Fermi3CEm Resource

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Subject: Comments Re: NUREG 2105 (Nuclear Reactors and a New Reactor, Fermi 3, at Monroe, MI)

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Submitted by email at: Fermi3.COLEIS@nrc.gov

Chief, Rules, Announcements, and Directives Branch
Office of Administration
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Comments Re: NUREG 2105

http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2105/

Comments on U.S. Nuclear Regulatory Commission Environmental Impact Statement and Provisional Approval to Detroit Edison to Build and Operate Fermi 3, a New Nuclear Reactor At Monroe, MI

I view with alarm the prospect of another reactor producing additional ionizing radiation and nuclear "waste" (spent fuel plus related toxins) for which there is no solution. This includes the prospect of further "normalizing" of man-made ionizing radiation into the biosphere, including the human gene pool, and the arrogance of moving forward with avoidance/denials of the consequences of major nuclear accidents, meltdowns and explosions. All of this is on top of the burden of radionuclides loaded into the human family and the environment by the manufacture and explosion of atomic and thermonuclear weapons. From the beginning, the U.S. has;

- led the proliferation of nuclear weapons/nuclear reactors,
- subsidized the private nuclear industry with tax payer dollars and loan guarantees,
- indemnified private reactor owners from catastrophic financial loss from catastrophic reactor malfunctions and explosions (Price-Anderson Act 1957 as amended 2005) without which, there would be no commercial nuclear reactors,
- withheld information, misled the public, and suppressed credible science on effects of radiation on human health,
- avoided adequate measurement of release radioactive doses and biological effects,
- avoided and marginalized the study of the biological effects of man-made ionizing radiation
- and blurred the inherent connection between nuclear weapons and nuclear power which are joined at the hip spawning each other (reactors have led to nuclear weapons and thermonuclear fuel components production, i.e. commercial reactors {Watts Bar, TN} producing tritium for thermonuclear weapons).

In so doing it was necessary and convenient to mislead the public on the serious risks of x-rays so as to have less public concern about the risk of gamma rays. Hence, the ubiquitous refrain, "...it's no more than the risk of an x-ray..." when reassuring the public about radioactive nuclear releases. This in turn has impacted public health more broadly. (see http://www.ratical.org/radiation/KillingOurOwn/KOO.pdf).
Below are my comments on the NRC Environmental Impact Statement for Combined License for Enrico Fermi 3 and on the NRC itself. It was not possible to comment on the entire three inch thick NRC environmental impact statement in the time allowed before the January 11, 2012 deadline.

1.
Is it accurate that five of the six new nuclear reactors of the Fermi 3 GE-Hitachi proposed design ordered have been cancelled? Fermi 3 is a loss leader for GE-Hitachi hoping to have a demonstration up and running to sell others? The GE-Hitachi Economically Simplified Boiling Water Reactor (ESBWR) is experimental, untried and its cooling system questionable and unproven in real life experience. NRC proposes to allow this to be built and licensed without safety design validation.

2.
Regarding the “Pre-construction Activities” (v 1, p 1.6) which “...include clearing, grading, excavating, dredging, and discharge of fill, erection of support buildings and transmission lines, and other associated activities.” What pre-construction activities has Detroit Edison undertaken to date towards construction of the unlicensed reactor not yet approved for construction? Is this Environmental Impact
Statement to satisfy a legal obligation for a project already underway?

3.
Why did DTE submit (July 18, 2011) a “letter of intent to the NRC to file an application in 2014 for renewal of the operating license of Fermi 2” (v 1, p 1.8) when the existing license does not expire for more than a decade? Has NRC ever refused to renew a reactor license anywhere in the U.S.?

4.
The document cites geologic issues and states that pollution is kept to a minimum by recharging the waters in the fill and overburden, “recharge of the fill is through precipitation…The overburden is recharged with precipitation…” (v 1, p 2.18) If “annual average rainfall over Lake Erie is about 35 in./yr … The average annual evaporation from Lake Erie is estimated to be 36 in./yr…” (v 1, p 2.14) How can the precipitation refresh either fill or overburden if evaporation rate exceeds precipitation?

5.
I was dismayed to see the chart of Lake Erie water usage: 56,024 million/gallon/per day and power plants drew 50,518 of them! All other uses added up to ten percent of the power plant uses. (v 1, p 2.24) Could that use be connected to the NUREG 2105 prediction, “Recent studies of the effects of climate change indicate that there could be declines in the overall Lake Erie water levels of 1 to 2 meters.”? (v 1, p 2.25) I think the glut of water going to the power plants is not sustainable in the long term and might get blamed on climate change.

6.
“Fermi 3 operations would result in an average consumptive use of approximately 7.6 billion gallons of Lake Erie water per year.” (v 2, p 10.9) “Unavoidable adverse impacts on aquatic ecology resources would include an increased potential for entrainment, impingement, and thermal loading to Lake Erie…” That is just not acceptable.

7.
Tritium (which is radioactive for 248 years and can pass from mother to fetus) is showing up in the monitoring wells of Fermi 2. (v 1, p 2.29) “In wells within a 5-mi radius of the Fermi site, elevated concentrations of arsenic about the EPA maximum contaminate level were found in groundwater samples.” and “…detected in the few shallow groundwater wells downwind from the Fermi 2 stack.” (v 1, p 5.117) Detroit Edison attributed this to the recapture of tritium in precipitation from the plant’s gaseous effluent.” (v 1, p 2.234) To allow a Fermi 3 to be built would be to contribute to our own deaths. Children are more susceptible to radiation than adults.

8.
The Port of Monroe provides a point of access for Great Lakes shipping and transport through the Great Lakes-Saint Lawrence Seaway (v 1, p 2.139). In case of a Fermi disaster, would DTE be financially liable for interference with Interstate Commerce?

9.
Walpole Island First Nations is located within the affected radius, but “because it is in Canada, the review team did not include it in its environmental justice investigation.” (v 1, p 2.187) It is my understanding that Walpole Island First Nations is on unceded lands and is not Canadian or American, but those residents have dual citizenship. Therefore, they need to be included in your scoping process – even if you have to back up to do so.

10.
Fermi 1 is stated as eligible for listing on the National Registry of Historic Places? (v 1, p 2.199 & 2.203) If it becomes listed, then maintenance/monitoring of all the spent fuel on site (and decommissioning) will be done at taxpayers’ expense? What presentation could there be of Fermi 1 except that it was a near catastrophic explosion, unable to produce electricity, and a financial loss? Will the historic presentation include the 1957 WASH Report produced by the Brookhaven National Laboratory at the request of the Atomic Energy Commission? That report said that in a major accident the following would happen: 3,400 people would die within 15 miles; 43,000 people within 44 miles would suffer severe radiation sickness; 82,000 people within 200 miles would have double the chance of cancer; 66,000 people would have to be rapidly moved out of a 92 square mile area stretching 100 miles downwind; and subsequently, 460,000 people would have to be moved out of their homes up to 320 miles downwind of the accident; and there would be 7 billion dollars in property damage. Would the historical presentation include the 1956 report of the Advisory Committee on Reactor Safe Guards, given to the Atomic Energy Commission, that clearly stated that the design of the proposed Fermi 1 reactor was unsafe and should not be built? Would it acknowledge that AEC Chairman Strauss suppressed these reports and authorized construction of Fermi 1 ?

11.
Table 2-11: “Estimated Numbers of Fish Eggs and Larva Entrained by the Fermi 2 Cooling Water Intake” in an eight month period! 62,566,649 (v 1, p 2.78) Over 62 million! (v 1, p 5.29) That destroys commercial and noncommercial

fishing.

12.
"The DE (Detroit Edison) employs approximately 1,200 to 1,500 workers for 30 days during every refueling outage…" (v 1, p 2.134) Are these workers allowed to receive a year's dosage of radiation during those 30 days? What is their dose exposure for the refueling period?

13.
"Public and occupational health can be compromised by activities at the Fermi site that encourage the growth of disease-causing microorganisms (etiological agents). Thermal discharges from Fermi into the circulation water system and Lake Erie have the potential to increase the growth…These microorganisms could give rise to potentially serious human concerns, particularly at high exposure levels." (v 1, p 2.229) With these results, what could possibly justify the unnecessary doubling of the thermal discharges into Lake Erie?

14.
Additional discharges to Lake Erie could include treated liquid radwaste."(v 1, p 3.14) "The monthly average anticipated water intake from Lake Erie would vary between approximately 23,750 and 33,500 gallons per minute (Table 3.5). …monthly discharge to Lake Erie (blowdown) would vary between 11,868 and 16,743 gallons per minute." (v 1, p3.30) Are there hourly samplings done and are there any emergency shut off values to stop the discharge when samples exceed radiation/contamination limits? What radionuclides are in this liquid discharge? At what dose?

15.
The atmosphere would receive heat and water in the form of cooling tower vapor and drift." (v 1, p 3.31) Can these emissions be stopped when they exceed contamination limits? What provision is there for notifying the public of excess releases beyond design releases? What are the contaminants and at what dose?

16.
"Liquid, gaseous, and solid radioactive waste management systems would be used to collect and treat the radioactive materials produced as byproducts of operating Fermi 3 (v 1, p3.31)….Waste-processing systems would be designed to meet the design objectives…" (v 1, p.3.32). If the systems haven't been designed yet, shouldn't the NRC withhold the normal licensing procedure until the systems are invented and manufactured? What radioactive waste is being referenced here and in what dose?

17.
Considering the Solid Radioactive Waste Management System (v 1, p3.33), "There are no onsite facilities for permanent disposal of solid wastes, so the packaged wastes would be temporarily stored in the Auxiliary and Radwaste Buildings prior to being shipped to a licensed disposal facility." What facility would that be? Is radioactive waste to be privatized, without NRC oversight, recycled into consumer products, commercial land fills? Isn't it true that solid cast storage of spent fuel cannot be done at the Fermi site because the ground can't withstand the weight of the concrete casts? This results in large amounts of spent fuel kept in pools that are more vulnerable to accident/meltdown/explosions.

18.
Is there a limit on the heat temperature of waste water released into Lake Erie? "When the Turbine Bypass System is in operation, the temperature of the discharge could reach up to 96 degrees." (v 1, p 3.35) Is the public informed of actual real time temperature of releases? Where and how?

19.
"Radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures." Why was this sentence used more than once in the document? (v 1, p 5.112 & 5.122, & 6.12, & 6.23, etc)

20.
"If a severe accident occurred at a reactor located at the Fermi site, it is likely that Federal, State, and local officials would take various measures, including limiting access to contaminated areas and interdiction of drinking water and fishing to reduce exposures." (v 1, p 5.133) Who would be notified? What expectation can the public have of being notified? In every major nuclear reactor accident on record, the public was ***not*** notified without significant delay. Governments downplayed the past accidents and denied seriousness of the risk to the public. A severe accident at the Fermi site would contaminate an extremely large area and immediately and seriously irradiate anyone within 50 to 100 miles and further, depending on wind and weather conditions. There is no way to avoid that or mitigate it. To pretend otherwise indicates a callous disregard for public health and safety. The NRC does not require or evaluate or address mitigating public exposure, evacuation, management of evacuated populations, mitigation of air, land, water, food, and human contamination. **No state or federal agency claims responsibility or presents a plan to address the consequences of a serious nuclear reactor accident in the past, present, or future.**

21.
After onsite storage for sufficient time to allow for short-lived fission product decay and to reduce the heat generation rate, the fuel assemblies would be transferred to a waste repository for internment." (v 1, p 6.5) Where is the Federal waste repository? None exists. Spent fuel remains on site, hopefully in hardened casts (not possible at the Fermi site due to geological issue), monitored and protected from threats from weather and

attack?

22.
“DE can currently ship Class A low level waste (LLW) to the Energy Solutions site in Clive, Utah; however it cannot dispose of Class B and C LLW at the Energy Solutions site in Barnwell, South Carolina. (v 1, p 6.14) That statement says DE “can” ship Class A LLW to Clive, but does it currently ship Fermi 2 waste there? Who monitors what private corporations do with radioactive waste? What restrictions are placed on private management of radioactive waste?

23.
Current national policy …mandates that high-level and transuranic wastes be buried at a deep geologic repository, such as the proposed repository at Yucca Mountain, Nevada.” (v 1, p 6.15) Didn’t Congress permanently reject Yucca Mountain as a repository? Increasing the volume of radioactive waste threatens people and the rest of the biosphere forever. There is no safe solution to man-made radionuclides that remain radioactive and a biological threat for hundreds, thousands, millions or billions of years.

24.
“Fuel for the plants would be enriched up to about 4.6 weight percent uranium-235, which exceeds the 10 Code of Federal Regulations 51.52(a) condition. In addition, the expected irradiation level of about 46,000 MWd/MTU exceeds the 10 CFR 51.52(a).“ (v 1, p 6.19) Are we to understand that the NRC said DE can exceed the legal limits as long as they explain? What public control exists on the level of uranium enrichment?

25.
Unirradiated fuel is shipped to the reactor by truck; irradiated (spent) fuel is shipped from the reactor by truck, rail, or barge; and radioactive waste other than irradiated fuel is shipped from the reactor by truck or rail.” (v 1, p 6.19) Are communities along the route notified of the shipments?
“Impacts from these shipments would be from the low levels of radiation that penetrate the unirradiated fuel shipping containers. Radiation exposures at some level would occur to the following individuals: (1) persons residing along the transportation corridors between the fuel fabrication facility and the Fermi site; (2) persons in vehicles traveling on the same route as an unirradiated fuel shipment; (3) persons at vehicle stops for refueling, rest and vehicle inspections; and (4) transportation crew workers.” (v 1, p 6.20) Does that mean I could be exposed by passing a truck hauling unirradiated fuel?
“The Individual Stuck in Traffic… for one hour at a distance of 4 feet…Person at a Truck Service Station…….would be exposed for 49 minutes at a distance of 52 ft from the loaded shipping container.” (v 1, p 6.26) Who else could be exposed?
“Truck crew members would receive the highest radiation doses …NRC staff’s analysis assumed that crew member doses are limited to 2 rem/yr...”(v 1, p 6.24) Shouldn’t the NRC be more definite than merely assuming that will be the limit?

26.
“…shipments of fuel and waste to the Davis-Besse site may also contribute to the cumulative radiological impacts of transportation as a result of sharing some highway links with Fermi 2 shipments.” (v 1, p 7.44) Why have and why would shipments of waste go to the Davis-Besse reactor?

27.
In its application process for a license to build a new reactor, Fermi 3, Detroit Edison estimates that the collective total body dose within a 50 mile radius of the Fermi 3 site to be 14.9 person-rem from liquid effluents and 6.7 person-rem from gaseous effluents. (p 5.112) So, I recognize that this means that collective dose is a measure of the total amount of effective dose multiplied by the size of the exposed population; and that there is then a net increase of 21.6 person-rem for all in the 50 mile radius. The NRC “concludes there would be no observable health impacts on the public from normal operation of Fermi 3, the health impacts would be SMALL, and additional mitigation is not warranted.” In so doing, NRC dismisses the report of the National Academy of Sciences, Committee on the Biological Effects of Ionizing Radiation (BEIR) that all radiation including low level radiation can produce non-malignant illness and cancer as well as genetic mutations. The BEIR report defines low level radiation as near zero to 100 millisieverts (mSv).
http://www8.nationalacademies.org/onpinews/ newsitem.aspx?RecordID=11340
The BEIR report was sponsored by the U.S. departments of Defense, Energy, and Homeland Security, the U.S. Nuclear Regulatory Commission, and the U.S. Environmental Protection Agency. The National Research Council is the principal operating arm of the National Academy of Sciences and the National Academy of Engineering. It is a private, nonprofit institution that provides science and technology advice under a congressional charter.
Clearly, the NRC is a cheer leader for the nuclear power industry and not a spokesperson for public health. The NRC goes on, “The estimated collective dose to the same population from natural background radiation is estimated to be 2,200,000 person-rem/yr. The dose from natural background radiation was calculated by multiplying the 50-mi population estimate for 2060 of approximately 7,710,000 people by the annual background dose rate of 311 mrem/yr.” The statement of average background radiation (311 mrem/yr) is excessive and indicates the NRC effort to trivialize additional reactor releases. The National Academy of Sciences, Committee on the Biological Effects of Ionizing Radiation states that the average background radiation is 3 mSv (millisieverts) per year. I recognize that Millirem and millisievert can be thought of as equivalent. Actually, I recognize that millirem measures the release amount. Millisievert measures the biological impact, variable on different parts of the body. I bear in mind that background radiation exposure varies from one region to another and is higher at higher elevations. This NRC statement does not indicate

what effective dose is multiplied by what population to get the total of 21.6 person-rems designed Fermi 3 release. Why would the calculation for background radiation go out to the 2060 estimated population rather than use current population figures? Is that to make the the background radiation appear to dwarf the proposed Fermi 3 release? This appears to be an average dosage. Left unsaid is that those closer to the reactor would be exposed to higher doses and that weather patterns may concentrate exposures anywhere within or beyond the 50 mile radius and that radiation does not stop at 50 miles. Also, the NRC does not take account of or address or comment or report on large releases of radionuclides from reactors during “normal” operation (beyond designed releases) or due to defective equipment, operator error, relative proximity to reactors or accidents. It does not address radioactive “hot spots”, regions where high dose concentrations impact populations. We know and the NRC knows that these are real issues that occur at existing reactors in the U.S. and around the world. To imply that this can not happen at Fermi 3 is not credible.

28.
A Center for Disease Control statistical analysis shows that there is a significantly higher incidence of cancer deaths for Monroe, MI residents compared with incidences for the U.S. as a whole. This increase in Monroe cancer deaths correlates with the Fremi 2 going to full power. This is ignored by the NRC and Detroit Edison:

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The following is a statement by Joseph J. Mangano

Joseph J. Mangano, MPH, MBA, is Director, Secretary, and the Executive Director of the Radiation and Public Health Project.

Mr. Mangano is a public health administrator and researcher who has studied the connection between low-dose radiation exposure and subsequent risk of diseases such as cancer and damage to newborns.

He has published numerous articles and letters in medical and other journals in addition to books, including *Low Level Radiation and Immune System Disorders: An Atomic Era Legacy.* There he examines the connection between radiation exposure and current widespread health problems.

RISING LOCAL CANCER RATE SUGGESTS LINK WITH FERMI REACTOR

January 14, 2009 - The cancer death rate in Monroe County has been rising since the late 1980s, when the Fermi 2 nuclear reactor began operating, according to a new analysis.

The rise in cancer has been sharpest among children and adolescents, who are most susceptible to the harmful effects of radiation exposure. The analysis uses official data from the U.S. Centers for Disease Control and Prevention.

"The increasing cancer death rate among Monroe County residents, especially young people, suggests a link with the radioactive chemicals emitted from the Fermi reactor," says Joseph J. Mangano MPH MBA, Executive Director of the Radiation and Public Health Project research group. "Because Monroe County has a low risk population that is well educated, high income, and has few language barriers, rising cancer rates are unexpected, and all potential causes should be investigated by health officials."

Fermi 2 reactor began “operating” June 21, 1985. However, it ran very little after the initial low-power start-up until a warranty run in January of 1988, marking the commercial start-up of the reactor. In the early 1980s, the Monroe County cancer death rate was 36th highest of 83 Michigan counties, but by the early 2000s, it had moved up to 13th highest.

From 1979-1988, the cancer death rate among Monroe County residents under age 25 was **21.2% below** the U.S. rate. But from 1989-2005, when Fermi 2 was fully operational, the local rate was **45.5% above** the U.S.

All nuclear reactors produce electricity by splitting uranium atoms, which creates high energy needed to heat water. This process also creates over 100 radioactive chemicals, not found in nature, including Strontium-90, Cesium-137, and Iodine-131.

While most of these chemicals are retained in reactors and stored as waste, a portion is routinely released into the local air and water. They enter human bodies through breathing and the food chain, and raise cancer risk by killing and injuring cells in various parts of the body. They are especially harmful to children.

The findings come at a time when a new nuclear reactor has been proposed at the Fermi plant. The original Fermi 1 reactor, which was the site of a “Partial Core-Melt Accident” in 1966, shut permanently in 1972.

DATA ON CANCER RISK FROM FERMI 2 RADIOACTIVE EMISSIONS

- The Fermi 2 reactor is located in Monroe County, and started on June 21, 1985, not becoming fully operational until January 1988.

- Fermi 2 came close to a meltdown on March 28, 2001 and August 14, 2003. (1)
- Fermi 2, like all reactors, routinely emits over 100 radioactive chemicals into air and water.
- Each of these chemicals causes cancer, and is most harmful to infants and children.
- For cancer deaths for all ages (whites only), Monroe County ranked
36th highest of 83 Michigan counties in 1979-1983 (before startup)
13th highest of 83 Michigan counties in 2000-2005 (latest data) (2)
- The Monroe County cancer death rate age 0-24
was 21.1% below the U.S. in 1979-1988 (before/during startup)
was 45.5% above the U.S. in 1989-2005 (after startup) (3)
Monroe County has no obvious cancer risk. It has a high income, low poverty, well educated population with few language barriers and access to excellent medical care in nearby Detroit. (4) Thus, an increase in cancer (especially to children) is unexpected. This change should be investigated, and one potential cause should be radioactive emissions from Fermi.
Sources:
1. Fermi 2 incurred “near miss” accidents on March 28, 2001 (emergency diesel generator was inoperable for over 7 days) and August 14, 2003 (loss of offsite power due to northeast blackout). Source: Greenpeace USA. An American Chernobyl: Nuclear “Near Misses” at U.S. Reactors Since 1986. www.greenpeace.org, April 26, 2006.
2. U.S. Centers for Disease Control and Prevention, http://cdc.wonder.gov, underlying cause of death. Death rates are adjusted to 2000 U.S. standard population. Includes ICD-9 codes 140.0-239.9 (1979-1983) and ICD-10 codes C00-D48.9 (2000-2005). Whites account for over 95% of Monroe residents.
3. Cancer Death Rates, Monroe County vs. U.S.
1979-1988 and 1989-2005, age 0-24
Monroe County Deaths/100,000 Pop.
Period Cancer Deaths Avg. Pop. Monroe U.S. %vs. US
1979-1988 22 56,234 3.91 4.96 **- 21.2%**
1989-2005 42 51,407 4.86 3.79 **+45.5%**
Source: U.S. Centers for Disease Control and Prevention, http://cdc.wonder.gov, underlying cause of death. Includes ICD-9 codes 140.0-239.9 (1979-1983) and ICD-10 codes C00-D48.9 (2000-2005). Increase in rate significant at p<.05.
4. Demographic Comparison, Monroe County vs. U.S.
Indicator Monroe U.S.
2006 Population 155,035 299,398,484
2000 % Foreign Born 1.9 11.1
2000 % Language other than English 4.0 17.9
spoken at home, age 5+
2000 % High School graduates, age 25+ 83.1 80.4
2000 % Homeownership 81.0 66.2
2004 Median Household Income $53,838 $44,344
2004 % Below Poverty 8.7 12.7
Source: U.S. Census Bureau, www.census.gov, 2000 population, State and County Quick facts

29.
Page 7-42, line 23, states: “On the basis of these findings, the NRC staff concludes that the cumulative risks of severe accidents at any location within 50 mi of the Fermi site would likely be SMALL, and no further mitigation would be warranted.” This dismisses the possibility of a major explosion of Fermi 2 or Fermi 3 or Bessie-Davis. Such an explosion could release radionuclides that would quickly kill large numbers of people, result in both non-malignant illnesses and cancers, and genetic mutations. It would permanently contaminate a very large region. The damage could not be undone.

The environmental impact statement does not acknowledge the permanent effects on people and the biosphere of actual accidents that have taken place.

