to determine the affect of aircraft impact on Oyster Creek's Reactor Building, floor elevation 119'. Assume the largest rigid object striking the floor weighs 1000-pounds and is traveling at 300-mph.

2.0 SUMMARY OF RESULTS:

A 1000-pound aircraft component, traveling at 300-mph, striking the floor at a 30-degree angle, exceeds the Reactor Building's strongest floor beam's capacity, at 119' elevation, by more than 500% and exceeds the weakest beam capacity by 8000%. This analysis indicates a large aircraft will likely penetrate the building's top floor, allowing burning jet fuel to leak down onto vital Reactor shutdown wiring and equipment. The the analysis neglects the weight of the impacting aircraft and collapsing roof steel onto the floor system around the spent fuel pool. There is a very high probability the spent fuel pool will be severely damaged, causing a leak that will uncover several hundred tons of radioactive fuel rods.

3.0 REFERENCES:

3.1 EQE Calculation No. 240012-C-003, Oyster Creek Load Drop Analysis, Structural Capacities of Beams and Slabs at El. 119'-3"

4.0 ASSUMPTIONS:

4.1 A large aircraft will impact Oyster Creek's Reactor Building roof at an angle of 30-degrees from horizontal, traveling at 300-mph at time of impact.

4.2 The evaluation will determine the effect of a 1000-pound component from an aircraft hitting the concrete floor slab at elevation 119'. The energy of the impact will be compared to the calculated beam/floor capacities from Reference 3.1.

5.0 DESIGN INPUT:

5.1 Weight of aircraft component $W_{component} := 1000 \cdot lbf$

5.2 Velocity of component at impact $V_{component} := 300 \cdot mph$ $V_{component} = 440 \frac{ft}{sec}$

5.3 Acceleration of gravity $g = 32.17 \frac{ft}{sec^2}$

5.4 The maximum beam capacity from Ref. 3.1, Sheet B21, Beam 5B19 & Sheet B35, Beam 5B39

$SE_{Beam.5B19} := 239769 \cdot ft \cdot lbf$

$SE_{Beam.5B39} := 18129 \cdot ft \cdot lbf$

6.0 CALCULATION:

Determine the impact energy of a 1000-pound mass, traveling at 300-mph, hitting a floor system at a 30-degree angle from horizontal (using mass=weight/acceration of gravity and KE=1/2mV²).

$$Impact_{Energy} := \frac{1}{2} \cdot \left(\frac{W_{component}}{g} \right) \cdot V_{component}^2 \qquad Impact_{Energy} = 3008636\, ft \cdot lbf$$

Stephen M. Lazorchak, PE
Consulting Structural Engineer

Determine the vertical and horizontal components from the 1000-pound object hitting a rigid floor at an angle 30-degrees from horizontal.

Impact angle $\theta := 30deg$

$Vertical_{Impact.Energy} := (Impact_{Energy}) \cdot \sin(\theta)$ $Vertical_{Impact.Energy} = 1504318\,ft \cdot lbf$

$Horizontal_{Impact.Energy} := (Impact_{Energy}) \cdot \cos(\theta)$ $Horizontal_{Impact.Energy} = 2605555\,ft \cdot lbf$

Determine the order of magnitude that a 1000-pound object, traveling at 300-mph, will exceed the capacity of the strongest beam in the Reactor Building's floor at elevation 119'.

$Vertical_{Impact.Energy} = 1504317.99\,ft \cdot lbf$

$SE_{Beam.5B19} = 239769\,ft \cdot lbf$

$$\frac{Vertical_{Impact.Energy} - SE_{Beam.5B19}}{SE_{Beam.5B19}} = 5.27$$

Therefore, a 1000-pound object traveling at 300-mph, striking the floor at a 30-degree angle, will hit with a vertical force, that exceeds the strongest floor beam capacity by more than 500%. This evaluation neglects the weight of the impacting aircraft and collapsing structural steel roof and overhead bridge crane.

