TESTIMONY OF JOSEPH MANGANO
TO NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Lacey Township, New Jersey
February 24, 2010

Good afternoon. I am Joseph Mangano, Executive Director of the Radiation and Public Health Project, an organization of scientists and health professionals. The RPHP mission is to conduct studies of health risks posed by nuclear weapons and reactors. Our members have published 25 medical journal articles and 7 books on the subject.

The regulation proposed by the DEP on January 7 to require cooling towers at the Oyster Creek nuclear reactor will reduce deaths to aquatic organisms in the Barnegat Bay. The presence of cooling towers means fish will no longer

1. Be subjected to millions of gallons of water overheating their habitat every day.

2. Be trapped and crushed against intake screens.

Barnegat Bay will be a safer place with cooling towers. But the towers will have no effect on the health of local humans. Oyster Creek produces over 100 radioactive chemicals to generate electricity, the same mix in atomic bomb test fallout. These gases and particles are highly unstable atoms which emit alpha particles, beta particles, or gamma rays. When they enter the body, they affect various organs. Each causes cancer after damaging DNA in cells and creating mutations, and is especially harmful to the fetus, infant, and child. Some decay and disappear from the body quickly, while others remain for long periods.

These radioactive chemicals must be stored in pools of cooled water inside the plant or concrete casks outside the plant. A mechanical failure or terrorist attack would cause a catastrophic meltdown, during which these chemicals would be released into the air. The Oyster Creek area could not be evacuated without many being exposed, and thousands would suffer from radiation poisoning or cancer.

Over 1,000 tons of nuclear waste is stored at the site, the equivalent of several Chernobyl accidents and hundreds of Hiroshima bombs. Whether or not cooling towers are built, this number will rise as Oyster Creek continues to operate, making the consequences of a meltdown even worse.

Cooling towers would also not affect the portion of the waste routinely emitted from the reactor. Emissions occur from leaking equipment in the reactor core, damaged cladding, corroding pipes, and cracked steam generator tubes. Radiation is also purposely released during refueling every 18 months. This radiation enters the air, water, and food, and enters human bodies. According to official records show that

1. Oyster Creek has historically had the 2nd highest amount of radioactive releases of all U.S. nuclear plants

2. Radioactivity levels in air and water near Oyster Creek are much higher than more distant areas

3. Levels of Strontium-90 measured in baby teeth of children living near Oyster Creek have risen sharply since the late 1980s. Local trends in Strontium-90 near match trends in local childhood cancer incidence.

Cooling towers would have no effect local cancer rates, which are unusually high. According to official health statistics

1. Ocean County has the 2nd highest cancer incidence rate in the state, trailing only Cape May County, a rate 32% higher than the U.S.

2. Ocean ranks 1st or 2nd highest in cancers of the bladder, esophagus, lung, pancreas, and uterus, along with leukemia. In the past two decades, nearly 90,000 county residents have been diagnosed with cancer.

Our research has found that closing nuclear plants improves local health. Dramatic declines in local infant death and child cancer rates occurred in the first two years after shut down near every one of the nine studied U.S. plants that shut down in the 1980s and 1990s. Our scientific studies lead us to conclude that if Oyster Creek closed, the health of Ocean County residents, especially its young, would improve.

RPHP applauds the proposal to mandate cooling towers at Oyster Creek as a means of improving health for local aquatic\species. However, we continue to urge that state and federal officials recognize the actual and potential threats to humans that the reactor poses, and to pursue policies that best protects New Jersey residents.

Thank you for this opportunity, and I will be glad to answer any questions you may have.

SUPPORTING EVIDENCE FOR TESTIMONY OF JOSEPH MANGANO
February 24, 2010

Table 1
U.S. Nuclear Plants with Highest Emissions of Airborne Radioactivity, 1970-1993

Plant	Location	Reactors	Emissions*
1. Dresden	Morris IL	3	97.22
2. **Oyster Creek**	**Forked River NJ**	**1**	**77.05**
3. Millstone	Waterford CT	3	32.80
4. Quad Cities	Cordova IL	2	26.95
5. Indian Point	Buchanan NY	3	17.50

* Emissions defined as curies of airborne effluents of iodine-131 and particulates (all radioactive chemicals with half life of over eight days). Source: Tichler J et al. Radioactive Materials Released from Nuclear Power Plants, annual reports. Upton NY: Brookhaven National Laboratory, NUREG/CR-2907. Centralized reports discontinued after 1993.

Table 2
Gaseous Airborne Releases, Strontium-90
U.S. Reactors with Largest Releases, Total 2001-2004

Reactor, State	Microcuries of Sr-90
1. Fitzpatrick 1 (NY)	673.4
2. Oyster Creek (NJ)	**303.9**
3. Nine Mile Point 1 (NY)	67.1
4. LaSalle 1 (IL)	49.3
5. Quad Cities 1 (IL)	43.6

Source: U.S. Nuclear Regulatory Commission, www.reirs.com/EDB/effluent. A microcurie equals one-millionth of a curie. Half life of Strontium-90 is 28.7 years.

Table 3
Gaseous Airborne Releases, Strontium-89
U.S. Reactors with Largest Releases, Total 2001-2004

Reactor, State	Millicuries of Sr-89
1. Oyster Creek (NJ)	**59.2**
2. LaSalle 1 (IL)	11.3
3. Quad Cities 1 (IL)	7.6
4. Cooper Station (NE)	4.9
5. Dresden 2 (IL)	4.0

Source: U.S. Nuclear Regulatory Commission, www.reirs.com/EDB/effluent. A millicurie equals one-thousandth of a curie. Half life of Strontium-89 is 50 days.