Nuclear Reactor Incidents, Malfunctions, Meltdowns/Explosions, and Radioactive Releases ignored by NRC in the Environmental Impact Statement:

Excerpts from: Killing Our Own The Disaster of America□s Experience with Atomic Radiation by Harvey Wasserman & Norman Solomon with Robert Alvarez &Eleanor Walters (A Delta Book 1982 Dell Publishing Co., Inc. I Dag Hammarskjold Plaza, New York, NY 10017)
The entire book can be read on line at http://www.ratical.org/radiation/KillingOurOwn/KOO.pdf
Excerpts below have references to on-line page designations which differ from the hard cover book page designations. The page designations, in turn, lead to the authors□ primary source documentation in the book notes.

Kyshtym: Deaths occurred in the Soviet Union From this Nuclear Reactor Explosion.
“...Catastrophe at Kyshtym Soviet Union Ural Mountains 1957 a massive explosion at radioactive dump site: "There was an enormous explosion, like a violent volcano," Medvedev explained. "The nuclear reactions had led to an over-heating in the underground burial grounds. The explosion poured radioactive dust and materials high up into the sky." The human fallout was "terrible. . . . Tens of thousands of people were affected, hundreds dying, though the real figures have never been made public. The large area, where the accident happened, is still considered dangerous and is closed to the public." p.166
This is rated 6 on the International Nuclear Events Scale. Possible ratings are 1 to 7.

Deaths at **Three Mile Island** March 28, 1979
"... Radiation escaped through the containment. Radioactive water leaked into the Susquehanna River. Finally, a hydrogen bubble developed in the core, apparently threatening an explosion.
....unknown quantities of radiation escaped into the air of central Pennsylvania." (p.186)
"....It was impossible to tell how much radiation really escaped. The monitors merely recorded a minimum amount..." according to NRC " ....Inside the building readings showed a minimum of a million millirems per hour, a lethal dose. On site, the day of the accident, monitors 1000 feet from the vent stack showed levels of 365 millirems of beta and gamma rays per hour. A helicopter directly over the vent stack measured emissions three times as high. Even those measurements were "very inconclusive," said Gibson. They showed dose rates "only at the moments the measurements were made." Without full knowledge of weather patterns, he admitted, "we don□t know if they were made at the appropriate locations." Thus Gibson had told his NRC superiors that one of the key methods of measuring emissions—the stack monitors—had been essentially useless during and after the accident." p. 188 This is rated 5 on the International Nuclear Events Scale. Animals died at Three Mile Island. People Died at Three Mile Island. See Chapters 13 and 14.
"In December of 1979, Sternglass carried his conclusions much further. In a paper delivered to the Fifth World Congress of Engineers and Architects at Tel Aviv, he said that *data from the U.S. Bureau of Vital Statistics showed that there were "242 [infant] deaths (from TMI) above the normally expected number in Pennsylvania and a total of 430 in the entire northeastern area of the United States," a rise of clear statistical significance.* The linkage with TMI was clear because "large amounts of radioactive Iodine-131 were released from the plant" and the peak of infant mortality came within a matter of months thereafter. The greatest rises took place near the plant, with effects decreasing as a function of distance away from Harrisburg."
".....But I-131 was not the only radioactive element released from TMI—nor were infants the only humans likely to be harmed. Strontium 90, cesium 137, noble gases, and other disease-causing isotopes may also have escaped. Overall, said Sternglass, increases in cancers, leukemia, and a wide range of other diseases were "likely to occur.....many thousands over the next 10 to 20 years."p. 201

Additional Health studies at Three Mile Island: http://www.tmia.com/taxonomy/term/12

Chernobyl 1986: meltdown with multiple explosions and release of radioactive material. 100,000 people evacuated from the immediate area and 300,000 from areas of heavy fallout in Ukraine, Belarus, and Russia. Exclusion zone of approximately 1,000 square miles indefinitely off limits for human habitation.

Excerpts from: CHERNOBYL Consequences of the Catastrophe for People and the Environment Yablokov, Vassily Nesterenko, and Alexey Nesterenko published by license from New York Academy of Sciences March 15, 2011
Can also be downloaded at http://www.strahlentelex.de/Yablokov%20Chernobyl%20book.pdf
This monograph is a reprint of a volume originally published by the New York Academy of Sciences in 2009. It is a translation from Russian.

"Emissions from this one reactor exceeded by hundredfold the radioactive contamination of the bombs dropped on Hiroshima and Nagasaki. No citizen of any country can be assured that he or she can be protected from radioactive contamination. One nuclear reactor can pollute half the globe. Chernobyl fallout covered the entire Northern Hemisphere..." page 2

Thousands of reports and studies in Russia, Belarus, and Ukraine document a wide range of illness and death from the Chernobyl explosion. Excerpts below are marked with page notation where the subject addressed is found in the book:

p. 27 "....contamination not less than 300 years for Cs-137 and Sr-90, more than 200,000 years for Pu, and several thousand years for Am-241.....tens of millions of people will live under measurable chronic radioactive contamination for decades to come...."

p. 32 ".... nearly 400 million human beings have been exposed to Chernobyl□s radioactive fallout and for many generations, they and their descendants will suffer the devastating consequences...."
42-50 ".... comparing heavily contaminated with less contaminated areas: general morbidity increased significantly....range of illness increased: Weakness, dizziness, headache, fainting, nose bleeds, fatigue, heart arrhythmia's, stomach pain, vomiting, heartburn, loss of appetite, allergy, chronic gastroenteric pathology, dodentitis, gallbladder inflammation, vascular and heart syndromes, low birth weight...."

p. 55 ".... Chernobyl catastrophe produced accelerated aging. multiple illnesses characteristic of aging were seen many years sooner...."

p. 58 ".... there is a high incidence of non-malignant diseases in people heavily contaminated including: brain damage, premature cataracts, tooth and mouth abnormalities, blood, lymphetic, heart, lung, gastrointestinal, urologic, bone, and skin diseases. endocrine dysfunction, thyroid disease including cancer, genetic damage and birth defects, immunological abnormalities and increases in viral, bacterial and parasitic disease...."

p. 65 ".... a common reason for functional impairment of blood, blood forming organs, and circulatory system is radioactive destruction of the endothelium, the covering surface of vessels...."
"....incidence of chromosomal aberrations is significantly higher in all the territories contaminated by Chernobyl...."

p. 71 ".... there is a high increases of Down Syndrome, 30-49%..."

p.75 “....the 2nd and 3rd generations of children whose parents were irradiated by the atomic bomb explosion in Japan in 1945 suffered 10 fold more circulatory system diseases and impaired liver function and 3.3 fold more respiratory system illness than a control group....”

p. 76 ”The overwhelming majority of Chernobyl induced genetic changes will not become apparent for several generations.”

p. 77 “The Chernobyl radiation is genetically much more dangerous than that released in Hiroshima and Nagasaki as the quantity of radionuclides emitted from the chernobyl meltdown was several hundred fold higher and there were more different kinds of radionuclides.”
“The genetic consequences of the Chernobyl catastrophe will impact hundreds of millions of people, including:(a)those who were exposed to the first release of short-lived radionuclides in 1986, which spread worldwide...(b) those who live and will continue to live in the territories contaminated by Sr-90 (strontium)and Cs-137 (cesium), as it will take no fewer than 300 year for the radioactive level to decrease to background; (c) those who will live in the territories contaminated by Pu (plutonium) and Am (Americum) as millennia will pass before that deadly radioactivity decays; and (d)children of irradiated parents for as many as seven generations (even if they live in areas free from Chernobyl radionuclide fallout)....”

83 “In all of the contaminated territories, there is a marked increase in nonmalignant thyroid diseases....delayed healing of wounds and ulcers, delay in growth of hair, dryness, fragility, hair loss, increased susceptibility to respiratory infections, night blindness, ringing in the ears, headaches, fatigue and lack of energy, lack of appetite (anorexia) delayed growth in children, male impotence, increased bleeding....”

p. 87 “.... Chernobyl radiation suppresses immunity...”

p. 92 “....marked increase in respiratory system morbidity everywhere in the territories contaminated by Chernobyl.”

p. 96 “For children of the hibakusha who were not irradiated directly, the incidence of respiratory system illnesses was higher compared to controls some decades after the bombardment.”

p. 102 “Urogenital tract diseases and reproductive disorder: abnormalities in spermatozoa, reproductive failures, birth abnormalities in children... □

p. 102 “.... bone and muscle diseases: cases of children born practically without bones (“jelly fish-children”), a condition seen previously only in the Marshall Islands after the nuclear tests of the 1950s”

p. 105 “....diseases of the nervous system and sense organs and their impact on mental health: low levels of ionizing radiation changes in both central and autonomic nervous systems and can cause encephalopathy.....significant morbidity was documented in contaminated territories....”

p.112 “...45% of children born to mothers who went through Hiroshima and Nagasaki nuclear bombardment were diagnosed with intellectual retardation....”

p. 133 “The occurrence of congenital malformations continues to increas in several of the contaminated territories and correlates with the level of irradiation...”

p. 162 “There are 2 ways to define the scale of cancer morbidity associated with the Chernobyl catastrophe: (1) on the basis of calculated received doses (with application of appropriate risk factors) and (2) by direct comparison of cancer morbidity in the heavily and less contaminated territories.”

p.174 “In Connecticut there were two separate fallouts of Chernobyl radionuclides (in the middle of May and the second half of June, 1986), resulting in a 7 to 28-fold increased level of I-131 in milk. The rate of thyroid cancer among Connecticut children under the age of 15 years rose sharply (from 0.16 to 0.31 per 100,000) from 1985-1989 to 1990-1992. During the same period rates of thyroid cancer for all age groups jumped to 23% (from 3.46 to 4.29 per 100,000), after 10 previous years without change.”

p.174 “The added risk of thyroid cancer after Hiroshima and Nagasaki radiation was highest 10-15 years later, with cases appearing 40-50 years afterward.”

p. 192 “ Mortality after Chernobyl: “A detailed study reveals that 3.8-4% of all deaths in the contaminated territories of Ukraine and Russia from 1990 to 2004 were caused by the Chernobyl catastrophe. The lack of evidence of increased mortality in other affected countries is not proof of the absence of effects from the radioactive fallout. Since 1990, mortality among liquidators (mitigation workers) has exceeded the mortality rate in corresponding populations groups. From 112,000 to 125,000 liquidators died before 2005---that is, some 15% of the 830,000 members of the Chernobyl cleanup teams. The calculations suggest that the Chernobyl catastrophe has already killed several hundred thousand human beings in a population of several hundred million that was unfortunate enough to live in territories affected by the fallout. The number of Chernobyl victims will continue to grow over many future generations.”

210 “The overall mortality for the period april 1986 to 2004....estimated at 985,000 deaths....Given the half-life

of the two main radionuclides (Cs-137 {Cesium} and Sr-90 {Strontium}),of approximately 30 years each, the radioactive load in the contaminated territories will decrease about 50% for each human generation. The concentration of Pu {Plutonium},Cl-36 {Chlorine}, and Tc-99 {Technetium} will remain practically the same forever (half-lives consequently more than 20,000 and 200,000 years), and the concentration of Am-241 {Americum} which is a decay product of Pu-241, will increase over several generations."

p. 223 "Air particulate activity over all of the Northern Hemisphere reached its highest levels since the termination of nuclear weapons testing---sometimes up to 1 million times higher than before the chernobyl contamination. There were essential changes in the ....structure of the surface air in heavily contaminated territories....Many years after the catastrophe aerosols from forest fires have dispersed hundreds of kilometers away...."

p. 225 "Three Chernobyl clouds entered eastern Canada...(in 1986). The fallout included..."(15 radionuclides).

p. 226 3 radionuclides from Chernobyl reached the U.S. and were measured and recorded by the U.S. EPA.

p. 232 "Levels of radioactive contamination even in North America and Asia are above the maximun levels that were found in the wake of weapons testing in the 1960s"

p. 237 "Chernobyl irradiation has caused structural anomalies and tumor like changes in many plant species. Unique pathological complexes are seen...."

p. 255 "Radioactive shock when the Chernobyl reactor exploded in 1986 combined with chronic low dose contamination has resulted in morphologic, physiologic, and genetic disorders in every animal species that has been studied----mammals, birds, amphibians, fish, and invertebrates."

p. 273 "...an enormous amount of many different radionuclides was absorbed by animals through food, water and air. Levels were sometimes hundreds of times higher than precatastrophe ones....The levels of incorporated radionuclides in some areas of Europe remain dangerous for mammals, birds, amphibians, and fish."

287 "The reluctance on the part of officialdom to acknowledge the truth about Chernobyl□s consequences has led to concerned citizens organizing to find additional sources of information to help those who are suffering. Hundreds of such public local, national, and international organizations have been created,,,"

p. 287 Andrei Sakharov and 2 others "....in 1987 initiated the Belorussian Institute for Radiation Safety (BELRAD), an independent public organization devoted to helping Belorussian children---those suffering most from the catastrophic contamination. BELRAD has collected an extensive database for 24 years and is unique as a center for scientific and practical information."

p .289 "In many European countries level of I-131,Cs-134/137, Sr-90 and other radionuclides in milk, dairy products, vegetables, grains, meat, and fish increased dramatically (sometimes as much as 1,000 fold) immediately after the catastrophe. Up until 1991, the United States imported food products with measurable amounts of Chernobyl radioactive contamination, mostly from Turkey, Italy, Austria, West Germany, Greece, Yugoslavia, Hungary, Sweden, and Denmark....Given that more than 90% of the current radiation fallout is due to Cs-137, with a half-life of about 30 years, we know that the contaminated areas will be dangerously radioactive for roughly the next three centuries."

311 "Owing to internally absorbed radionuclides, radiation levels for individuals living in the contaminated territories of Belarus, Ukraine, and Russia hae been increasing steadily since 1994."

p. 316 "Today the most serious contaminating agents are Cs-137 and Sr-90. In coming years the situation will change and Am-241 will present a serious problem....constant monitoring and control (will be) required for Cs-137 and Sr-90 for at least 150-300 years....The contamination from the wider spectrum of radioisotopes is dynamic and will require constant monitoring and control essentially forever."

p. 318 "More than 50% of Chernobyl□s radionuclides were dispersed outside of Belarus, Ukraine, and European Russia.....nearly 5 million people are still being exposed to dangerous contamination. The increase in morbidity, premature aging, and mutations is seen in all the contaminated territories that have been studied. The increase in the rates of total mortality for the first 17 years in European Russia was up to 3.75% and in Ukraine is was up to 4.0% Levels of internal irradiation are increasing owing to plants absorbing and recycling Cs-137, Sr-90, Pu, and Am.

p. 319 The claim by the International Atomic Energy Agency (IAEA), the united Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and several other groups that the Chernobyl radioactive fallout adds "only" 2% to the natural radioactive background ignores several facts: First, many territories continue to have dangerously high levels of radiation. Second, high levels of radiation were spread far and wide in the first weeks after the catastrophe. Third, there will be decades of chronic low-level contamination after the catastrophe. Fourth, every increase in nuclear radiation has an effect on both somatic and reproductive cells of all living things....There is no justification for the fact that specialists from IAEA and the World Health Organization (WHO)(Chernobyl Forum, 2005) completely neglected to cite the extensive data on the negative consequences of radioactive contamination in areas other than Belarus, Ukraine, and European Russia, where

about 57% of the Chernobyl radionuclides were deposited."
50% of Chernobyl□s fallout was outside of European Russia, Belarus, and the Ukraine.
Heavily contaminated agricultural land taken out of use: Belarus, 265,000 hectares (654,550 acres); Ukraine, 130,000 hectares (321,100 acres); Russia, 17,000 hectares (41,990 acres) total equals 1,017,640 acres withdrawn (page 312)

Chernobyl: Consequences of the catastrophe 25 years later
by Janette D. Sherman, M.D., and Alexey V. Yablokov, Ph.D.
published April 26, 2011 article and interview by Democracy Now at
http://sfbayview.com/2011/chernobyl-consequences-of-the-catastrophe-25-years-later/print/

In the first 25 years after the multiple Chernobyl explosions, mitigating costs reached 500 billion dollars and Belarus spends 20% of its national annual budget to mitigate some of the consequences.

"Data from multiple scientists estimate the overall mortality from the Chernobyl catastrophe, for the period from April 1986 to the end of 2004, to be 985,000, similar to those of Gofman (1994a) and Bertell (2006) and a hundred times more than the WHO/IAEA estimate."

An agreement signed on May 28, 1959, at the 12th World Health Assembly obligates the World Health Organization (WHO) to submit public releases bearing on nuclear energy to the International Atomic Energy Agency (IAEA) for approval. The IAEA□s mandate is to promote nuclear energy.
Chernobyl is rated 7 on the International Nuclear Events Scale.

Fukushima
Fatal doses of radiation have been acknowledged near reactors 1 and 2 and measuring devices gave their maximum possible reading (off scale) of 10 sieverts per hour. This followed crippling explosions that destroyed the reactor buildings. The reactors have continued to spew radiation since the disaster.
Food and agricultural land contamination prevents use of land and food crops and one group of 1000 children were found to have radioactive iodine thyroid contamination. Evidence shows that cooling pipes were known to be deteriorated, and that the earth quake caused loss of cooling and the melt down before the tsunami hit which in turn knocked out the back-up generators. This puts at risk all of the other aging reactors of this same design in Tokyo as well as here in the U.S---including Fermi 2---., especially those on earth quake faults. Fall out from Daiichi reactors has been measured across the U.S.
The Japanese government and the IAEA are protecting the nuclear industry and not the people of Japan by claiming that Fukushima is stable when it is not; by substantially raising the "allowable limit" of radiation for the people; by allowing return to evacuated areas; and by planning on incinerating radioactive material and dumping the radioactive ash into Tokyo Bay. The U.S. State Department exuded support stating that Japan had made "the right decision". The Japanese people will now be "allowed" to experience up to 20 millisieverts. This is 10 times higher than allowable dose for U.S. nuclear workers. The claim that a "cold shut down" has been achieved is misleading. The jury rigged piping cooling the damaged reactors is not earth quake safe and there is a high likelihood of an earth quake that would return the reactors to meltdown again. The IAEA is not a UN agency as is often claimed. It□s purpose as expressed in article 2 of its mission statement is to "...seek to accelerate and enlarge atomic energy..." around the world. The current head of the IAEA is a former Japanese nuclear regulator. Japan has and continues to put large amounts of radiated water into the ocean. The assault on people and the rest of the biosphere represented by the Fukushima catastrophe is a current reality that will be played out into the indefinite future..
http://fairewinds.com/content/tepco-believes-mission-accomplished-regulators-allow-radioactive-dumpingtokyo-bay
This is rated 7 on the International Nuclear Events Scale.

Other reactor incidents, malfunctions and accidents:
• Chalk River, Ontario: 1952 and 1958: 1000 rads per hour exposure to a large number of people and area for days as a fuel rod had burned. 300 Canadian Armed Forces personnel were brought in for the clean up effort. This is rated 5 on the International Nuclear Events Scale (INES).
• Idaho Fallls, Idaho 1955; 1961 An explosion occurred and worker radiation meters read 1000 rads. Three workers were dead, one impaled on a fuel rod stuck to the ceiling. Even those well suited in protective clothing and limited to 60 seconds time of exposure in addressing the crisis absorbed 30 rads of radiation.
• 1957 Windscale, England: Information withheld from the public. The public lied to. Contaminated food, animals and agricultural land. A cover up occurred and fallout reached London, 300 miles away. This is rated 5 on the International Nuclear Events Scale.
• 1958 Vinca, Serbia A criticality excursion radiated 6 scientists with doses of 2-4 Sv This was rated 5 on the International Nuclear Events Scale.
• 1959 Santa Susana, CA Partial core meltdown resulting in release of radioactive gases.
• 1960 Westmoreland County, Pennsylvania A core meltdown resulted in release of 2 million gallons of contaminated water, some of which resulted in Sr-90 detected in ground water and soil contamination.
• 1964 Charlestown, Rhode Island A criticality accident in which one worker was exposed to 10,000 rad of radiation and two others 100 rad.
• 1966 The Soviet ship *Lenin* experienced a (likely) meltdown resulting in the death of at least 30 crewl and the dumping of the reactor and fuel into the Kara Sea.
• 1967 Dumfries and Galloway, Scotland Fuel meltdown and fire.
• 1969 Lecens, Switzerland Power excursion contaminated containment area resulting in it being permanently sealed off.
• 1975 Greifswald, Germany Excessive heating damaged 10 fuel rods, attributed to poor construction.

INES level 3.
• 1977 Jaslovske Bohunice, Slovakial Accident damaged fuel integrity and resulted in reactor decommissioning. INES Level 4.
• 1980 Orleans, France Rupture of fuel bundles resulted in a release of nuclear materials. Rated level 4 on INES.
• 1981 Tsuruga, Japan Radioactive materials released into the Sea of Japan. More than 100 workers exposed to doses of up to 155 millirems per day of radiation during repairs. Level 2 on the INES.
• 1983 Buenos Aires, Argentina Accidental criticality resulting in fatal 2000 rad of gamma and 1700 rad of neutron radiation to one worker and up to 35 rad to 17 people outside the reactor. INES level 4.
• 1986 Hamm-Uentrop, Germany Reactor malfunction resulted in radioactive release detected two kilometers away.
• 1993 Tomsk, Russia Explosion at this plutonium reprocessing facility caused release of Pu 239 and other radionuclides 20 km beyond the facility property exposing the village of Georgievka and 160 on-site workers and 2,000 cleanup workers to doses of up to 50 mSv. INES level 4.
• 1999 Ishikawa Prefecture, Japan Uncontroled sustained reaction due to operator error. Reactor owner did not report this incident and falsified records, covering it up until 2007. INES level 2.
• 1999 Ibaraki Prefecture, Japan Accidental criticality due to operator error resulting in neutron exposure to 3 workers. Two died. 16 other workers received lesser doses of 1 mSv or greater. INES level 4.
• 2003 Paks, Hungary Rupture of fuel rods releasing radionuclides. INES level 3.
• 2005 Sellafield, England Twenty metric tons of uranium and 160 kilograms of plutonium disolved in 83,000 litres of nitric acid leaked over several months from a cracked pipe into a stainless steel sump chamber at this reprocessing plant. INES level 3.
• 2005 Braidwood, Illinois Tritium contamination of groundwater at Exelon reactor.
• 2006 Erwin, TN Thirty-five litres of highly enriched uranium solution leaked during transfer into a lab at Nuclear Furl Services Plant. INES level 2.

Fermi 1: On October 5, 1966, when Fermi 1 over heated and released radiation into and out side of the containment building operators were uncertain of what to do. Fuel had melted. Fuel distribution had shifted which could threaten a secondary major explosion. This was already beyond designed parameters and predictions that it was impossible for this to happen. The reactor had not shut down automatically. It had to be shut down manually. Operators were in a quandary as to what to do next to stave off a larger catastrophe. They did not know the cause of the problem or how to fix it. The best nuclear experts from around the country and the world were called and consulted. In 1968, a year and a half after the meltdown, after tedious efforts to examine the core of the reactor, with the risk of a severe explosion at each step and the prospect of hundreds of thousands of deaths, the piece of zirconium metal that had blocked coolant was retrieved from the bottom of the reactor. It had broken off from its installation. Its presence did not appear on the blueprints of the reactor design. In May of 1970, Fermi 1 was allowed to resume operation when 200 pounds of radioactive sodium burst out of the pipes and was doused with water causing it to flash and burn. It was doused with argon gas. Fermi 1 was closed forever on August 27, 1972. The AEC (Atomic Energy Commission) was building a new breeder reactor at Oak Ridge, TN as though Fermi 1 had never existed. Fermi 1 sits radioactive and needing to be monitored indefinitely with no resolution possible. See We Almost Lost Detroit by John Fuller 1975 Readers Digest Press. Crowell Company New York.