$SE_{Beam.5B39} = 18129\,ft \cdot lbf$

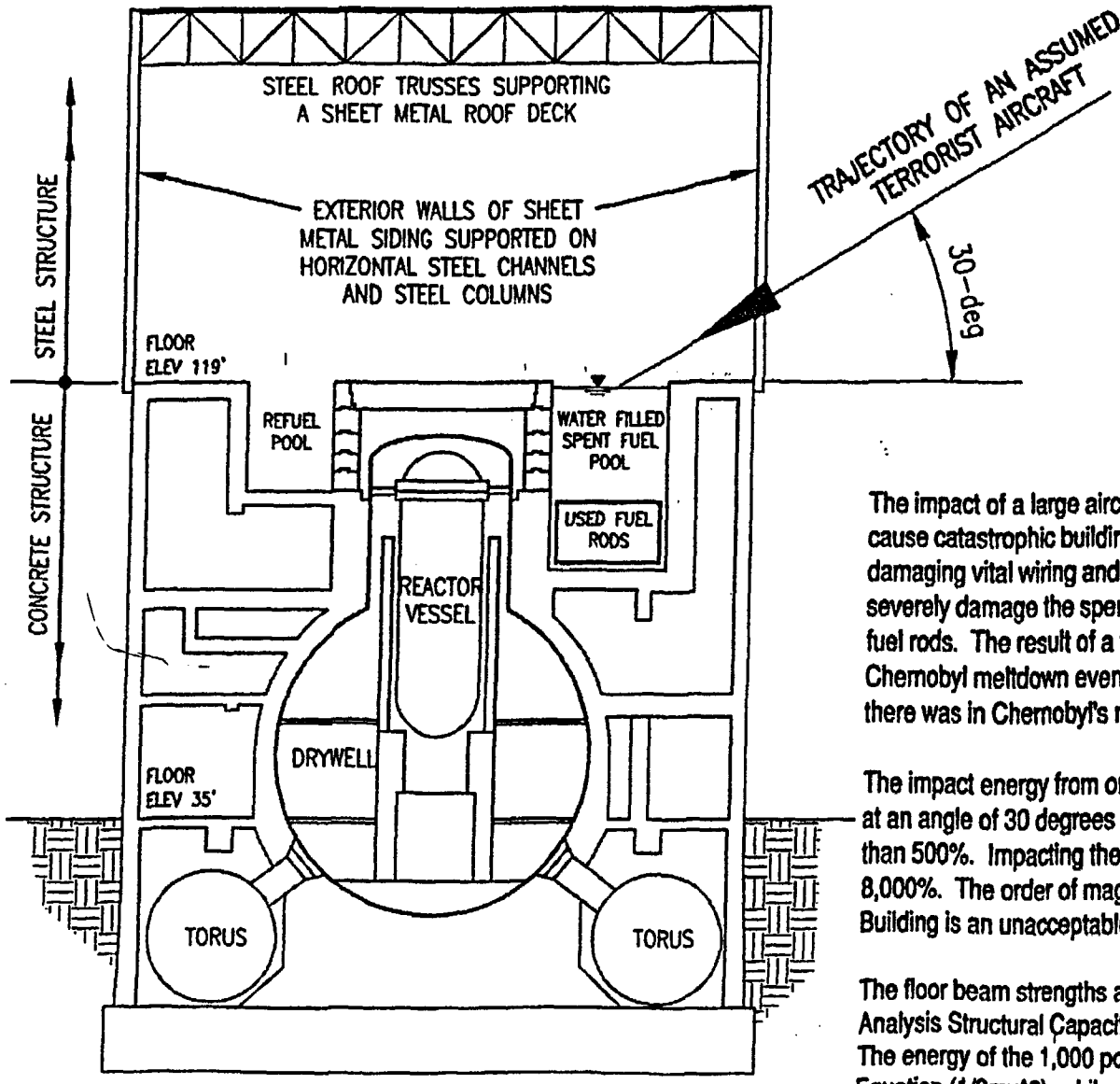
$$\frac{Vertical_{Impact.Energy} - SE_{Beam.5B39}}{SE_{Beam.5B39}} = 81.98$$

Therefore, a 1000-pound object traveling at 300-mph, striking the floor at a 30-degree angle, will hit with a vertical force, that exceeds the weakest floor beam capacity by more than 8000%. This evaluation neglects the weight of the impacting aircraft and collapsing structural steel roof and overhead bridge crane.