Table 4
Average Annual Radioactivity Levels in Drinking Water
Waretown NJ vs. Trenton NJ, 1984-2004

Measure	Waretown	Trenton	% Waretown Exceeds Trenton
Gross alpha	.906	.114	**+795%**
Gross beta	1.986	1.539	**+ 29%**
Strontium-90	.0590	.0280	**+111%**

Source: Environmental Protection Agency, http://oaspub.epa.gov/enviro/html/erams. All readings in picocuries of radioactivity per liter of drinking water; a picocurie is one-trillionth of a curie.

Table 5
Average Strontium-90 Levels in Baby Teeth
In Picocuries per Gram of Calcium at Birth, New Jersey, 1975-1998

Birth Year	Average Sr-90 (No. Teeth)	% Change
1975-1977	5.89 (11)	---
1978-1980	4.99 (9)	**- 15**
1981-1983	3.14 (14)	**- 37**
1984-1986	3.50 (16)	**+12**
1987-1989	2.74 (65)	**- 22**
1990-1992	3.82 (81)	**+39**
1993-1995	3.95 (77)	**+ 3**
1996-1998	5.47 (10)	**+39**

Source: Radiation and Public Health Project. A picocurie is one-trillionth of a curie. Teeth were among 300 New Jersey teeth tested using a Perkin-Elmer scintillation counter, which accurately detects low levels of radiation in matter.

Table 6
Cancer Incidence Rates, By New Jersey County, 2003-2007

County	Cases	Rate	
1. Cape May	4707	665.4	
2. Ocean	**23247**	**610.6**	
3. Atlantic	8473	586.4	
4. Gloucester	8088	584.5	
5. Burlington	13771	580.1	
6. Salem	2119	572.9	
7. Camden	15081	569.9	
8. Mercer	10490	567.4	
9. Morris	14734	566.1	
10. Monmouth	19465	565.3	
11. Warren	3261	559.2	
12. Sussex	4072	558.9	NJ Rate = 547.2
13. Bergen	28491	539.7	
14. Union	14766	533.2	
15. Middlesex	20761	529.7	
16. Somerset	8422	529.2	
17. Hunterdon	3551	527.1	
18. Essex	19886	516.8	
19. Cumberland	3153	508.4	
20. Passaic	12302	503.0	US rate = 462.9
21. Hudson	12956	462.2	

Ocean County rate is 32% higher than the U.S. (610.6 vs. 462.9).

From 1990-2007, 76,639 Ocean County residents were diagnosed with cancer.

Note: Source: New Jersey Cancer Registry, www.cancer-rates.info/nj/ U.S. rate is for 2002-2006, based on 17 states and cities, from National Cancer Institute, www.seer.cancer.gov, Cancer Statistics Review 1975-2006.. All rates per 100,000, adjusted to the 2000 U.S. standard population.

Table 7
Cancers in Which Ocean County Incidence is 1st or 2nd Highest of 21 NJ Cos., 2003-2007

	Ocean County		U.S.	% Ocean	County
Type Cancer	Cases	Rate	Rate	Over NJ	Rank
All Cancers	23247	610.6	462.9	+31.7	2
Esophagus	292	7.7	4.5	+71.1	1
Uterus	654	34.0	23.3	+45.9	1
Pancreas	563	13.4	11.7	+14.5	2
Leukemia	611	15.7	12.2	+28.7	2
Lung/bronchus	3388	84.4	63.1	+33.8	2
Bladder	1368	32.1	21.0	+52.9	2

Source: New Jersey Cancer Registry, www.cancer-rates.info/nj/ Rates per 100,000 adjusted to the 2000 U.S. standard.

Table 8
Change in Infant (<1) Mortality After Nuclear Plant Closing, First Two Years After Shut Down

Nuclear Plant	Yr Closed	% Change
LaCrosse WI	1987	-15.4
Rancho Seco CA	1989	-16.0
Fort St. Vrain CO	1989	-15.4
Trojan OR	1992	-17.9
Big Rock Point MI	1997	-42.4
Maine Yankee ME	1997	- 9.3
Zion IL	1998	-17.0
Pilgrim MA*	1986	-24.3
Millstone CT*	1995	-17.4
Total 9 Areas		**-17.3**
U.S. Average Change		**- 5.6**

Source: U.S. Centers for Disease Control and Prevention, http://wonder.cdc.gov, underlying cause of death. "Before" includes the year of shut down and prior year, "After" includes the next two years. *(Closed temporarily). Includes counties downwind (east) and under 40 miles of each nuclear plant.

Table 9
Change in Cancer Rate (Age<5) After Nuclear Plant Closing, First Seven Years After Shut Down

Nuclear Plant	Yr Closed	% Change
LaCrosse WI	1987	-38.6
Rancho Seco CA	1989	-25.4
Fort St. Vrain CO	1989	-12.0
Big Rock Point MI	1997	-53.3
Maine Yankee ME	1997	-29.9
Zion IL	1998	-17.0
Total 6 Areas		**-23.9**
U.S. Average Change, 1986-1998		**+ 0.3**

Source: State Cancer Registries. "Before" includes the year of shut down and prior year, "After" includes the following seven years, except for Big Rock Point (1998-2000), Maine Yankee (1998-2001), and Zion (1999-2000).