All of the reactor accidents, meltdowns, explosions that have occurred are not only historical events but ongoing present realities, in that radionuclides released and dispersed widely remain a threat to human health. The thrust of the nuclear industry and government is to "normalize" ever expanding man-made ionizing radiation into the biosphere by minimizing or denying statements of the risk to cell tissue.

30.
Gross Errors on Statement of Need for Additional Capacity in DEIS Section 8:

The Energy Information Administration (EIA), a division of the United States Department of Energy, tracks and publishes data on energy use in the United States. In particular, they publish figures on how much electricity was consumed each year in the state of Michigan, and how much was generated. According to the EIA, in 2006, 108,018 million Kilowatt-hours of electricity was consumed (sold at retail) in Michigan. For 2007, the figure was 109,927; for 2008, 105,781; for 2009, 98,121. Data for 2010 is not included in their table, available at http://www.eia.gov/state/seds/hf.jsp?incfile=sep_use/tx/use_tx_MI.html&mstate=Michigan.
The Fermi III Draft Environmental Impact Report, in section 8, relies on a study done by the Michigan Public Service Commission (MPSC) for an estimate of demand for electricity in Michigan. The MPSC study says that demand for electricity in 2006 was 112,183 million Kilowatt-hours, and that they expect demand to increase exponentially by 1.3% every year thereafter. Their formula projects a demand for 115,548 million Kilowatt-hours in 2007; 119,015 in 2008; and 122,589 in 2009.
I have compared the MPSC projections with the reality that we know about so far in the table below:
YEAR REAL DEMAND MPSC PROJECTION ERROR (%)
2006 108,018 112,183 03.9%
2007 109,927 115,548 05.1%
2008 105,781 119,015 12.5%

2009 98,121 122,589 24.9%
The error for 2006 comes from the fact that the MPSC used an estimate of the amount of electricity generated in the state instead of the figure for the amount actually consumed. The ever-increasing errors are caused by the fact that their simple formula did not and could not anticipate the global financial crisis which showed up in 2008 and which is not yet resolved.
We can't say with any certainty when or even if the financial crisis will be resolved. We can't say when or if the pattern of growth in demand for electricity that was normal for the 20th Century will be resumed. There is a logical case that says it will not be resumed, but that's far outside the scope of comments to be made here.
What we can say with certainty is the projection for electrical demand is already showing a great deal of error. By 2025, it is likely to be grossly wrong. It is already too wrong to be a legitimate basis for building Fermi III.
In case it is not clear, let's examine just how much of an error this is. If, from 2010 to 2025, Michigan's real electrical demand were to follow the simple formula used by the MPSC, by 2025 the demand would be roughly 157,500 million Kilowatt-hours. The MPSC's original prediction works out to 196,700 million Kilowatt-hours for 2025. That is, the error of 24.9% for 2009, if extended to 2025, would amount to 39,200 million kilowatt-hours less demand in 2025 than originally anticipated.
The DEIS (p. 8-1) says that Fermi III is expected to have an electrical output of 1605 MW plus or minus 50 MW. In a year, assuming nearly 100% uptime in plant operation, this would amount to a little over 14,000 million kilowatt-hours in a year. If this plant were needed to meet the demand originally anticipated, it is clearly not needed to meet the lower demand that would now be anticipated by the same formula.
The DEIS further says that the output for Fermi II is 1122 MW (p.2-5). By the same assumption as used above, this amounts to approximately 9,800 million kilowatt-hours in a year. The two plants together would produce a maximum of 23,800 million kilowatt-hours per year. Neither one of these nuclear power plants will be needed in 2025, if actual demand is lower by 39,200 million kilowatthours.
This Analysis was done by Art Myatt

31.
The NRC is not regulating:
Leak First, Fix Later
Uncontrolled and Unmonitored Radioactive Releases from Nuclear Power Plants
A Beyond Nuclear Report
Paul Gunter, Director, Reactor Oversight Project
April 2010
EXECUTIVE SUMMARY
The highly-publicized leaks of radioactive hydrogen – or tritium – from buried pipes at the Braidwood, Oyster Creek and Vermont Yankee nuclear power plants have drawn attention to a more widespread and longstanding problem analyzed by a new report from Beyond Nuclear. Leak First, Fix Later: Uncontrolled and Unmonitored Radioactive Releases from Nuclear Power Plants finds leaking U.S. reactors are now ubiquitous. There is evidence of 15 radioactive leaks from March 2009 through April 16, 2010 from buried pipe systems at 13 different reactor sites. At least 102 reactor units are now documented to have had recurring radioactive leaks into groundwater from 1963 through February 2009.
The report finds that the federal regulator – the U.S. Nuclear Regulatory Commission (NRC) – has replaced its own oversight responsibilities in favor of industry self-regulation. Instead of mandating compliance with established license requirements for the control and monitoring of buried pipe systems carrying radioactive effluent, the NRC cedes responsibility to industry voluntary initiatives that will add years onto the resolution of a decades-old environmental and public health issue. Of further concern, the agency and the industry continue to downplay and trivialize the health risks of prolonged exposure to tritium which is shown to cause cancer, genetic mutations and birth defects.
The delinquency of the NRC is made more alarming by the fact that the nuclear industry has deliberately misrepresented the truth about its leaking reactors to state governments, most dramatically in Illinois and Vermont. Given the history of untrustworthiness of the nuclear industry, it is even more important to have a vigilant and responsible regulator. The report found this not to be the case with the NRC and its oversight of increasing leaky reactors. The report examines radioactive leaks in Illinois, New Jersey, Michigan, New York and Vermont that illuminate concerns over continuing groundwater contamination, the accelerating deterioration of buried pipes, the lack of integrity of industry□s reporting of leaks and pipes and the questionable replacement of federal oversight and enforcement with industry “voluntary initiatives.”
“.....Braidwood nuclear power station (IL) had 22 recurring uncontrolled radioactive spills from unmaintained vacuum breaker valves on the same buried pipeline that went undisclosed from 1996 to December 2005 including two releases totaling six million gallons of tritiated water. The Braidwood operators allowed millions of gallons of radioactive water contaminated with tritium to soak into groundwater along the four and a half-mile long pipe and to run off site into the neighboring community of Godley Park Township where 600 people have been supplied with bottled water provided by Exelon for more than four years. The city of Wilmington takes in its drinking water from the Kankakee River just two and a half miles from the same Braidwood discharge pipe. Oyster Creek nuclear power plant (NJ) disclosed radioactive water leaking from buried pipes just seven days

after the NRC awarded the oldest reactor in the US a 20-year license renewal. The leaking buried pipes had been falsely documented in company work orders. Management decisions made in the1990s to close Oyster Creek cancelled numerous corrective actions for buried pipes carrying radioactive water. When the reactor was instead sold, many of the work orders were never resumed. The unmanaged deterioration of aging systems sounds an alarm about the thoroughness and adequacy of the NRC license extension review process.
Vermont Yankee nuclear power station (VT) is seeking a 20-year license extension. A January 6, 2010 lab report identified a "very low concentration of tritium" in an on-site test well. The reading spiked from 700 picocuries per liter to 2.7 million picocuries per liter as more test wells were dug to find the leak. Cobalt-60, cesium-137 and radioactive manganese and zinc were discovered in the leak path indicating that the contamination started with fuel damage. The company destroyed its credibility when it revealed that officials falsely reported in sworn testimony to state regulators that there were no buried pipes carrying radioactive water under the reactor. The state senate voted 26 to 4 to close the reactor at the end of its current license in 2012 effectively setting up a legal roadblock to NRC relicensing....."
http://www.beyondnuclear.org/storage/documents/LeakFirstFixLater_ExecutiveSummary_April2010.pdf

32.
Radioactive Fallout from Weapons Testing Combines with Reactors Emissions to Produce a Larger Biological Effect:
Cancer Risk to Americans from Atomic/Thermonuclear Test Fallout
Joseph J. Mangano MPH MBA
Radiation and Public Health Project October 20, 2009
http://www.radiation.org/reading/pubs/091020stlouisreport.html #summary
Excerpts below are quotes from the study:
Results of the study were as follows:
1.The average Sr-90 level in teeth of persons who died of cancer was 122% greater – more than double – than in teeth of healthy controls, a significant difference.
2. Average Sr-90 concentration in teeth of cancer survivors was not significantly elevated.
In 2002, the U.S. government estimated that 15,000 Americans will die of cancer from fallout (past nuclear weapons tests). This projection is much lower than a 2003 European Committee on Radiation Risk estimate of 61,600,000 cancer deaths worldwide. As about 20 million of the 79 million Americans born in the 1950s and 1960s are expected to die of cancer in their lifetime, tooth study results suggest the number of 15,000 cancer deaths from fallout is low, and that the true number may be hundreds of thousands, or even millions.
The immense blasts over the Nevada desert contained over 100 radioactive chemicals not found in nature. These chemicals, which are tiny metal particles and gases, were propelled high into the stratosphere, and moved with prevailing winds – generally to the east. It took roughly 2-3 days for fallout to move across the continental U.S. Precipitation returned the fallout to the environment, where it entered the food chain, including municipal water supplies, grazing areas for milk-producing cows and goats, fruit orchards, vegetable farms, and other forms of food.
Americans routinely ingested these chemicals as part of their diet. Levels of these radioactive chemicals in the environment were tracked by U.S. government officials. Beginning in 1957, the U.S. Public Health Service took monthly measurements in the air, water, and milk of five locations. The program expanded to nine sites in 1958 and 60 sites in 1960.
Scientists became interested in measuring fallout levels, not just in the environment but in the human body. The first such studies began back in 1953, when Columbia University researchers working for the U.S. government began measuring Strontium-90 (Sr-90) levels in bones of humans who had died. Strontium is a bone-seeking, calcium-like element; after it is consumed in food and water, it quickly enters the stomach, moves to the blood stream, and attaches to bone and teeth, where it harms and kills cells.
Sr-90 in bone penetrates into the bone marrow. Even among radioactive chemicals, Sr-90 is especially toxic, as the bone marrow is the site where the red and white blood cells critical to the immune response are formed.
For the next 12 years (after 1958), with the help of federal grants, this scientist-citizen partnership collected approximately 320,000 baby teeth, and tested them for Sr-90. As testing went on, average Sr-90 levels increased rapidly; St. Louis children born in 1964 had about 50 times more Sr-90 in their baby teeth than those born in 1950, before the start of testing in Nevada.
Congress mandated that the U.S. National Cancer Institute conduct the study, but the Institute took 15 years to produce it. In 1997, the report was finally released, and it concluded that Iodine-131 from tests, consumed in milk, caused from 11,000 to 212,000 Americans to develop thyroid cancer. A 2002 unreleased report by the U.S. Centers for Disease Control and Prevention estimated that 35,000 U.S. cancer cases (15,000 fatal) were caused by bomb fallout.
Projections of worldwide casualties from fallout suggest that the U.S. figures are highly underestimated. In 1996, the International Commission on Radiation Protection projected that 2,350,000 cancer cases would occur from fallout, half of them fatal. In 2003, the European Committee on Radiation Risk (formed by a panel of the European Parliament) issued a report stating that risk had been highly understated. Their estimates of 123,200,000 cancer cases (half of them fatal), 1,600,000 infant deaths, and 1,900,000 fetal deaths from fallout far exceeded any prior projections.
Despite the removal of bomb fallout from the environment, studying their effects have relevance to current policies. The same mixture of radioactive fission products, including Sr-90, is produced in nuclear reactors. The bulk of these chemical is stored as radioactive waste, but some is released from reactors into the air and water. They enter the human body through breathing and the food chain, much as they did after bomb tests.
Radiation levels in the environment (air, water, milk) are lower than they were during the bomb test era. For example, Strontium-90 in milk in the late 1950s were about 5-10 picocuries per gram of calcium. These levels were lower in the early 1950s and higher in the early 1960s (reaching a national high of 25 in the spring of 1964). Today, comparable values are about 1 picocurie per gram of calcium, probably representing reactor

emissions. However, these levels have existed for decades, while Sr-90 from bomb testing only lasted during the 1950s and 1960s.
There are 104 nuclear reactors in the U.S. that are aging (average age 30 years) and corroding. They will likely be in existence for many more years; each reactor is granted a 40 year license from federal regulators, and 52 of them are now allowed to operate for as many as 60 years. In addition, proposals have been made to add 32 new reactors. Thus, emissions will continue and radioactivity will enter bodies. These cell-killing and celldamaging chemicals will continue to affect human health, especially in fetuses, infants, and children.
(underlining added)

33.
The NRC is not a credible agency for protection of the public safety and health and taken together with its predecessor, the AEC, continues a long history of obfuscation, denial and Orwellian newspeak.
Federal and state agencies have recurrently denied the need for study of biological effects by denying radionuclide release dosage. The same agencies have suppressed credible research. Those scientists who did report on net increases of illness, morbidity, and death from nuclear radiation were subject to harassment, firing, and suppression of research, loss of funding, and marginalizing by government agencies and the nuclear industry. By 1980, this included Drs. John Gofman, Alice Stewart, Karl Z. Morgan, Rosalie Bertell , Irwin Bross, Thomas Mancuso, Edward Sternglass, and Linus Pauling. http://www.ratical.org/radiation/KillingOurOwn/KOO.pdf

Although U.S. nuclear plants have severe accident management plans, these plans are not required by regulations and do not have to be evaluated by the NRC and tested for their effectiveness.

NRC blocks implementation of its own staff recommendations for post Fukushima safety upgrades:

“One of the most important tasks before the Nuclear Regulatory Commission (NRC) today is moving forward quickly on implementing the safety improvements recommended by its Fukushima Near-Term Task Force, and considering additional safety enhancements that have been identified by the NRC staff.
For a while it appeared that this was actually taking place.
Following the October 20 release of a vote of the 5-member Commission, a press release stated that “The Nuclear Regulatory Commission has directed the agency□s staff to begin immediately implementing seven safety recommendations from the NRC□s Near-Term Task Force on lessons learned from the reactor accident at Fukushima.” These seven safety recommendations were categorized by the staff as actions that could be taken “without delay.” They include a crucially important upgrade to the requirements for nuclear plants to be able to cool the reactor core and spent fuel during a station blackout—when there is no AC electrical power. Such a “station blackout” resulted from the tsunami in Fukushima and led to the reactor meltdowns.
However, the Commission took a step backwards in a second vote on December 15. The Commission has now reserved for itself the future right to reject any of the safety upgrades the NRC staff is now working to implement, even though it originally instructed the staff to implement them without delay.
Instead of determining that these safety upgrades as a group are necessary to ensure “adequate protection to the health and safety of the public”—the standard set by the Atomic Energy Act—the Commission ordered the staff to submit further justifications for each new regulatory requirement. This means that the Commission will have the opportunity to vote on each proposed new requirement separately as to whether or not it is needed for “adequate protection.”
According to the NRC regulation known as the “backfit rule,” if the Commission decides that a proposed new regulatory requirement is not needed for “adequate protection,” then it cannot be adopted unless it passes a cost-benefit test. And since the guidelines for how the NRC conducts cost-benefit analyses are rooted in a pre-Fukushima way of thinking, there is little chance that any regulatory action based on a post-Fukushima understanding of risk would pass the test.
Here is a simple example why this is the case:
One of the Fukushima Near-Term Task Force□s recommendations is to modify emergency planning guidelines to address the potential for multi-unit accidents. Yet the analyses that would be used to assess the risk reduction associated with this upgrade are based only on single-unit accidents. So in effect, the current framework assumes that the risk of a multi-unit accident is so small that it is essentially zero, and does not consider the potential for a single event to affect multiple units. Therefore, there would be virtually no risk reduction associated with the emergency planning upgrade and it would fail the cost-benefit test.
One might think, therefore, that the NRC should modify its cost-benefit analysis guidelines to incorporate lessons learned from Fukushima before using such an analysis to assess the costs and benefits of the other recommended upgrades to safety requirements. Indeed, the Near Term Task Force considered development of a new post-Fukushima regulatory framework to be its top recommendation.
However, the Commission ordered the staff to put such an effort on the back burner, effectively leaving it to be resolved only after all the other recommendations had been addressed. This has created a pattern of circular reasoning that could endanger the implementation of all the other proposed actions, and could leave the NRC chasing its tail for years to come.
The Commission could—and should—give the NRC staff an unequivocal green light to proceed with implementing the full set of post-Fukushima safety upgrades. The NRC□s broad authority to decide on what constitutes “adequate protection” is, according to a presentation by NRC Commissioner William Ostendorff earlier this year, “virtually unique in administrative law.” Former NRC Chairman Joseph Hendrie, in a 1979 speech quoted by current Chairman Gregory Jaczko in a recent vote, summed it up as “adequate protection means what the Commission says it means, and we mean it to require a very high level of safety.”
The NRC has used this power in the past to authorize sweeping regulatory upgrades, most recently in the aftermath of the 9/11 attacks. The Near-Term Task Force has made a very compelling case why this should set a precedent for the Commission to redefine adequate protection again today:

The Task Force notes that, after the attacks of September 11, 2001, the Commission established new security requirements on the basis of adequate protection. These new requirements did not result from any immediate or imminent threat to NRC-licensed facilities, but rather from new insights regarding potential security events. The Task Force concluded that the Fukushima Dai-ichi accident similarly provides new insights regarding lowlikelihood, high-consequence events that warrant enhancements to defense-in-depth on the basis of redefining the level of protection that is regarded as adequate.

However, instead of modeling its post-Fukushima response on its response to the 9/11 attacks, the Commission is holding the sword of Damocles over each proposed new safety requirement. Each will take months to years of NRC staff time to develop, yet will be subject to the whims of the current or future Commissioners. This uncertainty has created a process that is at best highly inefficient and at worst a recipe for many years of inaction.

The vote was quite lopsided. NRC Commissioners Apostolakis, Magwood, Ostendorff, and Svinicki all voted to assess each potential new regulatory requirement separately; only Chairman Jaczko voted to move forward more expeditiously. The bottom line is that the majority decision in this case could potentially undermine the NRC□s ability to promptly address critical safety vulnerabilities at U.S. plants that could well result in a Fukushima-scale disaster occurring here.

Ed Lyman, Union of Concerned Scientists http://allthingsnuclear.org/post/14624150915/nrcs-post-fukushimaresponse-going-in-circles

The NRC blocked implementation of its staff recommendations for safety improvements as indicated in Summary and excerpts from Congressman Makey□s report:

• Four NRC Commissioners attempted to delay and otherwise impede the creation of the NRC Near-Term Task Force on Fukushima;
• Four NRC Commissioners conspired, with each other and with senior NRC staff, to delay the release of and alter the NRC Near-Term Task Force report on Fukushima;
• The other NRC Commissioners attempted to slow down or otherwise impede the adoption of the safety recommendations made by the NRC Near-Term Task Force on Fukushima;
• NRC Chairman Greg Jaczko kept the other four NRC Commissioners fully informed regarding the Japanese emergency, despite claims to the contrary made by these Commissioners.

http://markey.house.gov/docs/regulatory_meltdown_12.09.11.pdf

The consideration of the Fukushima safety upgrades is not the only safety-related issue that the other NRC Commissioners have opposed. The Commissioners currently serving at the NRC regrettably have a history of voting against the safety recommendations put forward by technical experts, including its own advisory committees. Some of these votes have occurred since the March 11 earthquake and tsunami. What follows is a summary of these votes:

April 15, 2009: The Commission voted 4-188 (Chairman Jaczko disapproved, Commissioner Svinicki approved, and the other Commissioners who voted have since left the NRC) to support a proposal to enhance the security associated with cesium chloride sources rather than to phase out the most dispersible form of the material altogether as recommended by the National Academies of Science in 2008. Cesium chloride is so dangerous that after scavengers found a small amount in Brazil in 1987 and children and others spread it on their bodies, 250 people were contaminated, 20 became ill with symptoms of radiation poisoning and 4 died.

June 30, 2009: The Commission voted 2-289 (Chairman Jaczko approved, Commissioner Svinicki disapproved, and the other Commissioners who voted have since left the NRC)) to defeat a staff proposal to expand the National Source Tracking System to include Category 3 radioactive sources, which the International Atomic Energy Agency says, if not safely managed or securely protected, could cause permanent injury to a person who handled them, or were otherwise in contact with them, for some hours.

June 1, 2010: The Commission voted 4-190 (with only Chairman Jaczko voting to disapprove) in support of a proposal to reduce the limitation on the number of work hours for employees who perform quality control and quality verification functions at nuclear power plants.

September 7, 2010: The Commission voted 4-191 (with only Chairman Jaczko voting to disapprove) to support a proposal to stop having separate votes on all requests to be exempted from the requirement that □near-site emergency operations facilities□ be located near to the site of where the actual nuclear reactor emergencies or accidents might occur. Licensees have instead proposed the creation of □centralized emergency operations facilities□ that are hundreds of miles away from the nuclear reactors located in multiple States they are intended to serve.

December 2, 2010: The Commission voted 4-192 (with only Chairman Jaczko voting to approve) to disapprove a proposal to require specific NRC licenses for radioactive materials that could be used to make a dirty bomb whose activity level is greater than 1/10th of “Category 3,” even though a previous Commission had supported such a proposal. Requiring a license would have alleviated some concerns related to the potential for a terrorist to aggregate these smaller sources to create a larger improvised dirty bomb.

March 15, 2011: The Commission voted 4-193 (with only Chairman Jaczko voting to disapprove) to approve a staff proposal to ignore a recommendation by NRC□s Advisory Committee on Reactor Safeguards to ensure that safety measures that are assumed to address the hotter reactor cores and higher pressures associated with □power up-rates□ (which enable nuclear reactors to produce more electricity) would work to prevent a melt-down in the event of an accident. The Advisory Committee believed that the possibility that a fire or earthquake could breach the containment of the nuclear reactor needed to be considered.

