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Technical Basis for Regulatory Guidance on the Alternate PTS Rule

RECEIVED

Comment On: NRC-2014-0137-0001

Draft Guidance Regarding the Alternate Pressurized Thermal Shock Rule

Document: NRC-2014-0137-DRAFT-0014

Comment on FR Doc # 2015-05754

3/13/2015
80 FR 13449

Submitter Information

15

Name: Kevin Kamps

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Beyond Nuclear

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Email: kevin@beyondnuclear.org

General Comment

Dear NRC,

Please see the attached files:

1. August 8, 2005: REQUEST FOR HEARING AND PETITION TO INTERVENE, submitted to the U.S. NRC ASLB, by attorney Terry Lodge, on behalf of Don't Waste Michigan and NIRS, in opposition to Palisades' 20-year license extension (specifically, the first contention, beginning on page 4, regarding "The license renewal application is untimely and incomplete for failure to address the continuing crisis of embrittlement").
2. September 16, 2005: PETITIONERS COMBINED REPLY TO NRC STAFF AND NUCLEAR MANAGEMENT COMPANY ANSWERS, submitted to the U.S. NRC ASLB, by attorney Terry Lodge, on behalf of Don't Waste Michigan and NIRS, in opposition to Palisades' 20-year license extension (pages 2 to 23 are regarding Contention 1, The license renewal application is untimely and incomplete for failure to address the continuing crisis of embrittlement).
3. Petitioners' Appendix of Evidence (129 pages), which accompanied its September 16, 2005 Reply.
4. November 3, 2005: Transcript of oral argument pre-hearing before the NRC ASLB, re: 20-year license extension for Palisades. The hearing was held in South Haven, Michigan. (See, specifically, the portions

SUNSI Review Complete
Template = ADM-013

E-REDS = ADM-03
Add = E. Stevens (GL54) - m. Kirk (mstK)
S. Burton (Sxb3)

pertaining to PTS risks, including pages 34-80 (pages 17-63 of 206 on PDF counter), and following, as articulated by attorney Terry Lodge on behalf of intervening groups NIRS and Don't Waste MI.)

Please accept the numerous challenges and criticisms contained within these documents, in the current context of Entergy Nuclear's July 2014 License Amendment Request for 10CFR50.61a regulatory relief, as public comments in your DG-1299 and NUREG-2163 proceeding. At the time, in 2005, 10CFR50.61 was the ruling regulatory regime. The concerns raised by attorney Terry Lodge on behalf of intervening groups NIRS and Don't Waste MI at the time, are all the more poignant now, that an even less conservative alternate fracture toughness rule (10CFR50.61a) is the context for this proceeding on DG-1299 and NUREG-2163.

Thank you for considering our public comments.

Sincerely,

Kevin Kamps, Beyond Nuclear (and Don't Waste Michigan, board member representing the Kalamazoo Chapter)

Attachments

Sept 2005 Combined Reply Appendix

8 8 2005 petition

9 16 2005 Combined Reply

11 3 2005 transcript

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

September 22, 2005 (3:47pm)

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

In the Matter of)
NUCLEAR MANAGEMENT)
COMPANY, LLC)
(Palisades Nuclear Plant))

Docket No. 50-255-LR
ASLBP No. 05-842-03-LR

CERTIFICATE OF SERVICE

I hereby certify that copies of the "PETITIONERS' Appendix of Evidence In Support of Contentions" in the above-captioned proceeding have been served with copies by U.S. First Class mail this 16th day of September, 2005:

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ATTN: Docketing and Service
Mail Stop: O-16C1
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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/s/ Terry J. Lodge / PG
Terry J. Lodge

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

January 27, 1970

Honorable Glenn T. Seaborg
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON PALISADES PLANT

Dear Dr. Seaborg:

At a Special Meeting, January 23-24, 1970, the Advisory Committee on Reactor Safeguards completed its review of the application by Consumers Power Company for authorization to operate the Palisades Plant at power levels up to 2200 MWt. This project was also considered at the 113th ACRS meeting, September 4-6, 1969, the 115th ACRS meeting, November 6-8, 1969, and the 116th ACRS meeting, December 11-13, 1969. Subcommittee meetings were held on July 31, 1969, at the site, and on October 29, 1969, December 3, 1969, and January 22, 1970, in Washington, D. C. During its review, the Committee had the benefit of discussions with representatives of Consumers Power Company, Combustion Engineering, Inc., Bechtel Corporation, the AEC Regulatory Staff, and their consultants. The Committee also had the benefit of the documents listed. The Committee reported to you on the construction of this plant in its letter dated January 18, 1967.