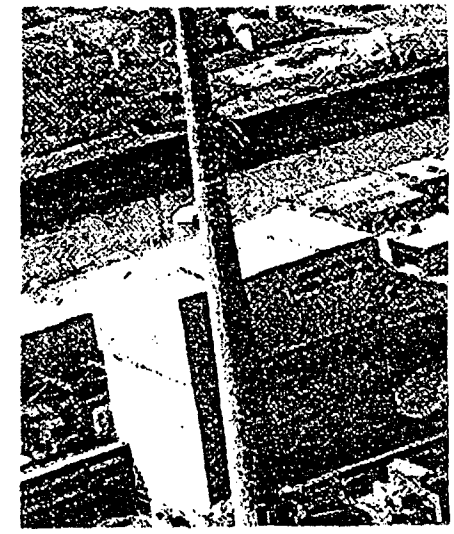
Stephen M. Lazorchak, PE
Consulting Structural Engineer

OYSTER CREEK REACTOR BUILDING IS STRUCTURALLY OBSOLETE AND NOT ABLE TO PROTECT NUCLEAR FUEL RODS FROM A TERRORIST AIRCRAFT ATTACK

THE PLANT IS NEITHER STRUCTURALLY ROBUST OR DESIGNED TO RESIST AN AIRCRAFT IMPACT



CROSS SECTION
OYSTER CREEK REACTOR BUILDING



The impact of a large aircraft into the Reactor Building's concrete floor at elevation 119'-3" will cause catastrophic building failure allowing burning fuel to leak down onto the floors below, damaging vital wiring and equipment needed to shut down the reactor. An aircraft impact will severely damage the spent fuel pool causing a water leak that will uncover tons of radioactive fuel rods. The result of a terrorist attack on Oyster Creek's Reactor Building will exceed a Chernobyl meltdown event because there is more spent fuel in Oyster Creek's fuel pool than there was in Chernobyl's reactor.

The impact energy from only one 1,000 pound object traveling at 300 mph and hitting the floor at an angle of 30 degrees above horizontal exceeds the strongest floor beam capacity by more than 500%. Impacting the weakest floor beam exceeds the beam's capacity by more than 8,000%. The order of magnitude of these values clearly demonstrates Oyster Creek's Reactor Building is an unacceptable safety risk to New Jersey.

The floor beam strengths are from Oyster Creek Calculation No. 240012-C-003, Load Drop Analysis Structural Capacities of Beams and Slabs at El. 119'-3", page B21 and page B35. The energy of the 1,000 pound aircraft component is determined from the Kinetic Energy Equation (1/2mv^2), while neglecting the larger consequences from the impacting aircraft and collapsing roof steel.

EQE ENGINEERING CONSULTANTS

CALCULATION COVER SHEET

Calculation No: 240012-C-003

Project: OYSTER CREEK LOAD DROP ANALYSIS

Calculation Title: STRUCTURAL CAPACITIES OF BEAMS AND SLABS AT EL. 119'-3"

References: AS NOTED

Attachments: AS NOTED

Total Number of Pages (including Cover Sheet): 99

Revision Number	Approval Date	Description of Revision	Originator	Checker	Approver
0	6/6/96	ORIGINAL ISSUE	[illegible]	[illegible]	[illegible]
1	6-14-96	REVISED SHEAR CAPACITIES	[illegible]	[illegible]	[illegible]

12312-01/Cover.xls (7/91)

EQE

240012-C-003, SHT. 2
BLB 6-10-96
SJL 6/14/96

Table of Contents

1.0 INTRODUCTION 3

2.0 METHOD 4

2.1 BEAMS 5

2.2 SLABS 12

3.0 ASSUMPTIONS 17

3.1 BEAMS 18

3.2 SLABS 24

4.0 RESULTS 29

4.1 DISCUSSION OF BEAM RESULTS 29

4.2 DISCUSSION OF SLAB RESULTS 29

5.0 REFERENCES 32

ATTACHMENT A: DERIVATIONS A1

A.1 EXTERNAL VS. INTERNAL WORK FOR BEAMS A2

A.2 INTERNAL WORK EQUATION FOR SLABS A3

A.3 EXTERNAL VS. INTERNAL WORK FOR SLABS A4

ATTACHMENT B: BEAM CALCULATIONS B1

B.1 EXAMPLE BEAM CALCULATION B2

B.2 BEAM WORKSHEETS B7

ATTACHMENT C: SLAB CALCULATIONS C1

C.1 EXAMPLE SLAB CALCULATION C2

C.2 SLAB WORKSHEETS C6

ATTACHMENT D: CHECKING CRITERIA CHECKLIST D1

CALC. 240012-C-003 SHT 7
JE 6/6/96
CHKD: SHW 6/6/96

1.0 INTRODUCTION

The purpose of calculation 240012-C-003 is to determine the strain energy available in the beam and slab systems which make up the floor at el. 119'-3" of the Oyster Creek Station Unit #1. A plastic analysis of the beams and slabs will be conducted and three values per member will be produced. These are:

1. **Ultimate Load (P_{lim}):** The ultimate point load at midspan required to form a collapse mechanism.
2. **Ultimate Strain Energy (SE):** The ultimate Strain Energy available given the prescribed ductility and hinge rotation limits.
3. **Shear Demand Capacity Ratio (V DCR):** The ultimate shear demand corresponding to the flexural capacity compared to the reduced ultimate shear capacity as dictated by ACI 318-95 [Ref. 2]. This ratio will be limited to .83 to assure that the member has 20% more capacity in shear than in flexure.

