



**Radiation and Public Health Project**

Joseph J. Mangano, MPH, MBA, National Coordinator  
912 Mill Grove Drive Norristown PA 19403  
610-666-2985 [odiejoe@aol.com](mailto:odiejoe@aol.com)  
[www.radiation.org](http://www.radiation.org)

Directors  
Jay M. Gould, PhD  
Jane S. Gould  
Ernest J. Sternglass, PhD  
David Friedson  
Scott Cullen, JD  
William McDonnell  
Joseph Mangano

*HP28/05  
To FR 22155*

Chief, Rules Review and Directives Branch  
U.S. Nuclear Regulatory Commission  
Mail Stop T6-D59  
Washington DC 20555-0001

①

RECEIVED

2005 JUL 12 AM 8:42

RULES AND DIRECTIVES  
BRANCH  
USNRC

July 5, 2005

Dear Sir/Madam:

Please accept the following comments on the document NUREG-1817, entitled Environmental Impact Statement for an Early Site Permit (ESP) at the Grand Gulf ESP Site, distributed in April 2005.

Members of the Radiation and Public Health Project (RPHP) believe that any EIS for new reactors at an existing nuclear plant should, in part, represent a "report card" of operations over the lifetime of the plant. In the case of Grand Gulf, the following environmental questions should be addressed.

- Has introducing the reactor affected local public health?
- Has the aging of the reactor affected local public health?
- Does the continued operation of the reactor represent a threat to public health?

Like any other nuclear reactor, Grand Gulf routinely emits fission products into the local environment. This radioactivity enters the air and food chain, and is taken up into human bodies through breathing and the diet. Several important facts that affect radioactive emissions and exposures to local residents should be considered.

- Grand Gulf lies far from any other nuclear reactor; thus, any documentation of potential radiation-related harm to public health is likely due to Grand Gulf, and not other reactors
- The area near Grand Gulf is largely rural, and has incurred very little industrial pollution before the reactor's startup

**Advisory Board**  
Rosalie Bertell, PhD, GNSH  
Samuel S. Epstein, MD  
John Gofman, MD, PhD

**Research Associates**  
William Reid, MD  
Susanne Saltzman, MD  
Janette Sherman, MD  
Agnes Reynolds, RN

*SISF Remark Complete  
Template = ADM-013*

*E-REDS = ADM-03  
Cec - C. Guerrero (CX53)  
J. Wilson (JNW)*

- The population living in the Grand Gulf region has long experienced elevated rates of poverty, unemployment, and lack of education. Moreover, it is a medically underserved area, placing it at increased health risk
- The Grand Gulf reactor first achieved criticality – and produced radioactive fission products – on August 18, 1982, and many mechanical parts of the reactor are aging.
- Grand Gulf is a boiling water reactor. Historically, over 80% of emissions of iodine-131 and particulates have been released from boiling water reactors, even though they make up only about one third of U.S. reactors.
- Since 1999, Grand Gulf has operated 96% of the time (capacity factor), up from 83% in previous years, even though the reactor is aging.

Unfortunately, the April 2005 EIS makes only cursory remarks about these important issues, or completely ignores them. Moreover, **no data are presented in the EIS about emission levels, environmental levels of radiation, and in-body radiation in the local area; and no data on changes in local health status are included. Without analyzing such information, any decision to approve or disapprove Entergy Nuclear's Early Site Permit application would be incomplete.**

RPHP members have taken the time to examine examples of public health data for the Grand Gulf area, and request that federal regulators consider them before making a decision on the application.

1. Immediate Effects of Reactor Startup. As mentioned, Grand Gulf unit 1 achieved initial criticality on August 18, 1982. Although several years elapsed until electricity from Grand Gulf was sold commercially, the reactor was producing fission products since the criticality date. These chemicals include over 100 radioisotopes, none of which exist in nature and all of which are carcinogenic. While much of this radioactive waste is contained and stored in fuel pools, some is emitted into the local air and water.