The site for the Palisades Plant consists of 487 acres on the eastern shore of Lake Michigan in Covert Township, approximately four and one-half miles south of South Haven, Michigan. The minimum exclusion radius for the site is 2300 feet and the nearest population center of more than 25,000 residents consists of the cities of Benton Harbor and St. Joseph, Michigan, which are approximately 16 miles south of the site.

The nuclear steam supply system for the Palisades Plant is the first of the Combustion Engineering line currently licensed for construction. A feature of the Palisades reactor is the omission of the thermal shield. Studies were made by the applicant to show that omission of the shield would not adversely affect the flow characteristics within the reactor vessel or alter the thermal stresses in the walls of the vessel in a manner detrimental to safe operation of the plant. Surveillance specimens in the vessel will be used to monitor the radiation damage during the life of the plant. If these specimens reveal changes that affect the safety of the plant, the reactor vessel will be annealed to reduce

radiation damage effects. The results of annealing will be confirmed by tests on additional surveillance specimens provided for this purpose. Prior to accumulation of a peak fluence of 10^{19} nvt (> 1 Mev) on the reactor vessel wall, the Regulatory Staff should reevaluate the continued suitability of the currently proposed startup, cooldown, and operating conditions.

The secondary containment is a reinforced concrete structure consisting of a cylindrical portion prestressed in both the vertical and circumferential directions, a dome roof prestressed in three directions, and a flat non-prestressed base. Before operation, it will be pressurized and extensive measurements will be made of gross deformations and of strains in the linear, reinforcement, and concrete, and the pattern and size of cracks in the concrete will be observed and measured. The applicant has proposed suitable acceptance criteria for the pressure test, and the ACRS recommends that the Regulatory Staff review and assess the results of this test prior to operation at significant power.

The prestressing tendons in the containment consist of ninety, one-quarter-inch diameter wires. They are not grouted or bonded, and are protected from corrosion by grease pumped into the tendon sheaths. The applicant has proposed that selected tendons be inspected periodically for broken wires, loss of prestress, and corrosion. If degradation is detected, the inspection can be extended to the remaining tendons, all of which are accessible. The applicant is performing studies to determine the appropriate number and interval for tendon inspection. This matter should be resolved in a manner satisfactory to the Regulatory Staff.

The core is calculated to have a slightly negative moderator coefficient at full power operation at beginning-of-life, but uncertainties in the calculations are such that the existence of a positive moderator coefficient cannot be precluded. The applicant has stated that the moderator coefficient will not exceed $+0.5 \times 10^{-4} \Delta k/k/^{\circ}F$ at beginning-of-life, computed from start-up test data on a conservative basis. The applicant also plans to perform tests to verify that divergent azimuthal xenon oscillations cannot occur in this reactor. The Committee recommends that the Regulatory Staff follow the measurements and analyses required to establish the value of the moderator coefficient.

The meteorological observation program conducted at the site subsequent to the Committee's report to you on January 18, 1967, indicated the need for the addition of iodine removal equipment to the containment for use in the unlikely event of a loss-of-coolant accident. The applicant proposed to install means for adding sodium hydroxide to the water in the containment spray system. However, because of uncertainties regarding the generation of hydrogen and the effects of other materials resulting

from the reaction of this alkaline solution with the relatively large amounts of aluminum in the containment, this spray additive will not be used unless it can be shown by further studies that the use of sodium hydroxide is clearly acceptable. In addition, the applicant will carry out studies of iodine removal by borated water sprays without sodium hydroxide. If the results of these studies are not acceptable, a different iodine removal system satisfactory to the Regulatory Staff will be installed at the first refueling outage. A report on the applicant's plans will be submitted to the AEC within six months following issuance of a provisional operation license. The Committee believes that this procedure is satisfactory for operation at power levels not exceeding 2200 MWt.

The applicant has stated that if fewer than four primary coolant pumps are operating, the reactor overpower trip settings will be reduced such that the safety of the reactor is assured in the absence of automatic changes in the thermal margin trip settings.