March 30, 2011: The Commission voted 4-194 (with only Chairman Jaczko voting to approve)

to disapprove a staff proposal to add requirements for personnel seeking access to nuclear reactor construction sites to ensure that appropriate security screening was conducted. The Commission instead decided to rely on a voluntary Nuclear Energy Institute personnel security initiative.
November 8, 2011: The Commission voted 3-2 (with Chairman Jaczko and Commissioner Ostendorff voting to approve) to disapprove a staff proposal that the Commission adopt an amendment to its Reactor Oversight Process,95 described as "a means to collect information about licensee performance, assess the information for its safety significance, and provide for appropriate licensee and NRC response," to add a new performance measure related to leaks of radioactive materials from nuclear reactors.
http://www.nrc.gov/reactors/operating/oversight/rop-description.html

See also: http://allthingsnuclear.org/post/9622364770/nrcs-path-after-fukushima-still-lined-with-pitfalls

New York Times May 7, 2011
Nuclear Agency Is Criticized as Too Close to Its Industry
By TOM ZELLER Jr.
In the fall of 2007, workers at the Byron nuclear power plant in Illinois were using a wire brush to clean a badly corroded steel pipe — one in a series that circulate cooling water to essential emergency equipment — when something unexpected happened: the brush poked through.
The resulting leak caused a 12-day shutdown of the two reactors for repairs.
The plant□s owner, the Exelon Corporation, had long known that corrosion was thinning most of these pipes. But rather than fix them, it repeatedly lowered the minimum thickness it deemed safe. By the time the pipe broke, Exelon had declared that pipe walls just three-hundredths of an inch thick — less than one-tenth the original minimum thickness — would be good enough.
Though no radioactive material was released, safety experts say that if enough pipes had ruptured during a reactor accident, the result could easily have been a nuclear catastrophe at a plant just 100 miles west of Chicago.
Exelon□s risky decisions occurred under the noses of on-site inspectors from the federal Nuclear Regulatory Commission. No documented inspection of the pipes was made by anyone from the N.R.C. for at least the eight years preceding the leak, and the agency also failed to notice that Exelon kept lowering the acceptable standard, according to a subsequent investigation by the commission□s inspector general. Exelon□s penalty? A reprimand for two low-level violations — a tepid response all too common at the N.R.C., said George A. Mulley Jr., a former investigator with the inspector general□s office who led the Byron inquiry. "They always say, □Oh, but nothing happened,□ " Mr. Mulley said. "Well, sooner or later, our luck — you know, we□re going to end up rolling craps."
Critics have long painted the commission as well-intentioned but weak and compliant, and incapable of keeping close tabs on an industry to which it remains closely tied. The concerns have greater urgency because of the crisis at the Fukushima Daiichi plant in Japan, which many experts say they believe was caused as much by lax government oversight as by a natural disaster.
The Byron pipe leak is just one recent example of the agency□s shortcomings, critics say. It has also taken nearly 30 years for the commission to get effective fireproofing installed in plants after an accident in Alabama. The N.R.C.□s decision to back down in a standoff with the operator of an Ohio plant a decade ago meant that a potentially dangerous hole went undetected for months.
And the number of civil penalties paid by licensees has plummeted nearly 80 percent since the late 1990s — a reflection, critics say, of the commission□s inclination to avoid ruffling the feathers of the nuclear industry and its Washington lobbyists.
Although the agency says plants are operating more safely today than they were at the dawn of the nuclear industry, when shutdowns were common, safety experts, Congressional critics and even the agency□s own internal monitors say the N.R.C. is prone to dither when companies complain that its proposed actions would cost time or money. The promise of lucrative industry work after officials leave the commission probably doesn□t help, critics say, pointing to dozens over the years who have taken jobs with nuclear power companies and lobbying firms.
Now, as most of the country□s 104 aging reactors are applying for, and receiving, 20-year extensions from the N.R.C on their original 40-year licenses, reform advocates say a thorough review of the system is urgently needed.
The agency□s shortcomings are especially vexing because Congress created it in the mid-1970s to separate the government□s roles as safety regulator and promoter of nuclear energy — an inherent conflict that dogged its predecessor, the Atomic Energy Commission.
"It wasn□t much of a change," said Peter A. Bradford, a former N.R.C. commissioner who now teaches at Vermont Law School. "The N.R.C. inherited the regulatory staff and adopted the rules and regulations of the A.E.C. intact."
Mr. Bradford said the nuclear industry had implicitly or explicitly supported every nomination to the commission until Gregory B. Jaczko□s in 2005. Mr. Jaczko, who was elevated to chairman by President Obama in 2009, had previously worked for both Representative Edward J. Markey, the Massachusetts Democrat and longtime critic of the nuclear industry, and Senator Harry Reid, the Nevada Democrat and current Senate majority leader who sought to block a nuclear waste repository in his state.
Mr. Jaczko acknowledges that the agency needs to move faster on some safety issues. But he defends its record. "I certainly feel very strongly that this is an independent regulator that will make what it thinks are the right decisions when it comes to safety," he said. "There will be people who will agree, and some people who will disagree. That□s part of the process."
For all the agency□s shortcomings as a regulator, even the most vocal critics acknowledge that it

should not be compared to the Minerals Management Service, the scandal-plagued agency that oversaw the oil and gas industry and was reorganized by Mr. Obama after the BP oil spill last year. Still, David Lochbaum, a frequent critic of the N.R.C. who recently worked as a reactor technology instructor there, said the agency too often rolled the dice on safety. “The only difference between Byron and Fukushima is luck,” he said.

No Rejections

In recent years, the Vermont Yankee nuclear plant in Vernon, Vt., has had several serious operational problems. Situated on the banks of the Connecticut River, the 39-year-old Vermont Yankee, whose reactor is similar in design to the stricken plant in Japan, suffered the partial collapse of a cooling tower in 2007. In January 2010, the plant□s operator, Entergy, discovered that nearby soil and groundwater had been contaminated by radioactive tritium, which had apparently leaked from underground piping. Just months before, the company assured state lawmakers that no such piping existed at the plant. The Vermont Senate, concerned about the problems, voted overwhelmingly last year to prevent the plant from operating beyond the scheduled expiration of its license on March 21, 2012 — invoking a 2006 state law, unique to Vermont, that requires legislative approval for continued operations.

But one day before the quake and tsunami that set Japan□s crisis in motion, the N.R.C. approved Vermont Yankee□s bid for license renewal — just as it has for 62 other plants so far. Its fate is now the subject of a federal lawsuit. “How does a place like that get a license renewal?” Mr. Lochbaum said. “Because they asked for one. Absent dead bodies, nothing seems to deter the N.R.C. from sustaining reactor operation.”

Indeed, no renewal application has been turned down by the agency since the first one was granted in 2000, although some have been sent back for more work before winning approval.

It was not always so. When the industry first set out in the 1980s to prove that the original 40-year licenses on its aging plants could be safely renewed for 20 years, two plants — Yankee Rowe in Massachusetts and Monticello in Minnesota — were offered as test cases. The N.R.C.□s criteria for relicensing essentially required that operators prove that they were in compliance with their current license and that they had an adequate plan to manage the aging equipment for the extra 20 years. That tripped up Yankee Rowe□s bid, because inspectors looking at its current operations found serious flaws in its reactor vessel. Rather than earn a renewal, the plant shut down with eight years left on its original license.

The failure threw the industry into turmoil. In 1992, Northern States Public Power, owner of the Monticello plant, complained that the agency was examining details beyond those necessary for license renewal. With billions of dollars of revenue and investment at stake for each plant, the N.R.C. changed the rules in 1995, scrapping the requirement that operators prove they were complying with their current license. Instead, the renewal process would focus only on the aging management plan.

The agency described the change as providing a “more stable and predictable regulatory process for license renewal.”

But James Riccio, a nuclear policy analyst with Greenpeace, said, “The N.R.C. rule change gutted a substantive process and replaced it with a rubber stamp. They placed industry profits ahead of public safety.”

To be sure, license renewal is still arduous. According to a 2007 audit by the inspector general□s office, an operator typically spends two years and up to $20 million preparing an application, and the commission on average spends two years and $4 million reviewing it.

But the audit also concluded that it was often impossible to know whether the agency had truly conducted an independent review of an application or why approval was granted. In some cases, for example, long passages in the commission□s assessment of a renewal appeared to have been simply copied and pasted directly from the application. And in a 2008 follow-up memo described to a reporter, the N.R.C.□s inspector general, Hubert T. Bell, went further, suggesting that the N.R.C. staff was unable to adequately document its reviews and may have destroyed essential records.

Asked about those issues, Mr. Jaczko said that the copying and repetition was intentional. “We want licensees to take those programs that we find are the best practices and use those,” he said. “So in many cases, those were showing up in applications and the staff was then looking at those and saying yes, those were acceptable.”

As for the lack of documentation backing up each decision, “not all of that information gets incorporated into a formal docket for license renewal,” Mr. Jaczko said. “We did reconfirm that there had not been any information that had been missed or any information that would change any of the conclusions in the license renewal decisions.”

Deference to Industry

The N.R.C.□s slowness in addressing serious problems is another concern. In 1975, a blaze at the Browns Ferry plant in Alabama crippled electrical wiring used to control critical cooling equipment in one of the reactor units. The incident set off alarm bells at the N.R.C., which issued new fire protection regulations in 1980. But over the next three decades, according to two internal agency investigations, the commission approved a succession of faulty or ineffective fire barrier materials. It then dragged its feet in the face of mounting evidence that the materials, even after being installed in dozens of plants, were failing to perform as advertised.

One of the earliest materials, Mr. Mulley said, was a product called Thermo-lag, which the commission approved based on what turned out to be fraudulent lab tests submitted by an obscure company. “No inspector ever bothered to check out the lab or to question the results,” said Mr. Mulley, who investigated the case for the agency.

Last year, the N.R.C. issued a 355-page report in which it suggested that the fire barrier issue had been finally sorted out, even though most plants were technically still not complying with the regulations.

The agency has little choice but to tolerate violations, said Mr. Lochbaum, who heads the Nuclear Safety Project with the Union of Concerned Scientists, an environmental and nuclear watchdog

group based in Cambridge, Mass. “Otherwise, nearly all the U.S. reactors would have to shut down,” he said.

Asked about the fire barrier fiasco, Mr. Jaczko said he would like the agency to put safety rules into effect more quickly. “I□ve certainly been pushing for some time that we do these things in a more timely manner,” he said. But the issues are complicated. “They involve very complex, technical findings, and then ultimately they involve complex plant modifications in some cases,” he said.

Mr. Mulley suggested that the companies themselves played a role in delaying the rules.

“There were good fire barrier materials on the market from 3M and other companies that people knew and trusted,” he said. “But these plant operators kept complaining that they were too expensive. So some company that no one has ever heard of comes along, with tests from a lab that no one has ever heard of, for a material that□s cheaper than anything else on the market, and the N.R.C. says, □Perfect! Use this!□ ”

The agency□s deferential attitude also brought the Davis-Besse plant in Ohio to the brink of the worst American nuclear accident since the Three Mile Island meltdown of 1979. On Aug. 3, 2001, armed with mounting evidence of potentially dangerous cracks and leaks in control nozzles that penetrate the vessel heads at most reactors, the commission asked 12 nuclear plants to conduct inspections. The inspections required a temporary but expensive shutdown, so regulators gave the plants until the end of the year to comply, and most did so. But FirstEnergy, owner of Davis-Besse, said it would look for the cracks during its next planned refueling shutdown — on March 22 the following year. In the test of wills that followed, the agency□s inspector general later concluded, it was the N.R.C. that blinked, agreeing to allow FirstEnergy to operate until mid-February. On March 6, 2002, workers finally conducted the inspections and found that acid used in the cooling water had eaten almost completely through the lid of the reactor. The plant was closed for two years for emergency repairs, two FirstEnergy engineers were convicted of lying to investigators and the company paid more than $33.5 million in civil and criminal penalties. “They should have just shut them down,” said Mr. Mulley, who investigated the case. “But the attitude at N.R.C. was always, □You can□t shut them down. They□ll fight us in court.□ ”

The Byron case in Illinois, while not as dangerous as Davis-Besse, was similar in that it revealed the industry□s predilection for deferring maintenance until more serious safety problems developed. Indeed, since the Three Mile Island accident, at least 38 nuclear power reactors have been forced to shut down for a year or more because of an accumulation of safety problems.

Marshall Murphy, an Exelon spokesman, said the company took “good learnings” from the Byron incident and improved its procedures. Eliot Brenner, an N.R.C. spokesman, said in an e-mail that the agency had also made several changes to its guidelines after the Byron case, including provisions that require inspectors to “tour areas that become accessible on an infrequent basis to assess the material condition and status of safety systems, structures, and components.”

But Mr. Lochbaum said the slap on the wrist delivered to Exelon ensured that similar incidents would occur in the future. “There□s no real regulatory discomfort imposed, so this sort of thing just continues,” he said.

Agency□s Gains

What frustrates some critics is that the N.R.C. has the expertise and resources — a staff of 4,000 and one of the highest densities of Ph.D.□s in government — to do a better job. Indeed, there are some examples of the commission making tough decisions.

In 2008, for example, workers at the Oconee plant in South Carolina discovered that a crucial line in the cooling system at Reactor Unit 1 was blocked by a broken gasket. The workers fixed it and the reactor was restarted. But the two N.R.C. inspectors assigned full time to Oconee quickly began asking why Duke Energy, the operator, wasn□t also inspecting corresponding valves and lines at the plant□s other two reactors. Duke said the clogging was isolated and a blocked line could be bypassed in a pinch. In February 2010, when the company finally agreed to look at the other two reactors, it discovered that the lines there had the same problem and that the bypass option would never have worked. The commission issued a “yellow finding” to Duke, its second-highest category of safety problem. The finding, which is rarely imposed, generally brings far more N.R.C. and media scrutiny, and can have financial implications for the company on Wall Street.

N.R.C. officials said that the current oversight system, begun in 2000 and refined since then, has improved safety by focusing on the reactor systems most prone to failure — and most likely to pose a safety risk. Fewer violations are issued, but when they are, the agency uses different colors — green, white, yellow and red — to signal the severity of the problem in a public way.

“Bottom line is, we drive for long-term improvements in safety,” Mr. Brenner said.

And by several measures, the N.R.C. notes, the nation□s nuclear plants appear to be getting safer. Incidents of worker radiation exposure and safety system failures are at their lowest levels in more than a decade. The number of “scrams” — which the N.R.C. defines as “the sudden shutting down of a nuclear reactor by rapid insertion of control rods, either automatically or manually by the reactor operator” — has been dropping as well.

Still, the nuclear industry is not shy about complaining, and if necessary, throwing around its weight with Congress, which approves the N.R.C.□s budget of roughly $1 billion a year.

That was borne out in June 1998, when then-Senator Pete V. Domenici, a New Mexico Republican with strong ties to the nuclear industry and chairman of the subcommittee that funded the N.R.C., threatened to slash the agency□s budget.

Although the budget was not ultimately cut, Shirley Ann Jackson, then chairwoman of the commission, said in a speech to her staff that the industry had sent a clear message: “That we are inefficient, that we over-regulate, that we inspect too much, assess too much, enforce too much, take too long on licensing actions and employ an overly restrictive body of regulation.”

Industry Connections

As with many regulatory agencies, the movement from N.R.C. jobs to industry jobs — and sometimes vice versa — is a recurring issue. Many engineers and technicians, of course, join the agency directly out of school, work in the field and remain with the commission their entire careers. But for others, particularly officials at the highest levels, the commission can be a steppingstone to more lucrative work in the private sector. That was certainly the case for one commissioner, Jeffrey S. Merrifield. Shortly after Mr. Merrifield retired from the commission in 2007, Shaw, a nuclear services company, announced that he was taking a top executive position with the company. That stirred the suspicions of the Project on Government Oversight, a nonprofit watchdog group, which complained to the N.R.C.

Federal law prohibits government employees from taking part in matters that they know could financially benefit them or anyone with whom the employee is negotiating or seeking employment. But according to an inspector general□s report on the case, Mr. Merrifield sought employment with not just Shaw but also General Electric and Westinghouse, both nuclear reactor makers, while still voting on two issues that affected them.

The conflict-of-interest case — which also included an allegation that Mr. Merrifield failed to disclose, upon departing the government, that he accepted travel reimbursements of $3,552.47 during his job hunt — was referred by the N.R.C. to the Justice Department for possible civil action and to the United States attorney□s office in Maryland for potential criminal action. Both offices declined to pursue it. Mr. Mulley, who took part in the investigation, was outraged. “Even if the lawyers don□t want to go after him, the N.R.C. could make an example of him if they wanted to,” he said. “They could speak out in some way. But they don□t.”

In a statement last month, Mr. Merrifield said he told investigators and prosecutors that he did not believe, based on legal advice, that he had acted inappropriately, but that if he had been told a conflict existed, he would have recused himself. He added that when he was alerted to the disclosure oversight, he immediately filed the correct forms. “Though the antinuclear community continues to try to raise these concerns,” Mr. Merrifield said, “I firmly believe that throughout my time as an N.R.C. commissioner, I acted in a fair and impartial manner and in the best interest of public health and safety.”

Other commissioners have also had close ties to the industry. Environmental groups and industry monitors were angered, for example, when Mr. Obama nominated William D. Magwood, a former employee of Westinghouse Electric and more recently director of the Energy Department□s nuclear expansion program, to fill a vacant seat on the commission last year.

“Given his more than a dozen years promoting nuclear power, we do not believe Mr. Magwood has the independence from the nuclear power industry, nor the security oversight background, to regulate it,” said Danielle Brian, executive director of the Project on Government Oversight.

In a letter in March to the oversight project about the Merrifield case, Mr. Jaczko rejected the group□s recommendation that job-seeking employees be required to recuse themselves in writing from matters affecting possible postcommission employers. “The failure of employees to disqualify themselves has not previously been an issue at the N.R.C., and absent evidence of a wider problem, the N.R.C. does not believe that additional reporting requirements are warranted,” he wrote.

Marvin S. Fertel, the president and chief executive of the Nuclear Energy Institute, the main industry lobby, took issue with the notion that the N.R.C. was captive to business interests.

“Is there too much coziness? No,” Mr. Fertel said. “Do I think there□s respect? Yes.” That includes a willingness on the part of N.R.C. to consider the financial impact of its rules on operators, he said.

Mr. Fertel said that as the N.R.C. has expanded to deal with the flood of relicensing applications, it has increasingly hired talent from within the industry. “It□s only a problem if you think getting good expertise is a problem,” he said.

But Mr. Mulley argued that the prospect of one day landing a lucrative position with a private company almost certainly played a role in softening the positions of some commission employees.

“The N.R.C. is like a prep school for many of these guys, because they know they□ve got a good shot at landing much higher-paying work with the people they□re supposed to be keeping in line,” Mr. Mulley said. “They□re not going to do anything to jeopardize that.”

John M. Broder and Matthew L. Wald contributed reporting.

Bessie-Davis Reactor was allowed to operate in very serious unsafe condition and senior NRC managers stated they would do the same in future:

“...NRC senior managers rejected their own staff□s recommendation and allowed Davis-Besse to continue operating into 2002. When the plant was finally shut down and the belated inspections finally performed, the situation was far worse than the NRC staff believed. The NRC later determined that Davis-Besse came closer to meltdown than any U.S. reactor since the Three Mile Island accident in March 1979.

In other words, hindsight showed the NRC staff to have been absolutely right.

When interviewed under oath by the NRC□s Office of the Inspector General, the NRC senior managers who shelved their staff□s shut down order defended that decision. Both stated that they would make the same decision again if confronted with the same facts. They insisted that “absolute proof” was required before they would order an operating reactor to be shut down for safety reasons.”

http://allthingsnuclear.org/post/11986415149/ to-flee-or-not-to-flee-that-was-the-question

Inadequate seismic protection: NRC Commissioners voted to delay safety improvements after Fukushima.

“.... the August 23 earthquake in Mineral, Virginia should be a further call to action for NRC. That magnitude 5.8 earthquake caused ground motion that exceeded the “design basis” at the nearby North Anna nuclear plant, even though Dominion, the plant operator, originally had said the plant was designed to withstand an earthquake of magnitude 5.9-6.2.

This event highlights the knowledge gaps in seismic protection at US nuclear plants and supports the Task

Force□s recommendation that the NRC should "order licensees to reevaluate the seismic and flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs [structures, systems, and components] important to safety to protect against the updated hazards." http://allthingsnuclear.org/post/9622364770/nrcs-path-after-fukushima-still-lined-with-pitfalls

Vulnerabilities to Reactor Operation that weren□t or can□t be designed out: See Fission Stories at http://allthingsnuclear.org/tagged/fission-stories

Reactor near misses due to impaired safety equipment or poor worker performance leading toward catastrophic outcomes in 2010: for description of each situation go to http://www.ucsusa.org/assets/documents/nuclear_power/nrc-2010-full-report.pdf
Nuclear One, Russel, AR owner: Entergy
Briarwood, Joliet, IL owner: Exelon
Brunswick, Southport, NC owner: Progress Energy
Calvert Cliffs, Annapolis, MD owner: Constellation Energy
Catawba, Rock Hill, SC owner: Duke Energy
Crystal River 3, Crystal River, FL owner: Progress Energy
Bessie-Davis, Toledo, OH owner: First Energy
Diablo Canyon, San Louis Obispo, CA owner: Pacific Gas & Electric
Farley, Dothan, AL owner: Southern Nuclear
Fort Calhoun, Omaha, NE owner: Omaha Public Power District
HB Robinson, Florence, SC owner: Progress Energy
HB Robinson, Florence, SC owner: Progress Energy
Surry, Newport News, VA owner: Dominion Generation
Wolf Creek, Burlington, KS owner: Wolf Creek Nuclear

Public vulnerability and risk from reactors is exposed in recommendations for improved reactor safety from the Union of Concerned Scientists.
Preventing and Mitigating the Effects of Severe Accidents:
Extend the scope of regulations to include the prevention and mitigation of severe accidents.
Require reactor owners to develop and test emergency procedures for situations when no AC or DC power is available for an extended period.
Modify emergency planning requirements to ensure that everyone at significant risk from a severe accident--not just the people within the arbitrary 10-mile planning zone--is protected.
Improving the Safety and Security of Spent Fuel:
The NRC should require plant owners to move spent fuel at reactor sites from storage pools to dry casks when it has cooled enough to do so.
The NRC should require reactor owners to improve the security of existing dry cask storage facilities.
The NRC should require plant owners to significantly improve emergency procedures and operator training for spent fuel pool accidents
Making Existing Reactors Safer:
The NRC should enforce its fire protection regulations and compel the owners of more than three dozen reactors to comply with regulations they currently violate.
The NRC should establish timeliness goals for resolving safety issues while continuing to meet its timeliness goals for business-related requests from reactor owners.
The NRC should treat generic and unique safety issues alike. Until a generic issue is resolved, the NRC should account for it as a potential risk factor in its safety analyses and decision making related to all affected reactors.
The NRC should require plant owners to use multiple inspection techniques to ensure detection of any degradation in aging, high-risk equipment.
The NRC should require plant owners to periodically inspect equipment outside the scope of normal inspections, both to determine whether that scope is appropriate and to detect problems before safety margins are compromised.
The NRC should revise its regulations for the licensing of "high burn-up" fuel to ensure public safety, and restrict how this fuel is used until the revisions are complete.
The U.S. government should prohibit the use of plutonium-bearing mixed-oxide (MOX) fuel in reactors, and end the program to produce MOX fuel from excess weapons plutonium.
Ensuring the Continued Safety of Reactors with Renewed Licenses:
Before granting a license renewal, the NRC should review all differences between current regulations and any past decisions specific to the aging reactor, to confirm that these differences will not compromise public safety going forward.
Making Existing Reactors More Secure against Terrorist Attacks:
The NRC should revise its assumptions about terrorists' capabilities to ensure nuclear plants are adequately protected against credible threats, and these assumptions should be reviewed by U.S. intelligence agencies.
The NRC should modify the way it judges force-on-force security exercises by assessing a plant's "margin to failure," rather than whether the plant merely passes or fails.
The U.S. government should establish a program for licensing private security guards that would require successful completion of a federally supervised training course and periodic recertification.
Making New Reactors More Secure against Terrrorist Attacks:
The NRC should require new reactor designs to be safer than existing reactors.
The NRC should require new reactor designs to be more secure against land- and water-based terrorist attacks.

Improving the NRC's Cost-Benefit and Risk-Informed Analyses:
The NRC should increase the value it assigns to a human life in its cost-benefit analyses so the value is consistent with other government agencies.
The NRC should require plant owners to calculcate the risk of fuel damage in spent fuel pools as well as reactor cores in all safety analyses.
The NRC should not make decisions about reactor safety using probabilistic risk assessments (PRAs) until it has corrected its flawed application of this tool.
Ensuring Public Participation:
The NRC should fully restore the public's right to obtain information and question witnesses in hearings about changes to existing power plant licenses and applications for new licenses.
http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/ucs-nuclear-safety-recommendations.html

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We do not want Fermi 3.
In fact, reactors cannot be made safe. Reactor failure cannot be designed out. Worker infallibility can not be achieved. Aging degradation of reactors cannot be adequately tracked and proactively repaired. Reactor explosions will happen; that□s a fact of life. The biosphere and the human gene pool is degraded and that will continue to increase. Reactor owners and the NRC cannot be trusted to honor licensing obligations. Stop public financing of all kinds and reactors will not be built or relicensed. Greed, with access to the public tax dollars and higher utility rates, drives reactors.