This Strain Energy Demand is assumed to be caused by an impact resulting from an accidental load drop and is calculated separately.

SH. 4
CALC 240012-C-003
SRL 6/6/96
CHK'D: GAW 6/6/96

2.0 METHOD

2.0 Introduction

Plastic analysis methods were used to calculate the ultimate flexural capacity of the beam and slab systems in accordance with EQE Procedure 240012-P-001.

In general, the beams were modeled assuming fixed support conditions. The load which causes the beam to become a collapse mechanism was then calculated. Since this load is assumed to occur at midspan of the beam, a lower bound ultimate load will result. A "collapse mechanism" is the point at which hinges form at the ends and at midspan of the beam resulting in flexural failure of the system. These plastic hinges occur when the ultimate moment capacity of a given section is reached. In this calculation, the ultimate moment capacity of a section is the allowable nominal moment capacity as calculated in accordance with ACI 318-95 [Ref. 2]. The ultimate load, P_{lim}, was calculated through the work energy method described in section 2.1. A limiting deflection was then calculated based on limited rotational capacities of the beam sections (Δ_{lim}). P_{lim} is then multiplied by the Δ_{lim} to attain the ultimate strain energy (SE), also referred to as External Work (W_e), required to form the collapse mechanism, thus fail the system in flexure.

The plastic analysis for the slab is based on the same principles as that for the beam. However, instead of forming 3 hinges, a series of hinged creases, or yield lines are formed. These yield lines are dictated by an end deflected shape which is assumed based on application of the load to the center of the slab. The slab is assumed to be fixed on all sides. Based on reinforcement properties of the slab, moment capacities are calculated at each yield line. These capacities are used to calculate the internal work required to yield the system. The internal work is then used to back out the ultimate load (P_{lim}) to yield the system. The rest of the process (calculation of Δ_{lim} and SE) is the same as for the beam.

This section is comprised of:

2.1 Summary and explanation of the plastic analysis process for a beam.
2.2 Summary and explanation of the plastic analysis process for a slab.

EQE INTERNATIONAL

SHEET NO. 5

JOB NO. _____ JOB CALC. 240072 C-03B BY SPL DATE 6/6/96

CALC. NO. _____ SUBJECT _____ CHK'D [illegible] DATE 6/6/96

2.0 METHOD:

2.1 BEAMS

THE GENERAL METHOD FOR CALCULATING THE ULTIMATE POINT LOAD AT MIDSPAN OF A BEAM REQUIRED TO YIELD THE SYSTEM IN FIGURE 13 AS FOLLOWS. NOTE: SHEAR IN BEAM MUST BE CHECKED TO INSURE SHEAR FAILURE DOES NOT PRECEED FLEXURAL YIELDING.

SUMMARY METHOD:

1. CALCULATE ULTIMATE MOMENT CAPACITIES OF BEAM SECTION (M_p)
2. CALCULATE DEAD LOAD MOMENT DEMAND (M_{DL})
3. CALCULATE RESIDUAL MOMENT CAPACITY (M)
4. CALULATE LIMITING POINT LOAD TO DEVELOP RESIDUAL MOMENT CAPACITY (P_{LIM})
5. CALCULATE LIMITING ROTATIONS OF BEAM SECTIONS (r_{uLIM})
6. CALCULATE CONTROLLING ROTATION FOR BEAM SYSTEM (r_u CONTROL)
7. CALCULATE MIDSPAN DISPLACEMENT CORRESPONDING (Δ_{LIM}) TO CONTROLLING ROTATATION OF BEAM SYSTEM
8. CALCULATE EXTERNAL WORK "SE"
9. SHEAR CHECK: FIND ULTIMATE SHEAR @ END OF BEAM V_u
10. CALCULATE REDUCED NOMINAL SHEAR CAPACITY OF SECTION (ϕV_n) COMPARE TO DEMAND IN DEMAND CAPACITY RATIO. (DCR)