The only time in which the Grand Gulf area had been exposed to these fission products was during the period of above-ground nuclear weapons testing in Nevada and the south Pacific. However, the Partial Test Ban Treaty of 1963 ended large-scale atmospheric testing, and by 1982, much of these products had disappeared from the local environment.

While all humans are adversely affected by exposure to radioactivity, it is the developing fetus and infant who are much more susceptible to damage to cell membranes and DNA. Estimates of this increased susceptibility range from 10 to 100 times that of adults. Fetal cells divide rapidly (and thus, a damaged cell is more likely to produce more damaged cells), and the fetal immune system is immature. The concept of increased susceptibility of the very young to radiation exposure was first demonstrated in the late 1950s with studies of carcinogenicity of pelvic Xrays to pregnant women.

The area most likely to be affected by Grand Gulf exposures are the closest counties. There are five counties that lie completely or mostly within 30 miles of the plant. Three are in Mississippi (Claiborne, Jefferson, and Warren) and two are in Louisiana (Madison and Tensas). The population of about 92,000 is 57% black and has more than double the poverty rate of the U.S.

In the first two years after Grand Gulf went critical, the fetal and infant death rates soared (compared to the two years before startup), while declining in the rest of the region and nation. Both whites and blacks were affected.

<u>Indicator</u>	<u>5 Local Counties</u>		<u>% Change, 1981-2 to 1983-4</u>		
	<u>1981-82</u>	<u>1983-84</u>	<u>Local</u>	<u>Oth LA/MS</u>	<u>U.S.</u>
Fetal deaths (gestation > 20 weeks)					
- Number of local deaths	41	60			
- Rate/1000 live births	11.0	17.3	+57.8	-6.1	-6.8
Infant deaths (under 1 year)					
- Number of local deaths	55	69			
- Rate/1000 live births	14.7	19.9	+35.3	-4.8	-6.4
White Infant deaths (under 1 year)					
- Number of local deaths	18	25			
- Rate/1000 live births	12.7	19.0	+50.0	-4.2	-6.7
Black Infant deaths (under 1 year)					
- Number of local deaths	37	44			
- Rate/1000 live births	16.1	20.6	+28.3	-4.7	-5.2

Local changes significant at  $p < .02$  (Fetal deaths) and  $p < .05$  (infant deaths)

Source: National Center for Health Statistics, Vital Statistics of the United States, annual volumes.

2. Effects of Continued Operation. While immediate health effects of radiation exposure are most likely to be observed in fetuses and infants, adults are also affected. Often there is a latency period of as much as several decades between initial exposure and disease onset.

Because Mississippi and Louisiana had no incidence registries for cancer and other diseases before Grand Gulf 1 began operating, mortality data are used. For each of the five local counties, the death rate for all causes combined from 1981-82 (before startup) and 1989-98 (7-16 years after startup) rose, versus declines in the region and nation.

<u>County</u>	<u>% Change, 1981-2 to 1989-98</u>	
	<u>Whites</u>	<u>Blacks</u>
Claiborne MS	+15	+10
Jefferson MS	+ 3	+ 8
Warren MS	- 0	+ 6
Madison LA	+ 2	+ 6
Tensas LA	+ 8	+ 4
Oth LA/MS	- 8	- 0
United States	- 10	- 3

Source: National Center for Health Statistics, Vital Statistics of the United States, annual volumes.

In closing, RPHP recommends that the Nuclear Regulatory Commission take the following steps. First, these data should be reviewed and understood. Second, more current data should be reviewed. Third, these trends should be compared with any information on environmental emissions and environmental levels of radioactivity near Grand Gulf. And fourth, the NRC should initiate a study of in-body radioactivity near Grand Gulf; RPHP is currently conducting the only such study near U.S. reactors, in which it measures Strontium-90 concentrations in baby teeth).

We urge that these steps be taken before any decision on the application is reached. Only by doing so will a truly complete environmental impact assessment be made.

Sincerely yours,

  
Joseph Mangano