Sincerely,
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Federal Register Notice: 76FR66998
Comment Number: 19

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U.S. Nuclear Regulatory Commission
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Comments Re: NUREG 2105
http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2105/

Comments on U.S. Nuclear Regulatory Commission Environmental Impact Statement and Provisional Approval to Detroit Edison to Build and Operate Fermi 3, a New Nuclear Reactor At Monroe, MI

I view with alarm the prospect of another reactor producing additional ionizing radiation and nuclear "waste" (spent fuel plus related toxins) for which there is no solution. This includes the prospect of further "normalizing" of man-made ionizing radiation into the biosphere, including the human gene pool, and the arrogance of moving forward with avoidance/denials of the consequences of major nuclear accidents, melt-downs and explosions. All of this is on top of the burden of radionuclides loaded into the human family and the environment by the manufacture and explosion of atomic and thermonuclear weapons. From the beginning, the U.S. has;

- led the proliferation of nuclear weapons/nuclear reactors,
- subsidized the private nuclear industry with tax payer dollars and loan guarantees,
- indemnified private reactor owners from catastrophic financial loss from catastrophic reactor malfunctions and explosions (Price-Anderson Act 1957 as amended 2005) without which, there would be no commercial nuclear reactors,
- withheld information, misled the public, and suppressed credible science on effects of radiation on human health,
- avoided adequate measurement of release radioactive doses and biological effects,
- avoided and marginalized the study of the biological effects of man-made ionizing radiation
- and blurred the inherent connection between nuclear weapons and nuclear power which are joined at the hip spawning each other (reactors have led to nuclear weapons and thermonuclear fuel components production, i.e. commercial reactors {Watts Bar, TN} producing tritium for thermonuclear weapons).

In so doing it was necessary and convenient to mislead the public on the serious risks of x-rays so as to have less public concern about the risk of gamma rays. Hence, the ubiquitous refrain, "...it's no more than the risk of an x-ray..." when reassuring the public about radioactive nuclear releases. This in turn has impacted public health more broadly. (see http://www.ratical.org/radiation/KillingOurOwn/KOO.pdf).

Below are my comments on the NRC Environmental Impact Statement for Combined License for Enrico Fermi 3 and on the NRC itself. It was not possible to comment on the entire three inch thick NRC environmental impact statement in the time allowed before the January 11, 2012 deadline.

1.

Is it accurate that five of the six new nuclear reactors of the Fermi 3 GE-Hitachi proposed design ordered have been cancelled? Fermi 3 is a loss leader for GE-Hitachi hoping to have a demonstration up and running to sell others? The GE-Hitachi Economically Simplified Boiling Water Reactor (ESBWR) is experimental, untried and its cooling system questionable and unproven in real life experience. NRC proposes to allow this to be built and licensed without safety design validation.

2.

Regarding the “Pre-construction Activities” (v 1, p 1.6) which “...include clearing, grading, excavating, dredging, and discharge of fill, erection of support buildings and transmission lines, and other associated activities.” What pre-construction activities has Detroit Edison undertaken to date towards construction of the unlicensed reactor not yet approved for construction? Is this Environmental Impact
Statement to satisfy a legal obligation for a project already underway?

3.

Why did DTE submit (July 18, 2011) a “letter of intent to the NRC to file an application in 2014 for renewal of the operating license of Fermi 2” (v 1, p 1.8) when the existing license does not expire for more than a decade? Has NRC ever refused to renew a reactor license anywhere in the U.S.?

4.

The document cites geologic issues and states that pollution is kept to a minimum by recharging the waters in the fill and overburden, “recharge of the fill is through precipitation…The overburden is recharged with precipitation…” (v 1, p 2.18) If “annual average rainfall over Lake Erie is about 35 in./yr … The average annual evaporation from Lake Erie is estimated to be 36 in./yr…” (v 1, p 2.14) How can the precipitation refresh either fill or overburden if evaporation rate exceeds precipitation?

5.

I was dismayed to see the chart of Lake Erie water usage: 56,024 million/gallon/per day and power plants drew 50,518 of them! All other uses added up to ten percent of the power plant uses. (v 1, p 2.24) Could that use be connected to the NUREG 2105 prediction, “Recent studies of the effects of climate change indicate that there could be declines in the overall Lake Erie water levels of 1 to 2 meters.”? (v 1, p 2.25) I think the glut of water going to the power plants is not sustainable in the long term and might get blamed on climate change.

6.

“Fermi 3 operations would result in an average consumptive use of approximately 7.6 billion gallons of Lake Erie water per year.” (v 2, p 10.9) “Unavoidable adverse impacts on aquatic ecology resources would include an increased potential for entrainment, impingement, and thermal loading to Lake Erie…” That is just not acceptable.

7.

Tritium (which is radioactive for 248 years and can pass from mother to fetus) is showing up in the monitoring wells of Fermi 2. (v 1, p 2.29) “In wells within a 5-mi radius of the Fermi site, elevated concentrations of arsenic about the EPA maximum contaminate level were found in groundwater samples.” and “…detected in the few shallow groundwater wells downwind from the Fermi 2 stack.” (v 1, p 5.117) Detroit Edison attributed this to the recapture of tritium in precipitation from the plant’s gaseous effluent.” (v 1, p 2.234) To allow a Fermi 3 to be built would be to contribute to our own deaths. Children are more susceptible to radiation than adults.

8.

The Port of Monroe provides a point of access for Great Lakes shipping and transport through the Great Lakes-Saint Lawrence Seaway (v 1, p 2.139). In case of a Fermi disaster, would DTE be financially liable for interference with Interstate Commerce?

9.

Walpole Island First Nations is located within the affected radius, but “because it is in Canada, the review team did not include it in its environmental justice investigation.” (v 1, p 2.187) It is my understanding that Walpole Island First Nations is on unceded lands and is not Canadian or American, but those residents have dual citizenship. Therefore, they need to be included in your scoping process – even if you have to back up to do so.

10.

Fermi 1 is stated as eligible for listing on the National Registry of Historic Places? (v 1, p 2.199 & 2.203) If it becomes listed, then maintenance/monitoring of all the spent fuel on site (and decommissioning) will be done at taxpayers’ expense? What presentation could there be of Fermi 1 except that it was a near catastrophic explosion, unable to produce electricity, and a financial loss? Will the historic presentation include the 1957 WASH Report produced by the Brookhaven National Laboratory at the request of the Atomic Energy Commission? That report said that in a major accident the following would happen: 3,400 people would die

within 15 miles; 43,000 people within 44 miles would suffer severe radiation sickness; 82,000 people within 200 miles would have double the chance of cancer; 66,000 people would have to be rapidly moved out of a 92 square mile area stretching 100 miles downwind; and subsequently, 460,000 people would have to be moved out of their homes up to 320 miles downwind of the accident; and there would be 7 billion dollars in property damage. Would the historical presentation include the 1956 report of the Advisory Committee on Reactor Safe Guards, given to the Atomic Energy Commission, that clearly stated that the design of the proposed Fermi 1 reactor was unsafe and should not be built? Would it acknowledge that AEC Chairman Strauss suppressed these reports and authorized construction of Fermi 1 ?

11.

Table 2-11: "Estimated Numbers of Fish Eggs and Larva Entrained by the Fermi 2 Cooling Water Intake" in an eight month period! 62,566,649 (v 1, p 2.78) Over 62 million! (v 1, p 5.29) That destroys commercial and non-commercial fishing.

12.

"The DE (Detroit Edison) employs approximately 1,200 to 1,500 workers for 30 days during every refueling outage…" (v 1, p 2.134) Are these workers allowed to receive a year's dosage of radiation during those 30 days? What is their dose exposure for the refueling period?

13.

"Public and occupational health can be compromised by activities at the Fermi site that encourage the growth of disease-causing microorganisms (etiological agents). Thermal discharges from Fermi into the circulation water system and Lake Erie have the potential to increase the growth…These microorganisms could give rise to potentially serious human concerns, particularly at high exposure levels." (v 1, p 2.229) With these results, what could possibly justify the unnecessary doubling of the thermal discharges into Lake Erie?

14.

Additional discharges to Lake Erie could include treated liquid radwaste."(v 1, p 3.14) "The monthly average anticipated water intake from Lake Erie would vary between approximately 23,750 and 33,500 gallons per minute (Table 3.5). …monthly discharge to Lake Erie (blowdown) would vary between 11,868 and 16,743 gallons per minute." (v 1, p3.30) Are there hourly samplings done and are there any emergency shut off values to stop the discharge when samples exceed radiation/contamination limits? What radionuclides are in this liquid discharge? At what dose?

15.

The atmosphere would receive heat and water in the form of cooling tower vapor and drift." (v 1, p 3.31) Can these emissions be stopped when they exceed contamination limits? What provision is there for notifying the public of excess releases beyond design releases? What are the contaminants and at what dose?

16.

"Liquid, gaseous, and solid radioactive waste management systems would be used to collect and treat the radioactive materials produced as byproducts of operating Fermi 3 (v 1, p3.31)….Waste-processing systems would be designed to meet the design objectives…" (v 1, p.3.32). If the systems haven't been designed yet, shouldn't the NRC withhold the normal licensing procedure until the systems are invented and manufactured? What radioactive waste is being referenced here and in what dose?

17.

Considering the Solid Radioactive Waste Management System (v 1, p3.33), "There are no onsite facilities for permanent disposal of solid wastes, so the packaged wastes would be temporarily stored in the Auxiliary and Radwaste Buildings prior to being shipped to a licensed disposal facility." What facility would that be? Is radioactive waste to be privatized, without NRC oversight, recycled into consumer products, commercial land fills? Isn't it true that solid cast storage of spent fuel cannot be done at the Fermi site because the ground can't withstand the weight of the concrete casts? This results in large amounts of spent fuel kept in pools that are more vulnerable to accident/meltdown/explosions.

18.

Is there a limit on the heat temperature of waste water released into Lake Erie? "When the Turbine Bypass System is in operation, the temperature of the discharge could reach up to 96 degrees." (v 1, p 3.35) Is the public informed of actual real time temperature of releases? Where and how?

19.

"Radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures." Why was this sentence used more than once in the document? (v 1, p 5.112 & 5.122, & 6.12, & 6.23, etc)

20.

"If a severe accident occurred at a reactor located at the Fermi site, it is likely that Federal, State, and local officials would take various measures, including limiting access to contaminated areas and interdiction of drinking water and fishing to reduce exposures." (v 1, p 5.133) Who would be notified? What expectation can the public have of being notified? In every major nuclear reactor accident on record, the public was ***not*** notified without significant delay. Governments downplayed the past accidents and denied seriousness of the risk to the public. A severe accident at the Fermi site would contaminate an extremely large area and immediately and seriously irradiate anyone within 50 to 100 miles and further, depending on wind and weather conditions. There is no way to avoid that or mitigate it. To pretend otherwise indicates a callous disregard for public health and safety. The NRC does not require or evaluate or address mitigating public exposure, evacuation, management of evacuated populations, mitigation of air, land, water, food, and human contamination. **No state or federal agency claims responsibility or presents a plan to address the consequences of a serious nuclear reactor accident in the past, present, or future.**

21.

After onsite storage for sufficient time to allow for short-lived fission product decay and to reduce the heat generation rate, the fuel assemblies would be transferred to a waste repository for internment." (v 1, p 6.5) Where is the Federal waste repository? None exists. Spent fuel remains on site, hopefully in hardened casts (not possible at the Fermi site due to geological issue), monitored and protected from threats from weather and attack?

22.

"DE can currently ship Class A low level waste (LLW) to the Energy Solutions site in Clive, Utah; however it cannot dispose of Class B and C LLW at the Energy Solutions site in Barnwell, South Carolina. (v 1, p 6.14) That statement says DE "can" ship Class A LLW to Clive, but does it currently ship Fermi 2 waste there? Who monitors what private corporations do with radioactive waste? What restrictions are placed on private management of radioactive waste?

23.

Current national policy …mandates that high-level and transuranic wastes be buried at a deep geologic repository, such as the proposed repository at Yucca Mountain, Nevada." (v 1, p 6.15) Didn't Congress permanently reject Yucca Mountain as a repository? Increasing the volume of radioactive waste threatens people and the rest of the biosphere forever. There is no safe solution to man-made radionuclides that remain radioactive and a biological threat for hundreds, thousands, millions or billions of years.

24.

"Fuel for the plants would be enriched up to about 4.6 weight percent uranium-235, which exceeds the 10 Code of Federal Regulations 51.52(a) condition. In addition, the expected irradiation level of about 46,000 MWd/MTU exceeds the 10 CFR 51.52(a)." (v 1, p 6.19) Are we to understand that the NRC said DE can exceed the legal limits as long as they explain? What public control exists on the level of uranium enrichment?

25.

Unirradiated fuel is shipped to the reactor by truck; irradiated (spent) fuel is shipped from the reactor by truck, rail, or barge; and radioactive waste other than irradiated fuel is shipped from the reactor by truck or rail." (v 1, p 6.19) Are communities along the route notified of the shipments?
"Impacts from these shipments would be from the low levels of radiation that penetrate the unirradiated fuel shipping containers. Radiation exposures at some level would occur to the following individuals: (1) persons residing along the transportation corridors between the fuel fabrication facility and the Fermi site; (2) persons in vehicles traveling on the same route as an unirradiated fuel shipment; (3) persons at vehicle stops for refueling, rest and vehicle inspections; and (4) transportation crew workers." (v 1, p 6.20) Does that mean I could be exposed by passing a truck hauling unirradiated fuel?

"The Individual Stuck in Traffic… for one hour at a distance of 4 feet…Person at a Truck Service Station…….would be exposed for 49 minutes at a distance of 52 ft from the loaded shipping container." (v 1, p 6.26) Who else could be exposed?
"Truck crew members would receive the highest radiation doses …NRC staff's analysis assumed that crew member doses are limited to 2 rem/yr..."(v 1, p 6.24) Shouldn't the NRC be more definite than merely assuming that will be the limit?

26.

"…shipments of fuel and waste to the Davis-Besse site may also contribute to the cumulative radiological impacts of transportation as a result of sharing some highway links with Fermi 2 shipments." (v 1, p 7.44) Why have and why would shipments of waste go to the Davis-Besse reactor?

27.

In its application process for a license to build a new reactor, Fermi 3, Detroit Edison estimates that the collective total body dose within a 50 mile radius of the Fermi 3 site to be 14.9 person-rem from liquid effluents and 6.7 person-rem from gaseous effluents. (p 5.112) So, I recognize that this means that collective dose is a measure of the total amount of effective dose multiplied by the size of the exposed population; and that there is then a net increase of 21.6 person-rem for all in the 50 mile radius. The NRC "concludes there would be no observable health impacts on the public from normal operation of Fermi 3, the health impacts would be SMALL, and additional mitigation is not warranted." In so doing, NRC dismisses the report of the National Academy of Sciences, Committee on the Biological Effects of Ionizing Radiation (BEIR) that all radiation including low level radiation can produce non-malignant illness and cancer as well as genetic mutations. The BEIR report defines low level radiation as near zero to 100 millisieverts (mSv).
http://www8.nationalacademies.org/onpinews/_newsitem.aspx?RecordID=11340
The BEIR report was sponsored by the U.S. departments of Defense, Energy, and Homeland Security, the U.S. Nuclear Regulatory Commission, and the U.S. Environmental Protection Agency. The National Research Council is the principal operating arm of the National Academy of Sciences and the National Academy of Engineering. It is a private, nonprofit institution that provides science and technology advice under a congressional charter.

Clearly, the NRC is a cheer leader for the nuclear power industry and not a spokesperson for public health. The NRC goes on, "The estimated collective dose to the same population from natural background radiation is estimated to be 2,200,000 person-rem/yr. The dose from natural background radiation was calculated by multiplying the 50-mi population estimate for 2060 of approximately 7,710,000 people by the annual background dose rate of 311 mrem/yr." The statement of average background radiation (311 mrem/yr) is excessive and indicates the NRC effort to trivialize additional reactor releases. The National Academy of Sciences, Committee on the Biological Effects of Ionizing Radiation states that the average background radiation is 3 mSv (millisieverts) per year. I recognize that Millirem and millisievert can be thought of as equivalent. Actually, I recognize that millirem measures the release amount. Millisievert measures the biological impact, variable on different parts of the body. I bear in mind that background radiation exposure varies from one region to another and is higher at higher elevations. This NRC statement does not indicate what effective dose is multiplied by what population to get the total of 21.6 person-rems designed Fermi 3 release. Why would the calculation for background radiation go out to the 2060 estimated population rather than use current population figures? Is that to make the the background radiation appear to dwarf the proposed Fermi 3 release? This appears to be an average dosage. Left unsaid is that those closer to the reactor would be exposed to higher doses and that weather patterns may concentrate exposures anywhere within or beyond the 50 mile radius and that radiation does not stop at 50 miles. Also, the NRC does not take account of or address or comment or report on large releases of radionuclides from reactors during "normal" operation (beyond designed releases) or due to defective equipment, operator error, relative proximity to reactors or accidents. It does not address radioactive "hot spots", regions where high dose concentrations impact populations. We know and the NRC knows that these are real issues that occur at existing reactors in the U.S. and around the world. To imply that this can not happen at Fermi 3 is not credible.

28.

A Center for Disease Control statistical analysis shows that there is a significantly higher incidence of cancer deaths for Monroe, MI residents compared with incidences for the U.S. as a whole. This increase in Monroe cancer deaths correlates with the Fremi 2 going to full power. This is ignored by the NRC and Detroit Edison:

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The following is a statement by Joseph J. Mangano

Joseph J. Mangano, MPH, MBA, is Director, Secretary, and the Executive Director of the Radiation and Public Health Project.

Mr. Mangano is a public health administrator and researcher who has studied the connection between low-dose radiation exposure and subsequent risk of diseases such as cancer and damage to newborns.

He has published numerous articles and letters in medical and other journals in addition to books, including *Low Level Radiation and Immune System Disorders: An Atomic Era Legacy.* There he examines the connection between radiation exposure and current widespread health problems.

RISING LOCAL CANCER RATE SUGGESTS LINK WITH FERMI REACTOR

January 14, 2009 - The cancer death rate in Monroe County has been rising since the late 1980s, when the Fermi 2 nuclear reactor began operating, according to a new analysis.

The rise in cancer has been sharpest among children and adolescents, who are most susceptible to the harmful effects of radiation exposure. The analysis uses official data from the U.S. Centers for Disease Control and Prevention.

"The increasing cancer death rate among Monroe County residents, especially young people, suggests a link with the radioactive chemicals emitted from the Fermi reactor," says Joseph J. Mangano MPH MBA, Executive Director of the Radiation and Public Health Project research group. "Because Monroe County has a low risk population that is well educated, high income, and has few language barriers, rising cancer rates are unexpected, and all potential causes should be investigated by health officials."

Fermi 2 reactor began “operating” June 21, 1985. However, it ran very little after the initial low-power start-up until a warranty run in January of 1988, marking the commercial start-up of the reactor. In the early 1980s, the Monroe County cancer death rate was 36th highest of 83 Michigan counties, but by the early 2000s, it had moved up to 13th highest. From 1979-1988, the cancer death rate among Monroe County residents under age 25 was **21.2% below** the U.S. rate. But from 1989-2005, when Fermi 2 was fully operational, the local rate was **45.5% above** the U.S.

All nuclear reactors produce electricity by splitting uranium atoms, which creates high energy needed to heat water. This process also creates over 100 radioactive chemicals, not found in nature, including Strontium-90, Cesium-137, and Iodine-131.

While most of these chemicals are retained in reactors and stored as waste, a portion is routinely released into the local air and water. They enter human bodies through breathing and the food chain, and raise cancer risk by killing and injuring cells in various parts of the body. They are especially harmful to children.

The findings come at a time when a new nuclear reactor has been proposed at the Fermi plant. The original Fermi 1 reactor, which was the site of a "Partial Core-Melt Accident" in 1966, shut permanently in 1972.

DATA ON CANCER RISK FROM FERMI 2 RADIOACTIVE EMISSIONS

- The Fermi 2 reactor is located in Monroe County, and started on June 21, 1985, not becoming fully operational until January 1988.
- Fermi 2 came close to a meltdown on March 28, 2001 and August 14, 2003. (1)
- Fermi 2, like all reactors, routinely emits over 100 radioactive chemicals into air and water.
- Each of these chemicals causes cancer, and is most harmful to infants and children.
- For cancer deaths for all ages (whites only), Monroe County ranked
  - 36th highest of 83 Michigan counties in 1979-1983 (before startup)
  - 13th highest of 83 Michigan counties in 2000-2005 (latest data) (2)
- The Monroe County cancer death rate age 0-24
  - was 21.1% below the U.S. in 1979-1988 (before/during startup)
  - was 45.5% above the U.S. in 1989-2005 (after startup) (3)

Monroe County has no obvious cancer risk. It has a high income, low poverty, well educated population with few language barriers and access to excellent medical care in nearby Detroit. (4) Thus, an increase in cancer (especially to children) is unexpected. This change should be investigated, and one potential cause should be radioactive emissions from Fermi.

Sources:

1. Fermi 2 incurred "near miss" accidents on March 28, 2001 (emergency diesel generator was inoperable for over 7 days) and August 14, 2003 (loss of offsite power due to northeast blackout). Source: Greenpeace USA. An American Chernobyl: Nuclear "Near Misses" at U.S. Reactors Since 1986. www.greenpeace.org, April 26, 2006.

2. U.S. Centers for Disease Control and Prevention, http://cdc.wonder.gov, underlying cause of death. Death rates are adjusted to 2000 U.S. standard population. Includes ICD-9 codes 140.0-239.9 (1979-1983) and ICD-10 codes C00-D48.9 (2000-2005). Whites account for over 95% of Monroe residents.

3. Cancer Death Rates, Monroe County vs. U.S.
1979-1988 and 1989-2005, age 0-24

	Monroe County		Deaths/100,000 Pop.		
Period	Cancer Deaths	Avg. Pop.	Monroe	U.S.	%vs. US
1979-1988	22	56,2343.91	4.96		**- 21.2%**
1989-2005	42	51,4074.86	3.79		**+45.5%**

Source: U.S. Centers for Disease Control and Prevention, http://cdc.wonder.gov, underlying cause of death.
Includes ICD-9 codes 140.0-239.9 (1979-1983) and ICD-10 codes C00-D48.9 (2000-2005). Increase in rate significant at $p<.05$.

4. Demographic Comparison, Monroe County vs. U.S.

Indicator	Monroe	U.S.
2006 Population	155,035	299,398,484
2000 % Foreign Born	1.9	11.1
2000 % Language other than English spoken at home, age 5+	4.0	17.9
2000 % High School graduates, age 25+	83.1	80.4
2000 % Homeownership	81.0	66.2
2004 Median Household Income	$53,838	$44,344
2004 % Below Poverty	8.7	12.7

Source: U.S. Census Bureau, www.census.gov, 2000 population, State and County Quick facts

Page 7-42, line 23, states: “On the basis of these findings, the NRC staff concludes that the cumulative risks of severe accidents at any location within 50 mi of the Fermi site would likely be SMALL, and no further mitigation would be warranted.” This dismisses the possibility of a major explosion of Fermi 2 or Fermi 3 or Bessie-Davis. Such an explosion could release radionuclides that would quickly kill large numbers of people, result in both non-malignant illnesses and cancers, and genetic mutations. It would permanently contaminate a very large region. The damage could not be undone.

The environmental impact statement does not acknowledge the permanent effects on people and the biosphere of actual accidents that have taken place.