BEAM:	5B19														
Ultimate Moment Calculation:			Mu												
M	phi	As (in^2)	Fy (ksi)	f'c (ksi)	h (in)	d (in)	b (in)	Mp (k-in)	Mp (k-ft)						
S/E	0.9	17.00	40	3	50.00	47.12	36.00	26571	2214	=MpS/E					
N/W	0.9	23.00	40	3	50.00	47.12	36.00	34868	2906	= Mp N/W					
Middle	0.9	16.00	40	3	50.00	47.12	57.00	25873	2156	= Mp mid					
Dead Load Moment Calc.:			Mdl			Moment Capacity		(k-ft)							
	Span	Load		Moment		Mp	- Mdl	M net							
M	l (ft)	w (k/ft)	Mdl (k-ft)	direction		2214	67.32	2147	Ms/e						
S/E	18.50	2.36	67.32	Neg		2906	67.32	2838	Mn/w						
N/W	18.50	2.36	67.32	Neg		2156	33.66	2122	Mmid						
Middle	18.50	2.36	33.66	Pos											
Ultimate Beam Load @ Midspan:															
Ms/e	Mn/w	Mmid	Span	1/2 span	P lim										
k-ft	k-ft	k-ft	ft	ft	kips										
2147	2838	2122	18.5	9.25	998	KIPS									
Limiting Rotations							Limiting Rotation @ End of Beam					Displacement Limit and SE			
	d (in)	c (in)	ru	ru lim	ru control			ru lim.	ru mid/2	ru end		Delta lim. (	We (k-ft)	SE (lb-ft.)	
S/E	47.12	8.71	0.0351	0.07	0.0351	ru S/E		S/E N/W		control		0.2403	240	239769	
N/W	47.12	11.79	0.0260	0.07	0.0260	ru N/W		0.0260	0.0296	0.0260					
Middle	47.12	5.18	0.0591	0.07	0.0591	ru mid									
												Feet			
Vn:															
	f'c	As S/E	d S/E	As N/W	d N/W	bw	Mu S/E	Mu N/W	# stir per	Av/stirrup	space				
	ksi	in^2			in	in			layer						
	3	17.00	47.12	23.00	47.12	36.00	2214	2906	3	0.40	6				
													phi Vn (Vc+Vs)=		
Vc ACI eqn	Vc (11-3)	Vc (11-5)						Vc control	Vc limit	Vc final	Vs=	phi=	phi Vn beam=		
dmin	kips	Vud/Mp	Vud/Mp	Vc (11-5)	Vud/Mp	Vud/Mp	Vc (11-5)	kips	kips	kips	kips		kips		
		S/E	S/E limit	S/E	N/W	N/W limit	N/W								
47.12	186	0.92	0.92	216	0.70	0.70	217	216	325	216	377	0.85	504		
						b effective	span/2-W/2		Vc slab		phi vn slab				
				thick =	t (in)	8 x t (in)	(in)	Control	Kips	phi=	Kips				
				(a)	26	208	121.5	121.5	311.45	0.85	264.73		PhiVn total		
				(b)	16	128	63	63	99.38	0.85	84.47		853	Kips	
Vu:				Summary:											
				Beam	P lim	SE		phiVn	Vu	V DCR					
Vdl	Vext	Vu total			kips	lb-ft		kips	kips						
21.83	498.92	520.75		5B19	998	239769		853	521	0.61					