Nuclear Reactor Incidents, Malfunctions, Meltdowns/Explosions, and Radioactive Releases ignored by NRC in the Environmental Impact Statement:

Excerpts from: Killing Our Own The Disaster of America’s Experience with Atomic Radiation by Harvey Wasserman & Norman Solomon with Robert Alvarez &Eleanor Walters (A Delta Book 1982 Dell Publishing Co., Inc. I Dag Hammarskjold Plaza, New York, NY 10017)

The entire book can be read on line at http://www.ratical.org/radiation/KillingOurOwn/KOO.pdf
Excerpts below have references to on-line page designations which differ from the hard cover book page designations. The page designations, in turn, lead to the authors’ primary source documentation in the book notes.

Kyshtym: Deaths occurred in the Soviet Union From this Nuclear Reactor Explosion.
“...Catastrophe at Kyshtym Soviet Union Ural Mountains 1957 a massive explosion at radioactive dump site: "There was an enormous explosion, like a violent volcano," Medvedev explained. "The nuclear reactions had led to an over-heating in the underground burial grounds. The explosion poured radioactive dust and materials high up into the sky." The human fallout was "terrible. . . . Tens of thousands of people were affected, hundreds dying, though the real figures have never been made public. The large area, where the accident happened, is still considered dangerous and is closed to the public." p.166
This is rated 6 on the International Nuclear Events Scale. Possible ratings are 1 to 7.

Deaths at **Three Mile Island** March 28, 1979
“... Radiation escaped through the containment. Radioactive water leaked into the Susquehanna River. Finally, a hydrogen bubble developed in the core, apparently threatening an explosion.
....unknown quantities of radiation escaped into the air of central Pennsylvania.” (p.186)

“....It was impossible to tell how much radiation really escaped. The monitors merely recorded a minimum amount...” according to NRC “ ....Inside the building readings showed a minimum of a million millirems per hour, a lethal dose. On site, the day of the accident, monitors 1000 feet from the vent stack showed levels of 365 millirems of beta and gamma rays per hour. A helicopter directly over the vent stack measured emissions three times as high. Even those measurements were "very inconclusive," said Gibson. They showed dose rates "only at the moments the measurements were made." Without full knowledge of weather patterns, he admitted, "we don’t know if they were made at the appropriate locations." Thus Gibson had told his NRC superiors that one of the key methods of measuring emissions—the stack monitors—had been essentially useless during and after the accident.” p. 188 This is rated 5 on the International Nuclear Events Scale.

Animals died at Three Mile Island. People Died at Three Mile Island. See Chapters 13 and 14.
“In December of 1979, Sternglass carried his conclusions much further. In a paper delivered to the Fifth World Congress of Engineers and Architects at Tel Aviv, he said that *data from the U.S. Bureau of Vital Statistics showed that there were "242 [infant] deaths (from TMI) above the normally expected number in Pennsylvania and a total of 430 in the entire northeastern area of the United States," a rise of clear statistical significance.*
The linkage with TMI was clear because "large amounts of radioactive Iodine-131 were released from the

plant" and the peak of infant mortality came within a matter of months thereafter. The greatest rises took place near the plant, with effects decreasing as a function of distance away from Harrisburg."
".....But I-131 was not the only radioactive element released from TMI—nor were infants the only humans likely to be harmed. Strontium 90, cesium 137, noble gases, and other disease-causing isotopes may also have escaped. Overall, said Sternglass, increases in cancers, leukemia, and a wide range of other diseases were "likely to occur.....many thousands over the next 10 to 20 years."
p. 201

Additional Health studies at Three Mile Island: http://www.tmia.com/taxonomy/term/12

Chernobyl 1986: meltdown with multiple explosions and release of radioactive material. 100,000 people evacuated from the immediate area and 300,000 from areas of heavy fallout in Ukraine, Belarus, and Russia. Exclusion zone of approximately 1,000 square miles indefinitely off limits for human habitation.

Excerpts from: CHERNOBYL Consequences of the Catastrophe for People and the Environment Yablokov, Vassily Nesterenko, and Alexey Nesterenko published by license from New York Academy of Sciences March 15, 2011
Can also be downloaded at http://www.strahlentelex.de/Yablokov%20Chernobyl%20book.pdf
This monograph is a reprint of a volume originally published by the New York Academy of Sciences in 2009. It is a translation from Russian.

"Emissions from this one reactor exceeded by hundredfold the radioactive contamination of the bombs dropped on Hiroshima and Nagasaki. No citizen of any country can be assured that he or she can be protected from radioactive contamination. One nuclear reactor can pollute half the globe. Chernobyl fallout covered the entire Northern Hemisphere..." page 2

Thousands of reports and studies in Russia, Belarus, and Ukraine document a wide range of illness and death from the Chernobyl explosion. Excerpts below are marked with page notation where the subject addressed is found in the book:

p. 27 "....contamination not less than 300 years for Cs-137 and Sr-90, more than 200,000 years for Pu, and several thousand years for Am-241.....tens of millions of people will live under measurable chronic radioactive contamination for decades to come...."
p. 32 ".... nearly 400 million human beings have been exposed to Chernobyl's radioactive fallout and for many generations, they and their descendants will suffer the devastating consequences...."
42-50 ".... comparing heavily contaminated with less contaminated areas: general morbidity increased significantly....range of illness increased: Weakness, dizziness, headache, fainting, nose bleeds, fatigue, heart arrhythmia's, stomach pain, vomiting, heartburn, loss of appetite, allergy, chronic gastroenteric pathology, dodentitis, gallbladder inflammation, vascular and heart syndromes, low birth weight...."

p. 55 ".... Chernobyl catastrophe produced accelerated aging. multiple illnesses characteristic of aging were seen many years sooner...."

p. 58 ".... there is a high incidence of non-malignant diseases in people heavily contaminated including: brain damage, premature cataracts, tooth and mouth abnormalities, blood, lymphetic, heart, lung, gastrointestinal, urologic, bone, and skin diseases. endocrine dysfunction, thyroid disease including cancer, genetic damage and birth defects, immunological abnormalities and increases in viral, bacterial and parasitic disease...."

p. 65 ".... a common reason for functional impairment of blood, blood forming organs, and circulatory system is radioactive destruction of the endothelium, the covering surface of vessels...."
"....incidence of chromosomal aberrations is significantly higher in all the territories contaminated by Chernobyl...."

p. 71 ".... there is a high increases of Down Syndrome, 30-49%..."

p.75 “....the 2nd and 3rd generations of children whose parents were irradiated by the atomic bomb explosion in Japan in 1945 suffered 10 fold more circulatory system diseases and impaired liver function and 3.3 fold more respiratory system illness than a control group....”

p. 76 ”The overwhelming majority of Chernobyl induced genetic changes will not become apparent for several generations.”

p. 77 “The Chernobyl radiation is genetically much more dangerous than that released in Hiroshima and Nagasaki as the quantity of radionuclides emitted from the chernobyl meltdown was several hundred fold higher and there were more different kinds of radionuclides.”

“The genetic consequences of the Chernobyl catastrophe will impact hundreds of millions of people, including:(a)those who were exposed to the first release of short-lived radionuclides in 1986, which spread worldwide...(b) those who live and will continue to live in the territories contaminated by Sr-90 (strontium)and Cs-137 (cesium), as it will take no fewer than 300 year for the radioactive level to decrease to background; (c) those who will live in the territories contaminated by Pu (plutonium) and Am (Americum) as millennia will pass before that deadly radioactivity decays; and (d)children of irradiated parents for as many as seven generations (even if they live in areas free from Chernobyl radionuclide fallout)....”

83 “In all of the contaminated territories, there is a marked increase in nonmalignant thyroid diseases....delayed healing of wounds and ulcers, delay in growth of hair, dryness, fragility, hair loss, increased susceptibility to respiratory infections, night blindness, ringing in the ears, headaches, fatigue and lack of energy, lack of appetite (anorexia) delayed growth in children, male impotence, increased bleeding....”

p. 87 “.... Chernobyl radiation suppresses immunity...”

p. 92 “....marked increase in respiratory system morbidity everywhere in the territories contaminated by Chernobyl.”

p. 96 “For children of the hibakusha who were not irradiated directly, the incidence of respiratory system illnesses was higher compared to controls some decades after the bombardment.”

p. 102 “Urogenital tract diseases and reproductive disorder: abnormalities in spermatozoa, reproductive failures, birth abnormalities in children... ‘

p. 102 “.... bone and muscle diseases: cases of children born practically without bones (“jelly fish-children”), a condition seen previously only in the Marshall Islands after the nuclear tests of the 1950s”

p. 105 “....diseases of the nervous system and sense organs and their impact on mental health: low levels of ionizing radiation changes in both central and autonomic nervous systems and can cause encephalopathy.....significant morbidity was documented in contaminated territories....”

p.112 “...45% of children born to mothers who went through Hiroshima and Nagasaki nuclear bombardment were diagnosed with intellectual retardation....”

p. 133 “The occurrence of congenital malformations continues to increas in several of the contaminated territories and correlates with the level of irradiation...”

p. 162 “There are 2 ways to define the scale of cancer morbidity associated with the Chernobyl catastrophe: (1) on the basis of calculated received doses (with application of appropriate risk factors) and (2) by direct comparison of cancer morbidity in the heavily and less contaminated territories.”

p.174 “In Connecticut there were two separate fallouts of Chernobyl radionuclides (in the middle of May and the second half of June, 1986), resulting in a 7 to 28-fold increased level of I-131 in milk. The rate of thyroid

cancer among Connecticut children under the age of 15 years rose sharply (from 0.16 to 0.31 per 100,000) from 1985-1989 to 1990-1992. During the same period rates of thyroid cancer for all age groups jumped to 23% (from 3.46 to 4.29 per 100,000), after 10 previous years without change."

p.174 "The added risk of thyroid cancer after Hiroshima and Nagasaki radiation was highest 10-15 years later, with cases appearing 40-50 years afterward."

p. 192 " Mortality after Chernobyl: "A detailed study reveals that 3.8-4% of all deaths in the contaminated territories of Ukraine and Russia from 1990 to 2004 were caused by the Chernobyl catastrophe. The lack of evidence of increased mortality in other affected countries is not proof of the absence of effects from the radioactive fallout. Since 1990, mortality among liquidators (mitigation workers) has exceeded the mortality rate in corresponding populations groups. From 112,000 to 125,000 liquidators died before 2005---that is, some 15% of the 830,000 members of the Chernobyl cleanup teams. The calculations suggest that the Chernobyl catastrophe has already killed several hundred thousand human beings in a population of several hundred million that was unfortunate enough to live in territories affected by the fallout. The number of Chernobyl victims will continue to grow over many future generations."

210 "The overall mortality for the period april 1986 to 2004....estimated at 985,000 deaths....Given the half-life of the two main radionuclides (Cs-137 {Cesium} and Sr-90 {Strontium}),of approximately 30 years each, the radioactive load in the contaminated territories will decrease about 50% for each human generation. The concentration of Pu {Plutonium},CI-36 {Chlorine}, and Tc-99 {Technetium} will remain practically the same forever (half-lives consequently more than 20,000 and 200,000 years), and the concentration of Am-241 {Americum} which is a decay product of Pu-241, will increase over several generations."

p. 223 "Air particulate activity over all of the Northern Hemisphere reached its highest levels since the termination of nuclear weapons testing---sometimes up to 1 million times higher than before the chernobyl contamination. There were essential changes in the ....structure of the surface air in heavily contaminated territories....Many years after the catastrophe aerosols from forest fires have dispersed hundreds of kilometers away...."

p. 225 "Three Chernobyl clouds entered eastern Canada...(in 1986). The fallout included..."(15 radionuclides).

p. 226 3 radionuclides from Chernobyl reached the U.S. and were measured and recorded by the U.S. EPA.

p. 232 "Levels of radioactive contamination even in North America and Asia are above the maximun levels that were found in the wake of weapons testing in the 1960s"

p. 237 "Chernobyl irradiation has caused structural anomalies and tumor like changes in many plant species. Unique pathological complexes are seen...."

p. 255 "Radioactive shock when the Chernobyl reactor exploded in 1986 combined with chronic low dose contamination has resulted in morphologic, physiologic, and genetic disorders in every animal species that has been studied----mammals, birds, amphibians, fish, and invertebrates."

p. 273 "...an enormous amount of many different radionuclides was absorbed by animals through food, water and air. Levels were sometimes hundreds of times higher than precatastrophe ones....The levels of incorporated radionuclides in some areas of Europe remain dangerous for mammals, birds, amphibians, and fish."

287 "The reluctance on the part of officialdom to acknowledge the truth about Chernobyl's consequences has led to concerned citizens organizing to find additional sources of information to help those who are suffering. Hundreds of such public local, national, and international organizations have been created,,,"

p. 287 Andrei Sakharov and 2 others "....in 1987 initiated the Belorussian Institute for Radiation Safety (BELRAD), an independent public organization devoted to helping Belorussian children---those suffering most from the catastrophic contamination. BELRAD has collected an extensive database for 24 years and is unique as a center for scientific and practical information."

p .289 "In many European countries level of I-131,Cs-134/137, Sr-90 and other radionuclides in milk, dairy products, vegetables, grains, meat, and fish increased dramatically (sometimes as much as 1,000 fold) immediately after the catastrophe. Up until 1991, the United States imported food products with measurable amounts of Chernobyl radioactive contamination, mostly from Turkey, Italy, Austria, West Germany, Greece, Yugoslavia, Hungary, Sweden, and Denmark....Given that more than 90% of the current radiation fallout is due to Cs-137, with a half-life of about 30 years, we know that the contaminated areas will be dangerously radioactive for roughly the next three centuries."

311 "Owing to internally absorbed radionuclides, radiation levels for individuals living in the contaminated territories of Belarus, Ukraine, and Russia hae been increasing steadily since 1994."

p. 316 "Today the most serious contaminating agents are Cs-137 and Sr-90. In coming years the situation will change and Am-241 will present a serious problem....constant monitoring and control (will be) required for Cs-137 and Sr-90 for at least 150-300 years....The contamination from the wider spectrum of radioisotopes is dynamic and will require constant monitoring and control essentially forever."

p. 318 "More than 50% of Chernobyl's radionuclides were dispersed outside of Belarus, Ukraine, and European Russia.....nearly 5 million people are still being exposed to dangerous contamination. The increase in morbidity, premature aging, and mutations is seen in all the contaminated territories that have been studied. The increase in the rates of total mortality for the first 17 years in European Russia was up to 3.75% and in Ukraine is was up to 4.0% Levels of internal irradiation are increasing owing to plants absorbing and recycling Cs-137, Sr-90, Pu, and Am.

p. 319 The claim by the International Atomic Energy Agency (IAEA), the united Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and several other groups that the Chernobyl radioactive fallout adds "only" 2% to the natural radioactive background ignores several facts: First, many territories continue to have dangerously high levels of radiation. Second, high levels of radiation were spread far and wide in the first weeks after the catastrophe. Third, there will be decades of chronic low-level contamination after the catastrophe. Fourth, every increase in nuclear radiation has an effect on both somatic and reproductive cells of all living things....There is no justification for the fact that specialists from IAEA and the World Health Organization (WHO)(Chernobyl Forum, 2005) completely neglected to cite the extensive data on the negative consequences of radioactive contamination in areas other than Belarus, Ukraine, and European Russia, where about 57% of the Chernobyl radionuclides were deposited."

50% of Chernobyl's fallout was outside of European Russia, Belarus, and the Ukraine.
Heavily contaminated agricultural land taken out of use: Belarus, 265,000 hectares (654,550 acres); Ukraine, 130,000 hectares (321,100 acres); Russia, 17,000 hectares (41,990 acres) total equals 1,017,640 acres withdrawn (page 312)

Chernobyl: Consequences of the catastrophe 25 years later
by Janette D. Sherman, M.D., and Alexey V. Yablokov, Ph.D.
published April 26, 2011 article and interview by Democracy Now at
http://sfbayview.com/2011/chernobyl-consequences-of-the-catastrophe-25-years-later/print/

In the first 25 years after the multiple Chernobyl explosions, mitigating costs reached 500 billion dollars and Belarus spends 20% of its national annual budget to mitigate some of the consequences.

“Data from multiple scientists estimate the overall mortality from the Chernobyl catastrophe, for the period from April 1986 to the end of 2004, to be 985,000, similar to those of Gofman (1994a) and Bertell (2006) and a hundred times more than the WHO/IAEA estimate.”
An agreement signed on May 28, 1959, at the 12th World Health Assembly obligates the World Health Organization (WHO) to submit public releases bearing on nuclear energy to the International Atomic Energy Agency (IAEA) for approval. The IAEA’s mandate is to promote nuclear energy.
Chernobyl is rated 7 on the International Nuclear Events Scale.

Fukushima
Fatal doses of radiation have been acknowledged near reactors 1 and 2 and measuring devices gave their maximum possible reading (off scale) of 10 sieverts per hour. This followed crippling explosions that destroyed the reactor buildings. The reactors have continued to spew radiation since the disaster.
Food and agricultural land contamination prevents use of land and food crops and one group of 1000 children were found to have radioactive iodine thyroid contamination. Evidence shows that cooling pipes were known to be deteriorated, and that the earth quake caused loss of cooling and the melt down before the tsunami hit which in turn knocked out the back-up generators. This puts at risk all of the other aging reactors of this same design in Tokyo as well as here in the U.S---including Fermi 2---., especially those on earth quake faults. Fall out from Daiichi reactors has been measured across the U.S.
The Japanese government and the IAEA are protecting the nuclear industry and not the people of Japan by claiming that Fukushima is stable when it is not; by substantially raising the “allowable limit” of radiation for the people; by allowing return to evacuated areas; and by planning on incinerating radioactive material and dumping the radioactive ash into Tokyo Bay. The U.S. State Department exuded support stating that Japan had made “the right decision”. The Japanese people will now be “allowed” to experience up to 20 millisieverts. This is 10 times higher than allowable dose for U.S. nuclear workers. The claim that a “cold shut down” has been achieved is misleading. The jury rigged piping cooling the damaged reactors is not earth quake safe and there is a high likelihood of an earth quake that would return the reactors to meltdown again. The IAEA is not a UN agency as is often claimed. It’s purpose as expressed in article 2 of its mission statement is to “...seek to accelerate and enlarge atomic energy...” around the world. The current head of the IAEA is a former Japanese nuclear regulator. Japan has and continues to put large amounts of radiated water into the ocean. The assault on people and the rest of the biosphere represented by the Fukushima catastrophe is a current reality that will be played out into the indefinite future..
http://fairewinds.com/content/tepco-believes-mission-accomplished-regulators-allow-radioactive-dumping-tokyo-bay
This is rated 7 on the International Nuclear Events Scale.

Other reactor incidents, malfunctions and accidents:
- Chalk River, Ontario: 1952 and 1958: 1000 rads per hour exposure to a large number of people and area for days as a fuel rod had burned. 300 Canadian Armed Forces personnel were brought in for the clean up effort. This is rated 5 on the International Nuclear Events Scale (INES).
- Idaho Fallls, Idaho 1955; 1961 An explosion occurred and worker radiation meters read 1000 rads. Three workers were dead, one impaled on a fuel rod stuck to the ceiling. Even those well suited in protective clothing and limited to 60 seconds time of exposure in addressing the crisis absorbed 30 rads of radiation.
- 1957 Windscale, England: Information withheld from the public. The public lied to. Contaminated food, animals and agricultural land. A cover up occurred and fallout reached London, 300 miles away. This is rated 5 on the International Nuclear Events Scale.
- 1958 Vinca, Serbia A criticality excursion radiated 6 scientists with doses of 2-4 Sv This was rated 5 on the International Nuclear Events Scale.
- 1959 Santa Susana, CA Partial core meltdown resulting in release of radioactive gases.
- 1960 Westmoreland County, Pennsylvania A core meltdown resulted in release of 2 million gallons of contaminated water, some of which resulted in Sr-90 detected in ground water and soil contamination.
- 1964 Charlestown, Rhode Island A criticality accident in which one worker was exposed to 10,000 rad of radiation and two others 100 rad.
- 1966 The Soviet ship *Lenin* experienced a (likely) meltdown resulting in the death of at least 30 crewl and the dumping of the reactor and fuel into the Kara Sea.

- 1967 Dumfries and Galloway, Scotland Fuel meltdown and fire.
- 1969 Lecens, Switzerland Power excursion contaminated containment area resulting in it being permanently sealed off.
- 1975 Greifswald, Germany Excessive heating damaged 10 fuel rods, attributed to poor construction. INES level 3.
- 1977 Jaslovske Bohunice, Slovakial Accident damaged fuel integrity and resulted in reactor decommissioning. INES Level 4.
- 1980 Orleans, France Rupture of fuel bundles resulted in a release of nuclear materials. Rated level 4 on INES.
- 1981 Tsuruga, Japan Radioactive materials released into the Sea of Japan. More than 100 workers exposed to doses of up to 155 millirems per day of radiation during repairs. Level 2 on the INES.
- 1983 Buenos Aires, Argentina Accidental criticality resulting in fatal 2000 rad of gamma and 1700 rad of neutron radiation to one worker and up to 35 rad to 17 people outside the reactor. INES level 4.
- 1986 Hamm-Uentrop, Germany Reactor malfunction resulted in radioactive release detected two kilometers away.
- 1993 Tomsk, Russia Explosion at this plutonium reprocessing facility caused release of Pu 239 and other radionuclides 20 km beyond the facility property exposing the village of Georgievka and 160 on-site workers and 2,000 cleanup workers to doses of up to 50 mSv. INES level 4.
- 1999 Ishikawa Prefecture, Japan Uncontroled sustained reaction due to operator error. Reactor owner did not report this incident and falsified records, covering it up until 2007. INES level 2.
- 1999 Ibaraki Prefecture, Japan Accidental criticality due to operator error resulting in neutron exposure to 3 workers. Two died. 16 other workers received lesser doses of 1 mSv or greater. INES level 4.
- 2003 Paks, Hungary Rupture of fuel rods releasing radionuclides. INES level 3.
- 2005 Sellafield, England Twenty metric tons of uranium and 160 kilograms of plutonium disolved in 83,000 litres of nitric acid leaked over several months from a cracked pipe into a stainless steel sump chamber at this reprocessing plant. INES level 3.
- 2005 Braidwood, Illinois Tritium contamination of groundwater at Exelon reactor.
- 2006 Erwin, TN Thirty-five litres of highly enriched uranium solution leaked during transfer into a lab at Nuclear Furl Services Plant. INES level 2.

Fermi 1: On October 5, 1966, when Fermi 1 over heated and released radiation into and out side of the containment building operators were uncertain of what to do. Fuel had melted. Fuel distribution had shifted which could threaten a secondary major explosion. This was already beyond designed parameters and predictions that it was impossible for this to happen. The reactor had not shut down automatically. It had to be shut down manually. Operators were in a quandary as to what to do next to stave off a larger catastrophe. They did not know the cause of the problem or how to fix it. The best nuclear experts from around the country and the world were called and consulted. In 1968, a year and a half after the meltdown, after tedious efforts to examine the core of the reactor, with the risk of a severe explosion at each step and the prospect of hundreds of thousands of deaths, the piece of zirconium metal that had blocked coolant was retrieved from the bottom of the reactor. It had broken off from its installation. Its presence did not appear on the blueprints of the reactor design. In May of 1970, Fermi 1 was allowed to resume operation when 200 pounds of radioactive sodium burst out of the pipes and was doused with water causing it to flash and burn. It was doused with argon gas. Fermi 1 was closed forever on August 27, 1972. The AEC (Atomic Energy Commission) was building a new breeder reactor at Oak Ridge, TN as though Fermi 1 had never existed. Fermi 1 sits radioactive and needing to be monitored indefinitely with no resolution possible. See We Almost Lost Detroit by John Fuller 1975 Readers Digest Press. Crowell Company New York.