L

07-11-97 09:19:14

RLP 6-6-96

Spr 6/6/96

240012-C-003, SH 13 21

BEAM:	5B39														
Ultimate Moment Calculation:			Mu												
M	phi	As (in^2)	Fy (ksi)	fc (ksi)	h (in)	d (in)	b (in)	Mp (k-in)	Mp (k-ft)						
S/E	0.9	0.00	40	3	30.00	27.25	27.00	0	0	=MpS/E					
N/W	0.9	0.00	40	3	30.00	27.25	27.00	0	0	= Mp N/W					
Middle	0.9	3.95	40	3	30.00	28.25	48.00	3925	327	= Mp mid					
Dead Load Moment Calc.:			Mdl			Moment Capacity		(k-ft)							
	Span	Load		Moment		Mp	- Mdl	M net							
M	l (ft)	w (k/ft)	Mdl (k-ft)	direction		0	45.42	-45	Ms/e						
S/E	20.25	1.33	45.42	Neg		0	45.42	-45	Mn/w						
N/W	20.25	1.33	45.42	Neg		327	22.71	304	Mmid						
Middle	20.25	1.33	22.71	Pos											
Ultimate Beam Load @ Midspan:															
Ms/e	Mn/w	Mmid	Span	1/2 span	P lim										
k-ft	k-ft	k-ft	ft	ft	kips										
-45	-45	304	20.25	10.125	51	KIPS									
Limiting Rotations							Limiting Rotation @ End of Beam					Displacement Limit and SE			
	d (in)	c (in)	ru	ru lim	ru control			ru lim.	ru mid/2	ru end		Delta lim. (	We (k-ft)	SE (lb-ft.)	
S/E	27.25	0.00	N/A	0.07	0.0700	ru S/E		S/E N/W		control		0.3544	18	18129	
N/W	27.25	0.00	N/A	0.07	0.0700	ru N/W		0.0700	0.0350	0.0350					
Middle	28.25	1.52	0.1209	0.07	0.0700	ru mid									
												feet			
Vn:															
	fc	As S/E	d S/E	As N/W	d N/W	bw	Mu S/E	Mu N/W	# stir per	Avsltrup	space				
	ksi	in^2			in	in			layer						
	3	0.00	27.25	0.00	27.25	27.00	0	0	1	0.40	12				
													phi Vn (Vc+Vs)=		
Vc ACI eqn	Vc (11-3)	Vc (11-5)						Vc control	Vc limit	Vc final	Vs=	phi=	phi Vn beam=		
dmin	kips	Vud/Mp	Vud/Mp	Vc (11-5)	Vud/Mp	Vud/Mp	Vc (11-5)	kips	kips	kips	kips		kips		
		S/E	S/E limit	S/E	N/W	N/W limit	N/W								
27.25	81	N/A	1.00	77	N/A	1.00	77	81	141	81	36	0.85	99		
						b effective	span/2-W/2		Vc slab		phi vn slab				
				thick =	t (in)	8 x t (in)	(in)	Control	Kips	phi=	Kips				
				(a)	16	128	22.5	22.5	35.49	0.85	30.17		PhiVn total		
				(b)	26	208	115.5	115.5	296.07	0.85	251.66		381	Kips	
Vu:				Summary:											
				Beam	P lim	SE		phiVn	Vu	V DCR					
Vdl	Vext	Vu total			kips	lb-ft		kips	kips						
13.46	25.58	39.04		5B39	51	18129		381	39	0.10					

L

KB 6-6-96 Spr 6/6/96

240012-C-003, SHB35

7-11-97 09:19:14

Stephen M. Lazorchak, P.E.
Consulting Structural Engineer
20 Dorchester Drive
Toms River, New Jersey 08753
(732) 255-1972 fax (732) 255-1972

February 7, 2005

COPY

Admiral Timothy J. Keating
NORAD/USNORTHCOM
250 Vandenberg, Ste. B-016
Peterson AFB, CO 80914-3808

Re: Oyster Creek Nuclear Station - Structural Vulnerability to Terrorist Attack
Lacey Township, NJ

Dear Admiral Keating:

On Friday February 4, 2005, two planes landed without incident at John F. Kennedy International Airport , New York, after authorities received reports that Delta Fight 119 from Paris and Delta Flight 81 from Amsterdam, Netherlands had been threatened. Both planes landed about 1330 and were momentarily held back from the gate. One news report stated Flight 119 was escorted by F16 fighters. Lt. Cmdr. Sean Kelly said NORAD did not send escort jets, "the situation didn't warrant it."

This incident prompted me to write you because NORAD/USNORTHCOM may not be aware of the structural vulnerabilities in Oyster Creek's Reactor Building, located approximately 60 miles south of JFK International Airport. Oyster Creek is one 22 nuclear power plant sites (affecting approximately 30,000 Megawatts of generation) with an obsolete boiling water reactor building design.

Oyster Creek's Reactor Building Design:
Oyster Creek's Reactor Building is a square building that can be easily seen from Route 9. The building's ground floor is at elevation 35'-0", the highest floor level is at elevation 119'-3" (typically known as the refueling floor). Below elevation 119', the Reactor Building is a concrete structure, above elevation 119' is steel framing about 50' high, supporting steel roof trusses. The whole steel framing system is covered with sheet metal siding.

The Reactor Building refueling floor is a large open space. During plant operation, one could walk over to the spent fuel pool, look down, and see several hundred tons of used radioactive fuel rods stored under 30-feet of water. The metal building enclosure above the spent fuel pool is

not robust, nor will it prevent a terrorist aircraft from impacting into the pool or onto the Reactor Building refueling floor.

The NRC's basic policy on the protection of nuclear facilities is laid down in regulation 10 CFR 50.13. Essentially, regulation limits the licensee's responsibility for defending a nuclear facility. Any gap in the licensee's capabilities to defend against a kamikaze assault using a large aircraft, are assumed to be provided by the Government. The NRC is not required to notify other government agencies about nuclear power plant vulnerabilities that may affect national security.

In August 2004, NRC Chairman Diaz was provided Oyster Creek's reference to the Reactor Building load drop calculation at floor elevation 119'-3". Using the calculation, it can be demonstrated an aircraft impacting the reactor building refueling floor will pass through it, critically damaging the spent fuel pool,..... resulting in a Chernobyl event.

The National Academy of Science, Board on Radioactive Waste Management prepared a confidential Committee report on the "Safety and Security of Commercial Spent Fuel Storage" (Project No. BRWM-U-03-05-A). The report was issued to the Congress, the Nuclear Regulatory Commission, and the Department of Homeland Security, in July 2004.

On Dec. 2, 2004, NRC Chairman Diaz spoke before the Nuclear Security Executive Forum and stated in his closing remarks;

"I would be remiss if I did not address further the issue that makes the most headlines: the intentional crash of an aircraft on a nuclear power plant. The NRC has conducted extensive analyses of the capability of representative nuclear power plants to withstand an aircraft attack. While these analyses are classified, the studies confirm that the likelihood of damaging the reactor core and releasing radioactivity that could affect public health and safety is low."

Based on the Chairman's remarks, it appears the report on "Safety and Security of Commercial Spent Fuel Storage" neglects a reactor building design like Oyster Creek, or it significantly over estimates a reactor building's structural capacity to resist aircraft impact. The BRWM Committee reviewed my evaluation of Oyster Creek's refueling floor, but I don't know if they will amend the classified report.

Oyster Creek's sheet metal covered superstructure, located over the spent fuel pool, is not designed for aircraft impact. The World Trade Center towers were designed for the impact by a Boeing 707 jetliner, but not the burning fuel after the crash. A much larger Boeing 767 hit the WTC towers, the 767 is 225% heavier than the 707. From a structural engineering viewpoint, Oyster Creek's Reactor Building is significantly weaker than the WTC towers.

The impact energy from only one 1,000 pound object traveling at 300 mph and hitting Oyster Creek's refueling floor at an angle of 30 degrees above horizontal, exceeds the strongest floor beam capacity by more than 500%. Impacting the weakest floor beam exceeds the beam's

COPY

capacity by more than 8,000%. The order of magnitude of these values clearly demonstrates Oyster Creek's Reactor Building is an unacceptable safety risk to New Jersey.

The NRC and Federal government needs to clearly identify the measures taken to mitigate an aircraft attack on structurally obsolete reactor buildings, like Oyster Creek. Otherwise, pronuclear individuals like me cannot support the continued operation of these plants, and demand their immediate shutdown. The loss of 450 Oyster Creek jobs and higher electric rates are a trivial concern to many thousands of Ocean County residents and property owners, compared to the consequences of a potential Chernobyl event, should terrorist attack the plant's Reactor Building.

I urge you to verify that existing NORAD/USNORTHCOM operational procedures and training scenarios include the protection of nuclear power plants like Oyster Creek. In my opinion, this security concern is the most difficult to solve because it relies on the efforts of thousands of people to perform their jobs perfectly, within a very limited time. The use of multiple overseas aircraft, like Delta Fight 119 and Delta Flight 81, should be expected in any real terrorist attack using a large aircraft as a guided missile.

Sincerely,

Stephen M. Lazorchak

COPY

Stephen M. Lazorchak, P.E.
Past employee of GPU Nuclear/Oyster Creek

Enclosures: Oyster Creek Aircraft Impact Handout (2 sheet)

Oyster Creek Nuclear Power Plant, The Structural Vulnerability to a Terrorist Attack, Forked River, NJ (4 sheets)

List of U.S. Commercial Reactors with Elevated Irradiated Fuel Storage Pools (1 sheet)

Photograph of Oyster Creek Nuclear Power Plant (1 sheet)

Calculation demonstrating structural vulnerability of Oyster Creek's Reactor Building refueling floor at elevation 119'-3" (9 sheets)

Stephen M. Lazorchak, P.E.
Consulting Structural Engineer
20 Dorchester Drive
Toms River, New Jersey 08753
(732) 255-1972 fax (732) 255-1972