All of the reactor accidents, meltdowns, explosions that have occurred are not only historical events but ongoing present realities, in that radionuclides released and dispersed widely remain a threat to human health. The thrust of the nuclear industry and government is to "normalize" ever expanding man-made ionizing radiation into the biosphere by minimizing or denying statements of the risk to cell tissue.

Gross Errors on Statement of Need for Additional Capacity in DEIS Section 8:

The Energy Information Administration (EIA), a division of the United States Department of Energy, tracks and publishes data on energy use in the United States. In particular, they publish figures on how much electricity was consumed each year in the state of Michigan, and how much was generated. According to the EIA, in 2006, 108,018 million Kilowatt-hours of electricity was consumed (sold at retail) in Michigan. For 2007, the figure was 109,927; for 2008, 105,781; for 2009, 98,121. Data for 2010 is not included in their table, available at http://www.eia.gov/state/seds/hf.jsp?incfile=sep_use/tx/use_tx_MI.html&mstate=Michigan.

The Fermi III Draft Environmental Impact Report, in section 8, relies on a study done by the Michigan Public Service Commission (MPSC) for an estimate of demand for electricity in Michigan. The MPSC study says that demand for electricity in 2006 was 112,183 million Kilowatt-hours, and that they expect demand to increase exponentially by 1.3% every year thereafter. Their formula projects a demand for 115,548 million Kilowatt-hours in 2007; 119,015 in 2008; and 122,589 in 2009.

I have compared the MPSC projections with the reality that we know about so far in the table below:

YEAR	REAL DEMAND	MPSC PROJECTION	ERROR (%)
2006	108,018	112,183	03.9%
2007	109,927	115,548	05.1%
2008	105,781	119,015	12.5%
2009	98,121	122,589	24.9%

The error for 2006 comes from the fact that the MPSC used an estimate of the amount of electricity generated in the state instead of the figure for the amount actually consumed. The ever-increasing errors are caused by the fact that their simple formula did not and could not anticipate the global financial crisis which showed up in 2008 and which is not yet resolved.

We can't say with any certainty when or even if the financial crisis will be resolved. We can't say when or if the pattern of growth in demand for electricity that was normal for the 20th Century will be resumed. There is a logical case that says it will not be resumed, but that's far outside the scope of comments to be made here.

What we can say with certainty is the projection for electrical demand is already showing a great deal of error. By 2025, it is likely to be grossly wrong. It is already too wrong to be a legitimate basis for building Fermi III.

In case it is not clear, let's examine just how much of an error this is. If, from 2010 to 2025, Michigan's real electrical demand were to follow the simple formula used by the MPSC, by 2025 the demand would be roughly 157,500 million Kilowatt-hours. The MPSC's original prediction works out to 196,700 million Kilowatt-hours for 2025. That is, the error of 24.9% for 2009, if extended to 2025, would amount to 39,200 million kilowatt-hours less demand in 2025 than originally anticipated.

The DEIS (p. 8-1) says that Fermi III is expected to have an electrical output of 1605 MW plus or minus 50 MW. In a year, assuming nearly 100% uptime in plant operation, this would amount to a little over 14,000 million kilowatt-hours in a year. If this plant were needed to meet the demand originally anticipated, it is clearly not needed to meet the lower demand that would now be anticipated by the same formula.

The DEIS further says that the output for Fermi II is 1122 MW (p.2-5). By the same assumption as used above, this amounts to approximately 9,800 million kilowatt-hours in a year. The two plants together would produce a maximum of 23,800 million kilowatt-hours per year. Neither one of these nuclear power plants

will be needed in 2025, if actual demand is lower by 39,200 million kilowatthours.
This Analysis was done by Art Myatt

31.

The NRC is not regulating:

Leak First, Fix Later
Uncontrolled and Unmonitored Radioactive Releases from Nuclear Power Plants
A Beyond Nuclear Report
Paul Gunter, Director, Reactor Oversight Project
April 2010
EXECUTIVE SUMMARY
The highly-publicized leaks of radioactive hydrogen – or tritium – from buried pipes at the Braidwood, Oyster Creek and Vermont Yankee nuclear power plants have drawn attention to a more widespread and longstanding problem analyzed by a new report from Beyond Nuclear. Leak First, Fix Later: Uncontrolled and Unmonitored Radioactive Releases from Nuclear Power Plants finds leaking U.S. reactors are now ubiquitous. There is evidence of 15 radioactive leaks from March 2009 through April 16, 2010 from buried pipe systems at 13 different reactor sites. At least 102 reactor units are now documented to have had recurring radioactive leaks into groundwater from 1963 through February 2009.
The report finds that the federal regulator – the U.S. Nuclear Regulatory Commission (NRC) – has replaced its own oversight responsibilities in favor of industry self-regulation. Instead of mandating compliance with established license requirements for the control and monitoring of buried pipe systems carrying radioactive effluent, the NRC cedes responsibility to industry voluntary initiatives that will add years onto the resolution of a decades-old environmental and public health issue. Of further concern, the agency and the industry continue to downplay and trivialize the health risks of prolonged exposure to tritium which is shown to cause cancer, genetic mutations and birth defects.

The delinquency of the NRC is made more alarming by the fact that the nuclear industry has deliberately misrepresented the truth about its leaking reactors to state governments, most dramatically in Illinois and Vermont. Given the history of untrustworthiness of the nuclear industry, it is even more important to have a vigilant and responsible regulator. The report found this not to be the case with the NRC and its oversight of increasing leaky reactors. The report examines radioactive leaks in Illinois, New Jersey, Michigan, New York and Vermont that illuminate concerns over continuing groundwater contamination, the accelerating deterioration of buried pipes, the lack of integrity of industry's reporting of leaks and pipes and the questionable replacement of federal oversight and enforcement with industry "voluntary initiatives."

".....Braidwood nuclear power station (IL) had 22 recurring uncontrolled radioactive spills from unmaintained vacuum breaker valves on the same buried pipeline that went undisclosed from 1996 to December 2005 including two releases totaling six million gallons of tritiated water. The Braidwood operators allowed millions of gallons of radioactive water contaminated with tritium to soak into groundwater along the four and a half-mile long pipe and to run off site into the neighboring community of Godley Park Township where 600 people have been supplied with bottled water provided by Exelon for more than four years. The city of Wilmington takes in its drinking water from the Kankakee River just two and a half miles from the same Braidwood discharge pipe.

Oyster Creek nuclear power plant (NJ) disclosed radioactive water leaking from buried pipes just seven days after the NRC awarded the oldest reactor in the US a 20-year license renewal. The leaking buried pipes had been falsely documented in company work orders. Management decisions made in the1990s to close Oyster Creek cancelled numerous corrective actions for buried pipes carrying radioactive water. When the reactor was instead sold, many of the work orders were never resumed. The unmanaged deterioration of aging systems sounds an alarm about the thoroughness and adequacy of the NRC license extension review process.

Vermont Yankee nuclear power station (VT) is seeking a 20-year license extension. A January 6, 2010 lab report identified a "very low concentration of tritium" in an on-site test well. The reading spiked from 700

picocuries per liter to 2.7 million picocuries per liter as more test wells were dug to find the leak. Cobalt-60, cesium-137 and radioactive manganese and zinc were discovered in the leak path indicating that the contamination started with fuel damage. The company destroyed its credibility when it revealed that officials falsely reported in sworn testimony to state regulators that there were no buried pipes carrying radioactive water under the reactor. The state senate voted 26 to 4 to close the reactor at the end of its current license in 2012 effectively setting up a legal roadblock to NRC relicensing....."
http://www.beyondnuclear.org/storage/documents/LeakFirstFixLater_ExecutiveSummary_April2010.pdf

32.

Radioactive Fallout from Weapons Testing Combines with Reactors Emissions to Produce a Larger Biological Effect:

Cancer Risk to Americans from Atomic/Thermonuclear Test Fallout
Joseph J. Mangano MPH MBA
Radiation and Public Health Project October 20, 2009
http://www.radiation.org/reading/pubs/091020stlouisreport.html #summary
Excerpts below are quotes from the study:

Results of the study were as follows:

1.The average Sr-90 level in teeth of persons who died of cancer was 122% greater – more than double – than in teeth of healthy controls, a significant difference.
2. Average Sr-90 concentration in teeth of cancer survivors was not significantly elevated.

In 2002, the U.S. government estimated that 15,000 Americans will die of cancer from fallout (past nuclear weapons tests). This projection is much lower than a 2003 European Committee on Radiation Risk estimate of 61,600,000 cancer deaths worldwide. As about 20 million of the 79 million Americans born in the 1950s and 1960s are expected to die of cancer in their lifetime, tooth study results suggest the number of 15,000 cancer deaths from fallout is low, and that the true number may be hundreds of thousands, or even millions.

The immense blasts over the Nevada desert contained over 100 radioactive chemicals not found in nature. These chemicals, which are tiny metal particles and gases, were propelled high into the stratosphere, and moved with prevailing winds – generally to the east. It took roughly 2-3 days for fallout to move across the continental U.S. Precipitation returned the fallout to the environment, where it entered the food chain, including municipal water supplies, grazing areas for milk-producing cows and goats, fruit orchards, vegetable farms, and other forms of food.

Americans routinely ingested these chemicals as part of their diet. Levels of these radioactive chemicals in the environment were tracked by U.S. government officials. Beginning in 1957, the U.S. Public Health Service took monthly measurements in the air, water, and milk of five locations. The program expanded to nine sites in 1958 and 60 sites in 1960.

Scientists became interested in measuring fallout levels, not just in the environment but in the human body. The first such studies began back in 1953, when Columbia University researchers working for the U.S. government began measuring Strontium-90 (Sr-90) levels in bones of humans who had died. Strontium is a bone-seeking, calcium-like element; after it is consumed in food and water, it quickly enters the stomach, moves to the blood stream, and attaches to bone and teeth, where it harms and kills cells.

Sr-90 in bone penetrates into the bone marrow. Even among radioactive chemicals, Sr-90 is especially toxic, as the bone marrow is the site where the red and white blood cells critical to the immune response are formed.

For the next 12 years (after 1958), with the help of federal grants, this scientist-citizen partnership collected approximately 320,000 baby teeth, and tested them for Sr-90. As testing went on, average Sr-90 levels

increased rapidly; St. Louis children born in 1964 had about 50 times more Sr-90 in their baby teeth than those born in 1950, before the start of testing in Nevada.

Congress mandated that the U.S. National Cancer Institute conduct the study, but the Institute took 15 years to produce it. In 1997, the report was finally released, and it concluded that Iodine-131 from tests, consumed in milk, caused from 11,000 to 212,000 Americans to develop thyroid cancer. A 2002 unreleased report by the U.S. Centers for Disease Control and Prevention estimated that 35,000 U.S. cancer cases (15,000 fatal) were caused by bomb fallout.

Projections of worldwide casualties from fallout suggest that the U.S. figures are highly underestimated. In 1996, the International Commission on Radiation Protection projected that 2,350,000 cancer cases would occur from fallout, half of them fatal. In 2003, the European Committee on Radiation Risk (formed by a panel of the European Parliament) issued a report stating that risk had been highly understated. Their estimates of 123,200,000 cancer cases (half of them fatal), 1,600,000 infant deaths, and 1,900,000 fetal deaths from fallout far exceeded any prior projections.

Despite the removal of bomb fallout from the environment, studying their effects have relevance to current policies. The same mixture of radioactive fission products, including Sr-90, is produced in nuclear reactors. The bulk of these chemical is stored as radioactive waste, but some is released from reactors into the air and water. They enter the human body through breathing and the food chain, much as they did after bomb tests.

Radiation levels in the environment (air, water, milk) are lower than they were during the bomb test era. For example, Strontium-90 in milk in the late 1950s were about 5-10 picocuries per gram of calcium. These levels were lower in the early 1950s and higher in the early 1960s (reaching a national high of 25 in the spring of 1964). Today, comparable values are about 1 picocurie per gram of calcium, probably representing reactor emissions. However, these levels have existed for decades, while Sr-90 from bomb testing only lasted during the 1950s and 1960s.

There are 104 nuclear reactors in the U.S. that are aging (average age 30 years) and corroding. They will likely be in existence for many more years; each reactor is granted a 40 year license from federal regulators, and 52 of them are now allowed to operate for as many as 60 years. In addition, proposals have been made to add 32 new reactors. Thus, emissions will continue and radioactivity will enter bodies. These cell-killing and cell-damaging chemicals will continue to affect human health, especially in fetuses, infants, and children.

(underlining added)

33.

The NRC is not a credible agency for protection of the public safety and health and taken together with its predecessor, the AEC, continues a long history of obfuscation, denial and Orwellian newspeak. Federal and state agencies have recurrently denied the need for study of biological effects by denying radionuclide release dosage. The same agencies have suppressed credible research. Those scientists who did report on net increases of illness, morbidity, and death from nuclear radiation were subject to harassment, firing, and suppression of research, loss of funding, and marginalizing by government agencies and the nuclear industry. By 1980, this included Drs. John Gofman, Alice Stewart, Karl Z. Morgan, Rosalie Bertell , Irwin Bross, Thomas Mancuso, Edward Sternglass, and Linus Pauling. http://www.ratical.org/radiation/KillingOurOwn/KOO.pdf

Although U.S. nuclear plants have severe accident management plans, these plans are not required by regulations and do not have to be evaluated by the NRC and tested for their effectiveness.

NRC blocks implementation of its own staff recommendations for post Fukushima safety upgrades:

"One of the most important tasks before the Nuclear Regulatory Commission (NRC) today is moving forward quickly on implementing the safety improvements recommended by its Fukushima Near-Term Task Force, and considering additional safety enhancements that have been identified by the NRC staff.

For a while it appeared that this was actually taking place.

Following the October 20 release of a vote of the 5-member Commission, a press release stated that "The Nuclear Regulatory Commission has directed the agency's staff to begin immediately implementing seven safety recommendations from the NRC's Near-Term Task Force on lessons learned from the reactor accident at Fukushima." These seven safety recommendations were categorized by the staff as actions that could be taken "without delay." They include a crucially important upgrade to the requirements for nuclear plants to be able to cool the reactor core and spent fuel during a station blackout—when there is no AC electrical power. Such a "station blackout" resulted from the tsunami in Fukushima and led to the reactor meltdowns.

However, the Commission took a step backwards in a second vote on December 15. The Commission has now reserved for itself the future right to reject any of the safety upgrades the NRC staff is now working to implement, even though it originally instructed the staff to implement them without delay.

Instead of determining that these safety upgrades as a group are necessary to ensure "adequate protection to the health and safety of the public"—the standard set by the Atomic Energy Act—the Commission ordered the staff to submit further justifications for each new regulatory requirement. This means that the Commission will have the opportunity to vote on each proposed new requirement separately as to whether or not it is needed for "adequate protection."

According to the NRC regulation known as the "backfit rule," if the Commission decides that a proposed new regulatory requirement is not needed for "adequate protection," then it cannot be adopted unless it passes a cost-benefit test. And since the guidelines for how the NRC conducts cost-benefit analyses are rooted in a pre-Fukushima way of thinking, there is little chance that any regulatory action based on a post-Fukushima understanding of risk would pass the test.

Here is a simple example why this is the case:

One of the Fukushima Near-Term Task Force's recommendations is to modify emergency planning guidelines to address the potential for multi-unit accidents. Yet the analyses that would be used to assess the risk reduction associated with this upgrade are based only on single-unit accidents. So in effect, the current framework assumes that the risk of a multi-unit accident is so small that it is essentially zero, and does not consider the potential for a single event to affect multiple units. Therefore, there would be virtually no risk reduction associated with the emergency planning upgrade and it would fail the cost-benefit test.

One might think, therefore, that the NRC should modify its cost-benefit analysis guidelines to incorporate lessons learned from Fukushima before using such an analysis to assess the costs and benefits of the other recommended upgrades to safety requirements. Indeed, the Near Term Task Force considered development of a new post-Fukushima regulatory framework to be its top recommendation.

However, the Commission ordered the staff to put such an effort on the back burner, effectively leaving it to be resolved only after all the other recommendations had been addressed. This has created a pattern of circular reasoning that could endanger the implementation of all the other proposed actions, and could leave the NRC chasing its tail for years to come.

The Commission could—and should—give the NRC staff an unequivocal green light to proceed with implementing the full set of post-Fukushima safety upgrades. The NRC's broad authority to decide on what constitutes "adequate protection" is, according to a presentation by NRC Commissioner William Ostendorff earlier this year, "virtually unique in administrative law." Former NRC Chairman Joseph Hendrie, in a 1979

speech quoted by current Chairman Gregory Jaczko in a recent vote, summed it up as “adequate protection means what the Commission says it means, and we mean it to require a very high level of safety.”

The NRC has used this power in the past to authorize sweeping regulatory upgrades, most recently in the aftermath of the 9/11 attacks. The Near-Term Task Force has made a very compelling case why this should set a precedent for the Commission to redefine adequate protection again today:

The Task Force notes that, after the attacks of September 11, 2001, the Commission established new security requirements on the basis of adequate protection. These new requirements did not result from any immediate or imminent threat to NRC-licensed facilities, but rather from new insights regarding potential security events. The Task Force concluded that the Fukushima Dai-ichi accident similarly provides new insights regarding low-likelihood, high-consequence events that warrant enhancements to defense-in-depth on the basis of redefining the level of protection that is regarded as adequate.

However, instead of modeling its post-Fukushima response on its response to the 9/11 attacks, the Commission is holding the sword of Damocles over each proposed new safety requirement. Each will take months to years of NRC staff time to develop, yet will be subject to the whims of the current or future Commissioners. This uncertainty has created a process that is at best highly inefficient and at worst a recipe for many years of inaction.

The vote was quite lopsided. NRC Commissioners Apostolakis, Magwood, Ostendorff, and Svinicki all voted to assess each potential new regulatory requirement separately; only Chairman Jaczko voted to move forward more expeditiously. The bottom line is that the majority decision in this case could potentially undermine the NRC’s ability to promptly address critical safety vulnerabilities at U.S. plants that could well result in a Fukushima-scale disaster occurring here.

Ed Lyman, Union of Concerned Scientists http://allthingsnuclear.org/post/14624150915/nrcs-post-fukushima-response-going-in-circles

The NRC blocked implementation of its staff recommendations for safety improvements as indicated in Summary and excerpts from Congressman Makey’s report:

- Four NRC Commissioners attempted to delay and otherwise impede the creation of the NRC Near-Term Task Force on Fukushima;
- Four NRC Commissioners conspired, with each other and with senior NRC staff, to delay the release of and alter the NRC Near-Term Task Force report on Fukushima;
- The other NRC Commissioners attempted to slow down or otherwise impede the adoption of the safety recommendations made by the NRC Near-Term Task Force on Fukushima;
- NRC Chairman Greg Jaczko kept the other four NRC Commissioners fully informed regarding the Japanese emergency, despite claims to the contrary made by these Commissioners.

http://markey.house.gov/docs/regulatory_meltdown_12.09.11.pdf

The consideration of the Fukushima safety upgrades is not the only safety-related issue that the other NRC Commissioners have opposed. The Commissioners currently serving at the NRC regrettably have a history of voting against the safety recommendations put forward by technical experts, including its own advisory committees. Some of these votes have occurred since the March 11 earthquake and tsunami. What follows is a summary of these votes:

April 15, 2009: The Commission voted 4-188 (Chairman Jaczko disapproved, Commissioner Svinicki approved, and the other Commissioners who voted have since left the NRC) to support a proposal to enhance the security associated with cesium chloride sources rather than to phase out the most dispersible form of the material altogether as recommended by the National Academies of Science in 2008. Cesium chloride is so dangerous that after scavengers found a small amount in Brazil in 1987 and children and others spread it on their bodies, 250 people were contaminated, 20 became ill with symptoms of radiation poisoning and 4 died.

June 30, 2009: The Commission voted 2-289 (Chairman Jaczko approved, Commissioner

Svinicki disapproved, and the other Commissioners who voted have since left the NRC)) to defeat a staff proposal to expand the National Source Tracking System to include Category 3 radioactive sources, which the International Atomic Energy Agency says, if not safely managed or securely protected, could cause permanent injury to a person who handled them, or were otherwise in contact with them, for some hours.

June 1, 2010: The Commission voted 4-190 (with only Chairman Jaczko voting to disapprove) in support of a proposal to reduce the limitation on the number of work hours for employees who perform quality control and quality verification functions at nuclear power plants.

September 7, 2010: The Commission voted 4-191 (with only Chairman Jaczko voting to disapprove) to support a proposal to stop having separate votes on all requests to be exempted from the requirement that 'near-site emergency operations facilities' be located near to the site of where the actual nuclear reactor emergencies or accidents might occur. Licensees have instead proposed the creation of 'centralized emergency operations facilities' that are hundreds of miles away from the nuclear reactors located in multiple States they are intended to serve.

December 2, 2010: The Commission voted 4-192 (with only Chairman Jaczko voting to approve) to disapprove a proposal to require specific NRC licenses for radioactive materials that could be used to make a dirty bomb whose activity level is greater than 1/10th of "Category 3," even though a previous Commission had supported such a proposal. Requiring a license would have alleviated some concerns related to the potential for a terrorist to aggregate these smaller sources to create a larger improvised dirty bomb.

March 15, 2011: The Commission voted 4-193 (with only Chairman Jaczko voting to disapprove) to approve a staff proposal to ignore a recommendation by NRC's Advisory Committee on Reactor Safeguards to ensure that safety measures that are assumed to address the hotter reactor cores and higher pressures associated with 'power up-rates' (which enable nuclear reactors to produce more electricity) would work to prevent a melt-down in the event of an accident. The Advisory Committee believed that the possibility that a fire or earthquake could breach the containment of the nuclear reactor needed to be considered.

March 30, 2011: The Commission voted 4-194 (with only Chairman Jaczko voting to approve) to disapprove a staff proposal to add requirements for personnel seeking access to nuclear reactor construction sites to ensure that appropriate security screening was conducted. The Commission instead decided to rely on a voluntary Nuclear Energy Institute personnel security initiative.

November 8, 2011: The Commission voted 3-2 (with Chairman Jaczko and Commissioner Ostendorff voting to approve) to disapprove a staff proposal that the Commission adopt an amendment to its Reactor Oversight Process,95 described as "a means to collect information about licensee performance, assess the information for its safety significance, and provide for appropriate licensee and NRC response," to add a new performance measure related to leaks of radioactive materials from nuclear reactors.

http://www.nrc.gov/reactors/operating/oversight/rop-description.html

See also: http://allthingsnuclear.org/post/9622364770/nrcs-path-after-fukushima-still-lined-with-pitfalls

New York Times May 7, 2011

Nuclear Agency Is Criticized as Too Close to Its Industry

By TOM ZELLER Jr.

In the fall of 2007, workers at the Byron nuclear power plant in Illinois were using a wire brush to clean a badly corroded steel pipe — one in a series that circulate cooling water to essential emergency equipment — when something unexpected happened: the brush poked through. The resulting leak caused a 12-day shutdown of the two reactors for repairs.

The plant's owner, the Exelon Corporation, had long known that corrosion was thinning most of these pipes. But rather than fix them, it repeatedly lowered the minimum thickness it deemed

safe. By the time the pipe broke, Exelon had declared that pipe walls just three-hundredths of an inch thick — less than one-tenth the original minimum thickness — would be good enough. Though no radioactive material was released, safety experts say that if enough pipes had ruptured during a reactor accident, the result could easily have been a nuclear catastrophe at a plant just 100 miles west of Chicago.

Exelon's risky decisions occurred under the noses of on-site inspectors from the federal Nuclear Regulatory Commission. No documented inspection of the pipes was made by anyone from the N.R.C. for at least the eight years preceding the leak, and the agency also failed to notice that Exelon kept lowering the acceptable standard, according to a subsequent investigation by the commission's inspector general. Exelon's penalty? A reprimand for two low-level violations — a tepid response all too common at the N.R.C., said George A. Mulley Jr., a former investigator with the inspector general's office who led the Byron inquiry. "They always say, 'Oh, but nothing happened,' " Mr. Mulley said. "Well, sooner or later, our luck — you know, we're going to end up rolling craps."

Critics have long painted the commission as well-intentioned but weak and compliant, and incapable of keeping close tabs on an industry to which it remains closely tied. The concerns have greater urgency because of the crisis at the Fukushima Daiichi plant in Japan, which many experts say they believe was caused as much by lax government oversight as by a natural disaster.

The Byron pipe leak is just one recent example of the agency's shortcomings, critics say. It has also taken nearly 30 years for the commission to get effective fireproofing installed in plants after an accident in Alabama. The N.R.C.'s decision to back down in a standoff with the operator of an Ohio plant a decade ago meant that a potentially dangerous hole went undetected for months. And the number of civil penalties paid by licensees has plummeted nearly 80 percent since the late 1990s — a reflection, critics say, of the commission's inclination to avoid ruffling the feathers of the nuclear industry and its Washington lobbyists.

Although the agency says plants are operating more safely today than they were at the dawn of the nuclear industry, when shutdowns were common, safety experts, Congressional critics and even the agency's own internal monitors say the N.R.C. is prone to dither when companies complain that its proposed actions would cost time or money. The promise of lucrative industry work after officials leave the commission probably doesn't help, critics say, pointing to dozens over the years who have taken jobs with nuclear power companies and lobbying firms.

Now, as most of the country's 104 aging reactors are applying for, and receiving, 20-year extensions from the N.R.C on their original 40-year licenses, reform advocates say a thorough review of the system is urgently needed.

The agency's shortcomings are especially vexing because Congress created it in the mid-1970s to separate the government's roles as safety regulator and promoter of nuclear energy — an inherent conflict that dogged its predecessor, the Atomic Energy Commission.

"It wasn't much of a change," said Peter A. Bradford, a former N.R.C. commissioner who now teaches at Vermont Law School. "The N.R.C. inherited the regulatory staff and adopted the rules and regulations of the A.E.C. intact."

Mr. Bradford said the nuclear industry had implicitly or explicitly supported every nomination to the commission until Gregory B. Jaczko's in 2005. Mr. Jaczko, who was elevated to chairman by President Obama in 2009, had previously worked for both Representative Edward J. Markey, the Massachusetts Democrat and longtime critic of the nuclear industry, and Senator Harry Reid, the Nevada Democrat and current Senate majority leader who sought to block a nuclear waste repository in his state.

Mr. Jaczko acknowledges that the agency needs to move faster on some safety issues. But he defends its record. “I certainly feel very strongly that this is an independent regulator that will make what it thinks are the right decisions when it comes to safety,” he said. “There will be people who will agree, and some people who will disagree. That’s part of the process.”

For all the agency’s shortcomings as a regulator, even the most vocal critics acknowledge that it should not be compared to the Minerals Management Service, the scandal-plagued agency that oversaw the oil and gas industry and was reorganized by Mr. Obama after the BP oil spill last year. Still, David Lochbaum, a frequent critic of the N.R.C. who recently worked as a reactor technology instructor there, said the agency too often rolled the dice on safety. “The only difference between Byron and Fukushima is luck,” he said.

No Rejections

In recent years, the Vermont Yankee nuclear plant in Vernon, Vt., has had several serious operational problems. Situated on the banks of the Connecticut River, the 39-year-old Vermont Yankee, whose reactor is similar in design to the stricken plant in Japan, suffered the partial collapse of a cooling tower in 2007. In January 2010, the plant’s operator, Entergy, discovered that nearby soil and groundwater had been contaminated by radioactive tritium, which had apparently leaked from underground piping. Just months before, the company assured state lawmakers that no such piping existed at the plant. The Vermont Senate, concerned about the problems, voted overwhelmingly last year to prevent the plant from operating beyond the scheduled expiration of its license on March 21, 2012 — invoking a 2006 state law, unique to Vermont, that requires legislative approval for continued operations.

But one day before the quake and tsunami that set Japan’s crisis in motion, the N.R.C. approved Vermont Yankee’s bid for license renewal — just as it has for 62 other plants so far. Its fate is now the subject of a federal lawsuit. “How does a place like that get a license renewal?” Mr. Lochbaum said. “Because they asked for one. Absent dead bodies, nothing seems to deter the N.R.C. from sustaining reactor operation.”

Indeed, no renewal application has been turned down by the agency since the first one was granted in 2000, although some have been sent back for more work before winning approval.

It was not always so. When the industry first set out in the 1980s to prove that the original 40-year licenses on its aging plants could be safely renewed for 20 years, two plants — Yankee Rowe in Massachusetts and Monticello in Minnesota — were offered as test cases. The N.R.C.’s criteria for relicensing essentially required that operators prove that they were in compliance with their current license and that they had an adequate plan to manage the aging equipment for the extra 20 years. That tripped up Yankee Rowe’s bid, because inspectors looking at its current operations found serious flaws in its reactor vessel. Rather than earn a renewal, the plant shut down with eight years left on its original license.

The failure threw the industry into turmoil. In 1992, Northern States Public Power, owner of the Monticello plant, complained that the agency was examining details beyond those necessary for license renewal. With billions of dollars of revenue and investment at stake for each plant, the N.R.C. changed the rules in 1995, scrapping the requirement that operators prove they were complying with their current license. Instead, the renewal process would focus only on the aging management plan. The agency described the change as providing a “more stable and predictable regulatory process for license renewal.”

But James Riccio, a nuclear policy analyst with Greenpeace, said, “The N.R.C. rule change gutted a substantive process and replaced it with a rubber stamp. They placed industry profits ahead of public safety.”

To be sure, license renewal is still arduous. According to a 2007 audit by the inspector general’s

office, an operator typically spends two years and up to $20 million preparing an application, and the commission on average spends two years and $4 million reviewing it.

But the audit also concluded that it was often impossible to know whether the agency had truly conducted an independent review of an application or why approval was granted. In some cases, for example, long passages in the commission's assessment of a renewal appeared to have been simply copied and pasted directly from the application. And in a 2008 follow-up memo described to a reporter, the N.R.C.'s inspector general, Hubert T. Bell, went further, suggesting that the N.R.C. staff was unable to adequately document its reviews and may have destroyed essential records.

Asked about those issues, Mr. Jaczko said that the copying and repetition was intentional. "We want licensees to take those programs that we find are the best practices and use those," he said. "So in many cases, those were showing up in applications and the staff was then looking at those and saying yes, those were acceptable."

As for the lack of documentation backing up each decision, "not all of that information gets incorporated into a formal docket for license renewal," Mr. Jaczko said. "We did reconfirm that there had not been any information that had been missed or any information that would change any of the conclusions in the license renewal decisions."

Deference to Industry

The N.R.C.'s slowness in addressing serious problems is another concern. In 1975, a blaze at the Browns Ferry plant in Alabama crippled electrical wiring used to control critical cooling equipment in one of the reactor units. The incident set off alarm bells at the N.R.C., which issued new fire protection regulations in 1980. But over the next three decades, according to two internal agency investigations, the commission approved a succession of faulty or ineffective fire barrier materials. It then dragged its feet in the face of mounting evidence that the materials, even after being installed in dozens of plants, were failing to perform as advertised.

One of the earliest materials, Mr. Mulley said, was a product called Thermo-lag, which the commission approved based on what turned out to be fraudulent lab tests submitted by an obscure company. "No inspector ever bothered to check out the lab or to question the results," said Mr. Mulley, who investigated the case for the agency.

Last year, the N.R.C. issued a 355-page report in which it suggested that the fire barrier issue had been finally sorted out, even though most plants were technically still not complying with the regulations.

The agency has little choice but to tolerate violations, said Mr. Lochbaum, who heads the Nuclear Safety Project with the Union of Concerned Scientists, an environmental and nuclear watchdog group based in Cambridge, Mass. "Otherwise, nearly all the U.S. reactors would have to shut down," he said.

Asked about the fire barrier fiasco, Mr. Jaczko said he would like the agency to put safety rules into effect more quickly. "I've certainly been pushing for some time that we do these things in a more timely manner," he said. But the issues are complicated. "They involve very complex, technical findings, and then ultimately they involve complex plant modifications in some cases," he said.

Mr. Mulley suggested that the companies themselves played a role in delaying the rules. "There were good fire barrier materials on the market from 3M and other companies that people knew and trusted," he said. "But these plant operators kept complaining that they were too expensive. So some company that no one has ever heard of comes along, with tests from a lab that no one has ever heard of, for a material that's cheaper than anything else on the market, and the N.R.C. says, 'Perfect! Use this!' "

The agency's deferential attitude also brought the Davis-Besse plant in Ohio to the brink of the worst American nuclear accident since the Three Mile Island meltdown of 1979. On Aug. 3, 2001, armed with mounting evidence of potentially dangerous cracks and leaks in control nozzles that penetrate the vessel heads at most reactors, the commission asked 12 nuclear plants to conduct inspections. The inspections required a temporary but expensive shutdown, so regulators gave the plants until the end of the year to comply, and most did so. But FirstEnergy, owner of Davis-Besse, said it would look for the cracks during its next planned refueling shutdown — on March 22 the following year. In the test of wills that followed, the agency's inspector general later concluded, it was the N.R.C. that blinked, agreeing to allow FirstEnergy to operate until mid-February. On March 6, 2002, workers finally conducted the inspections and found that acid used in the cooling water had eaten almost completely through the lid of the reactor. The plant was closed for two years for emergency repairs, two FirstEnergy engineers were convicted of lying to investigators and the company paid more than $33.5 million in civil and criminal penalties. "They should have just shut them down," said Mr. Mulley, who investigated the case. "But the attitude at N.R.C. was always, 'You can't shut them down. They'll fight us in court.' "

The Byron case in Illinois, while not as dangerous as Davis-Besse, was similar in that it revealed the industry's predilection for deferring maintenance until more serious safety problems developed. Indeed, since the Three Mile Island accident, at least 38 nuclear power reactors have been forced to shut down for a year or more because of an accumulation of safety problems.

Marshall Murphy, an Exelon spokesman, said the company took "good learnings" from the Byron incident and improved its procedures. Eliot Brenner, an N.R.C. spokesman, said in an e-mail that the agency had also made several changes to its guidelines after the Byron case, including provisions that require inspectors to "tour areas that become accessible on an infrequent basis to assess the material condition and status of safety systems, structures, and components."

But Mr. Lochbaum said the slap on the wrist delivered to Exelon ensured that similar incidents would occur in the future. "There's no real regulatory discomfort imposed, so this sort of thing just continues," he said.

Agency's Gains

What frustrates some critics is that the N.R.C. has the expertise and resources — a staff of 4,000 and one of the highest densities of Ph.D.'s in government — to do a better job. Indeed, there are some examples of the commission making tough decisions.

In 2008, for example, workers at the Oconee plant in South Carolina discovered that a crucial line in the cooling system at Reactor Unit 1 was blocked by a broken gasket. The workers fixed it and the reactor was restarted. But the two N.R.C. inspectors assigned full time to Oconee quickly began asking why Duke Energy, the operator, wasn't also inspecting corresponding valves and lines at the plant's other two reactors. Duke said the clogging was isolated and a blocked line could be bypassed in a pinch. In February 2010, when the company finally agreed to look at the other two reactors, it discovered that the lines there had the same problem and that the bypass option would never have worked. The commission issued a "yellow finding" to Duke, its second-highest category of safety problem. The finding, which is rarely imposed, generally brings far more N.R.C. and media scrutiny, and can have financial implications for the company on Wall Street.

N.R.C. officials said that the current oversight system, begun in 2000 and refined since then, has improved safety by focusing on the reactor systems most prone to failure — and most likely to pose a safety risk. Fewer violations are issued, but when they are, the agency uses different colors — green, white, yellow and red — to signal the severity of the problem in a public way. "Bottom line is, we drive for long-term improvements in safety," Mr. Brenner said.

And by several measures, the N.R.C. notes, the nation's nuclear plants appear to be getting safer. Incidents of worker radiation exposure and safety system failures are at their lowest levels in

more than a decade. The number of “scrams” — which the N.R.C. defines as “the sudden shutting down of a nuclear reactor by rapid insertion of control rods, either automatically or manually by the reactor operator” — has been dropping as well.

Still, the nuclear industry is not shy about complaining, and if necessary, throwing around its weight with Congress, which approves the N.R.C.’s budget of roughly $1 billion a year. That was borne out in June 1998, when then-Senator Pete V. Domenici, a New Mexico Republican with strong ties to the nuclear industry and chairman of the subcommittee that funded the N.R.C., threatened to slash the agency’s budget.

Although the budget was not ultimately cut, Shirley Ann Jackson, then chairwoman of the commission, said in a speech to her staff that the industry had sent a clear message: “That we are inefficient, that we over-regulate, that we inspect too much, assess too much, enforce too much, take too long on licensing actions and employ an overly restrictive body of regulation.”

Industry Connections

As with many regulatory agencies, the movement from N.R.C. jobs to industry jobs — and sometimes vice versa — is a recurring issue. Many engineers and technicians, of course, join the agency directly out of school, work in the field and remain with the commission their entire careers. But for others, particularly officials at the highest levels, the commission can be a steppingstone to more lucrative work in the private sector. That was certainly the case for one commissioner, Jeffrey S. Merrifield. Shortly after Mr. Merrifield retired from the commission in 2007, Shaw, a nuclear services company, announced that he was taking a top executive position with the company. That stirred the suspicions of the Project on Government Oversight, a nonprofit watchdog group, which complained to the N.R.C.

Federal law prohibits government employees from taking part in matters that they know could financially benefit them or anyone with whom the employee is negotiating or seeking employment. But according to an inspector general’s report on the case, Mr. Merrifield sought employment with not just Shaw but also General Electric and Westinghouse, both nuclear reactor makers, while still voting on two issues that affected them.

The conflict-of-interest case — which also included an allegation that Mr. Merrifield failed to disclose, upon departing the government, that he accepted travel reimbursements of $3,552.47 during his job hunt — was referred by the N.R.C. to the Justice Department for possible civil action and to the United States attorney’s office in Maryland for potential criminal action. Both offices declined to pursue it. Mr. Mulley, who took part in the investigation, was outraged. “Even if the lawyers don’t want to go after him, the N.R.C. could make an example of him if they wanted to,” he said. “They could speak out in some way. But they don’t.”

In a statement last month, Mr. Merrifield said he told investigators and prosecutors that he did not believe, based on legal advice, that he had acted inappropriately, but that if he had been told a conflict existed, he would have recused himself. He added that when he was alerted to the disclosure oversight, he immediately filed the correct forms. “Though the antinuclear community continues to try to raise these concerns,” Mr. Merrifield said, “I firmly believe that throughout my time as an N.R.C. commissioner, I acted in a fair and impartial manner and in the best interest of public health and safety.”

Other commissioners have also had close ties to the industry. Environmental groups and industry monitors were angered, for example, when Mr. Obama nominated William D. Magwood, a former employee of Westinghouse Electric and more recently director of the Energy Department’s nuclear expansion program, to fill a vacant seat on the commission last year.

“Given his more than a dozen years promoting nuclear power, we do not believe Mr. Magwood has the independence from the nuclear power industry, nor the security oversight background, to

regulate it," said Danielle Brian, executive director of the Project on Government Oversight.

In a letter in March to the oversight project about the Merrifield case, Mr. Jaczko rejected the group's recommendation that job-seeking employees be required to recuse themselves in writing from matters affecting possible postcommission employers. "The failure of employees to disqualify themselves has not previously been an issue at the N.R.C., and absent evidence of a wider problem, the N.R.C. does not believe that additional reporting requirements are warranted," he wrote.

Marvin S. Fertel, the president and chief executive of the Nuclear Energy Institute, the main industry lobby, took issue with the notion that the N.R.C. was captive to business interests. "Is there too much coziness? No," Mr. Fertel said. "Do I think there's respect? Yes." That includes a willingness on the part of N.R.C. to consider the financial impact of its rules on operators, he said. Mr. Fertel said that as the N.R.C. has expanded to deal with the flood of relicensing applications, it has increasingly hired talent from within the industry. "It's only a problem if you think getting good expertise is a problem," he said.

But Mr. Mulley argued that the prospect of one day landing a lucrative position with a private company almost certainly played a role in softening the positions of some commission employees. "The N.R.C. is like a prep school for many of these guys, because they know they've got a good shot at landing much higher-paying work with the people they're supposed to be keeping in line," Mr. Mulley said. "They're not going to do anything to jeopardize that."

John M. Broder and Matthew L. Wald contributed reporting.

Bessie-Davis Reactor was allowed to operate in very serious unsafe condition and senior NRC managers stated they would do the same in future:
"...NRC senior managers rejected their own staff's recommendation and allowed Davis-Besse to continue operating into 2002. When the plant was finally shut down and the belated inspections finally performed, the situation was far worse than the NRC staff believed. The NRC later determined that Davis-Besse came closer to meltdown than any U.S. reactor since the Three Mile Island accident in March 1979.
In other words, hindsight showed the NRC staff to have been absolutely right.
When interviewed under oath by the NRC's Office of the Inspector General, the NRC senior managers who shelved their staff's shut down order defended that decision. Both stated that they would make the same decision again if confronted with the same facts. They insisted that "absolute proof" was required before they would order an operating reactor to be shut down for safety reasons."
http://allthingsnuclear.org/post/11986415149/ to-flee-or-not-to-flee-that-was-the-question

Inadequate seismic protection: NRC Commissioners voted to delay safety improvements after Fukushima.
".... the August 23 earthquake in Mineral, Virginia should be a further call to action for NRC. That magnitude 5.8 earthquake caused ground motion that exceeded the "design basis" at the nearby North Anna nuclear plant, even though Dominion, the plant operator, originally had said the plant was designed to withstand an earthquake of magnitude 5.9-6.2.
This event highlights the knowledge gaps in seismic protection at US nuclear plants and supports the Task Force's recommendation that the NRC should "order licensees to reevaluate the seismic and flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs [structures, systems, and components] important to safety to protect against the updated hazards."
http://allthingsnuclear.org/post/9622364770/nrcs-path-after-fukushima-still-lined-with-pitfalls

Vulnerabilities to Reactor Operation that weren't or can't be designed out: See Fission Stories at http://allthingsnuclear.org/tagged/fission-stories

Reactor near misses due to impaired safety equipment or poor worker performance leading toward catastrophic outcomes in 2010: for description of each situation go to http://www.ucsusa.org/assets/documents/nuclear_power/nrc-2010-full-report.pdf

Nuclear One, Russel, AR owner: Entergy
Briarwood, Joliet, IL owner: Exelon
Brunswick, Southport, NC owner: Progress Energy
Calvert Cliffs, Annapolis, MD owner: Constellation Energy
Catawba, Rock Hill, SC owner: Duke Energy
Crystal River 3, Crystal River, FL owner: Progress Energy
Bessie-Davis, Toledo, OH owner: First Energy
Diablo Canyon, San Louis Obispo, CA owner: Pacific Gas & Electric
Farley, Dothan, AL owner: Southern Nuclear
Fort Calhoun, Omaha, NE owner: Omaha Public Power District
HB Robinson, Florence, SC owner: Progress Energy
HB Robinson, Florence, SC owner: Progress Energy
Surry, Newport News, VA owner: Dominion Generation
Wolf Creek, Burlington, KS owner: Wolf Creek Nuclear

Public vulnerability and risk from reactors is exposed in recommendations for improved reactor safety from the Union of Concerned Scientists.
Preventing and Mitigating the Effects of Severe Accidents:
Extend the scope of regulations to include the prevention and mitigation of severe accidents.
Require reactor owners to develop and test emergency procedures for situations when no AC or DC power is available for an extended period.
Modify emergency planning requirements to ensure that everyone at significant risk from a severe accident--not just the people within the arbitrary 10-mile planning zone--is protected.

Improving the Safety and Security of Spent Fuel:
The NRC should require plant owners to move spent fuel at reactor sites from storage pools to dry casks when it has cooled enough to do so.
The NRC should require reactor owners to improve the security of existing dry cask storage facilities.
The NRC should require plant owners to significantly improve emergency procedures and operator training for spent fuel pool accidents

Making Existing Reactors Safer:
The NRC should enforce its fire protection regulations and compel the owners of more than three dozen reactors to comply with regulations they currently violate.
The NRC should establish timeliness goals for resolving safety issues while continuing to meet its timeliness goals for business-related requests from reactor owners.
The NRC should treat generic and unique safety issues alike. Until a generic issue is resolved, the NRC should account for it as a potential risk factor in its safety analyses and decision making related to all affected reactors.
The NRC should require plant owners to use multiple inspection techniques to ensure detection of any degradation in aging, high-risk equipment.
The NRC should require plant owners to periodically inspect equipment outside the scope of normal inspections, both to determine whether that scope is appropriate and to detect problems before safety margins are compromised.
The NRC should revise its regulations for the licensing of "high burn-up" fuel to ensure public safety, and restrict how this fuel is used until the revisions are complete.
The U.S. government should prohibit the use of plutonium-bearing mixed-oxide (MOX) fuel in reactors, and end the program to produce MOX fuel from excess weapons plutonium.

Ensuring the Continued Safety of Reactors with Renewed Licenses:

Before granting a license renewal, the NRC should review all differences between current regulations and any past decisions specific to the aging reactor, to confirm that these differences will not compromise public safety going forward.

Making Existing Reactors More Secure against Terrorist Attacks:
The NRC should revise its assumptions about terrorists' capabilities to ensure nuclear plants are adequately protected against credible threats, and these assumptions should be reviewed by U.S. intelligence agencies.
The NRC should modify the way it judges force-on-force security exercises by assessing a plant's "margin to failure," rather than whether the plant merely passes or fails.
The U.S. government should establish a program for licensing private security guards that would require successful completion of a federally supervised training course and periodic recertification.

Making New Reactors More Secure against Terrrorist Attacks:
The NRC should require new reactor designs to be safer than existing reactors.
The NRC should require new reactor designs to be more secure against land- and water-based terrorist attacks.

Improving the NRC's Cost-Benefit and Risk-Informed Analyses:
The NRC should increase the value it assigns to a human life in its cost-benefit analyses so the value is consistent with other government agencies.
The NRC should require plant owners to calculcate the risk of fuel damage in spent fuel pools as well as reactor cores in all safety analyses.
The NRC should not make decisions about reactor safety using probabilistic risk assessments (PRAs) until it has corrected its flawed application of this tool.

Ensuring Public Participation:
The NRC should fully restore the public's right to obtain information and question witnesses in hearings about changes to existing power plant licenses and applications for new licenses.
http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/ucs-nuclear-safety-recommendations.html

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We do not want Fermi 3.
In fact, reactors cannot be made safe. Reactor failure cannot be designed out. Worker infallibility can not be achieved. Aging degradation of reactors cannot be adequately tracked and proactively repaired. Reactor explosions will happen; that's a fact of life. The biosphere and the human gene pool is degraded and that will continue to increase. Reactor owners and the NRC cannot be trusted to honor licensing obligations. Stop public financing of all kinds and reactors will not be built or relicensed. Greed, with access to the public tax dollars and higher utility rates, drives reactors.

Sincerely,

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