February 10, 2005

COPY

Admiral Timothy J. Keating
NORAD/USNORTHCOM
250 Vandenberg, Ste. B-016
Peterson AFB, CO 80914-3808

Re: Oyster Creek Nuclear Station - Structural Vulnerability to Terrorist Attack
Lacey Township, NJ

Dear Admiral Keating:

The National Academy of Science, Board on Radioactive Waste Management (BRWM) prepared a confidential Committee report on the "Safety and Security of Commercial Spent Fuel Storage" (Project No. BRWM-U-03-05-A). It was issued to the Congress, the Nuclear Regulatory Commission, and the Department of Homeland Security, in July 2004. I urge you to contact BRWM Director Kevin D. Crowley (phone 202-334-3066) to obtain a copy of the classified spent fuel storage report. NORAD/USNORTHCOM must become an expert on the structural design vulnerabilities of our nuclear power plants and prevent terrorist attacking these plants with large aircraft, used as a guided missile. Currently there is an effort to rebuild the World Trade Center. However, if a nuclear power plant like Oyster Creek was destroyed in a 9/11 event, most of New Jersey will emulate the area around Chernobyl.

Several days ago I mailed you an information package detailing my concerns regarding the spent fuel storage pool at Oyster Creek Nuclear Station. Briefly stated, Oyster Creek's reactor building is an obsolete structural design, no longer allowed by current Nuclear Regulatory Commission standards. Located on the top floor of the Reactor Building, 84-feet above ground level, is the refueling floor. At one corner of the building is a stair/elevator tower, immediately adjacent to the elevator is a 30-foot square floor opening to move refueling equipment between the ground level and the refueling floor. Diagonally across the refueling floor from the stair/elevator tower is the spent fuel storage pool.

Authorized plant personnel can walk over to the fuel pool handrail, look down, and see 700-tons of used radioactive fuel rods stored under 30-feet of water. Looking up from the fuel pool, one will see steel roof trusses and the underside of the sheet metal roof decking. An overhead bridge crane will be typically parked at one end of the building. The roof trusses span the full width of

the structure and are supported by steel columns. Attached to the steel columns are horizontal steel channels spaced vertically 6-feet on center. Sheet metal siding is attached to the channel members. This whole metal building enclosure, located above the refueling floor, is part of the secondary containment structure. It is designed for severe wind and earthquake forces, but not for aircraft impact. The metal enclosure is the weakest structural system in the Reactor Building's design.

Below the refueling floor the Reactor Building is made of reinforced concrete several feet thick. All vital plant equipment required to shut down the reactor and maintain cooling to the spent fuel storage pool is located within the concrete portion of the building.

As part of a NRC directive, Oyster Creek was required to prepare load drop calculations for all floor levels within the Reactor Building. The calculations identify the amount of energy to critically damage floor slabs and floor beams, without allowing an accidental dropped load from penetrating the floor system. Using a Kinetic Energy Equation ($1/2\ mv^2$) to determine the force a heavy object will hit the floor and the load drop calculation for the refueling floor, one can determine if a unsafe structural concern exists.

> *The impact energy from only one 1,000 pound object traveling at 300 mph and hitting the Reactor Building's refueling floor at an angle of 30 degrees above horizontal, exceeds the strongest floor beam capacity by more than 500%. Impacting the weakest floor beam exceeds the beam's capacity by more than 8,000%. The order of magnitude of these values clearly demonstrates Oyster Creek's Reactor Building is an unacceptable safety risk to New Jersey, if a plane was intentionally crashed into the building.*
>
> *[American Airlines Flight 11 crashed into WTC Tower 1 at 350 mph, and United Airlines Flight 175 crashed into WTC Tower 2 at 550 mph. Oyster Creek's relicensing website* (www.oystercreeklr.com) *references an* EPRI *December 23, 2002 report showing aircraft could not breach nuclear structures. This report analyzed a cylindrical dome structure, not Oyster Creek's square reactor building. The EPRI Report used an impact velocity of 350 mph, at 550 mph a large aircraft will penetrate the structural model used in the EPRI Report].*

I hope NORAD/USNORTHCOM training scenarios include multiple terrorist aircraft that disappear from FAA control, turn to attack a nuclear power plant and another vital target close to an international airport. New Jersey's Newark International Airport and New York's JFK are excellent locations to test the military's response to such a threat.

Sincerely,

Stephen M. Lazorchak

COPY

Stephen M. Lazorchak, P.E.
Past employee of GPU Nuclear/Oyster Creek