The Committee believes that, for transients having a high probability of occurrence, and for which action of a protective system or other engineered safety feature is vital to the public health and safety, an exceedingly high probability of successful action is needed. Common failure modes must be considered in ascertaining an acceptable level of protection. Studies are to be made on further means of preventing common failure modes from negating scram action, and of design features to make tolerable the consequences of failure to scram during anticipated transients. The applicant should consider the results of such studies and incorporate appropriate provisions in the Palisades Plant.

The Committee recommends that attention be given to the long-term ability of vital components, such as electrical equipment and cables, to withstand the environment of the containment in the unlikely event of a loss-of-coolant accident. This matter is applicable to all large, water-cooled power reactors.

Continuing research and engineering studies are expected to lead to enhancement of the safety of water-cooled reactors in other areas than those mentioned: for example, by determination of the extent of the generation of hydrogen by radiolysis and from other sources, and development of means to control the concentration of hydrogen in the containment, in the unlikely event of a loss-of-coolant accident; by development of instrumentation for inservice monitoring of the pressure vessel and other parts of the primary system for vibration and detection of loose parts in the system; and by evaluation of the consequences of water contamination by structural materials and coatings in a loss-of-coolant accident. As solutions to these problems develop and are evaluated

Honorable Glenn T. Seaborg

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January 27, 1970

by the Regulatory Staff, appropriate action should be taken by the applicant on a reasonable time scale.

The Advisory Committee on Reactor Safeguards believes that, if due regard is given to the items mentioned above, and subject to satisfactory completion of construction and pre-operational testing, there is reasonable assurance that the Palisades Plant can be operated at power levels up to 2200 MWt without undue risk to the health and safety of the public.

Sincerely yours,

/s/ Joseph M. Hendrie

Joseph M. Hendrie
Chairman

References:

1. Final Safety Analysis Report for the Palisades Plant
2. Amendments No. 9-19 to license application

NRC STAFF PRESENTATION

TO THE

ACRS

SUBJECT: PALISADES PRESSURED THERMAL SHOCK

DATE: DECEMBER 9, 1994

**PRESENTER: BARRY J. ELLIOT
SENIOR MATERIALS ENGINEER
MATERIALS AND CHEMICAL ENGINEERING
BRANCH
DIVISION OF ENGINEERING
OFFICE OF NUCLEAR REACTOR REGULATION
(301) 504-2709**

10 CFR 50.61 RT_{PTS} EVALUATION

RT_{PTS} SCREENING CRITERIA PER 10 CFR 50.61

-270 °F FOR AXIAL WELDS AND PLATES

-300 °F FOR CIRCUMFERENTIAL WELDS

$$RT_{PTS} \text{ VALUE} = I + M + \Delta RT_{PTS}$$

I = INITIAL REFERENCE TEMPERATURE (RT_{NDT}) OF THE UNIRRADIATED MATERIAL.

-MEASURED VALUES MUST BE USED IF AVAILABLE.

-IF GENERIC VALUE NOT AVAILABLE, GENERIC MEAN VALUES MUST BE USED

M = MARGIN TO COVER UNCERTAINTIES IN THE VALUES OF INITIAL RT_{NDT}, COPPER AND NICKEL CONTENTS, FLUENCE AND THE CALCULATION PROCEDURES.

ΔRT_{PTS} = MEAN VALUE OF THE ADJUSTMENT IN REFERENCE TEMPERATURE CAUSED BY IRRADIATION AND IS A FUNCTION OF NEUTRON FLUENCE, PERCENT COPPER AND PERCENT NICKEL

-CALCULATED USING SURVEILLANCE DATA

-IF SURVEILLANCE DATA IS UNAVAILABLE, THE ADJUSTMENT IN REFERENCE TEMPERATURE MAY BE CALCULATED FROM TABLES USING THE BEST-ESTIMATE PERCENT COPPER AND NICKEL

PALISADES PTS

SINCE THE SURVEILLANCE WELD MATERIAL IN PALISADES IS NOT THE SAME AS THE BELTLINE WELDS, THE LICENSEE MUST DETERMINE THE EFFECT OF RADIATION USING NUCLEAR INDUSTRY DATA

THE STAFF MET WITH THE LICENSEE ON MARCH 9, 1994 TO DISCUSS THE LICENSEES PROGRAM FOR FURTHER EVALUATION OF THE CRITICAL WELDS IN THEIR RPV

THE LICENSEE PLANNED TO:

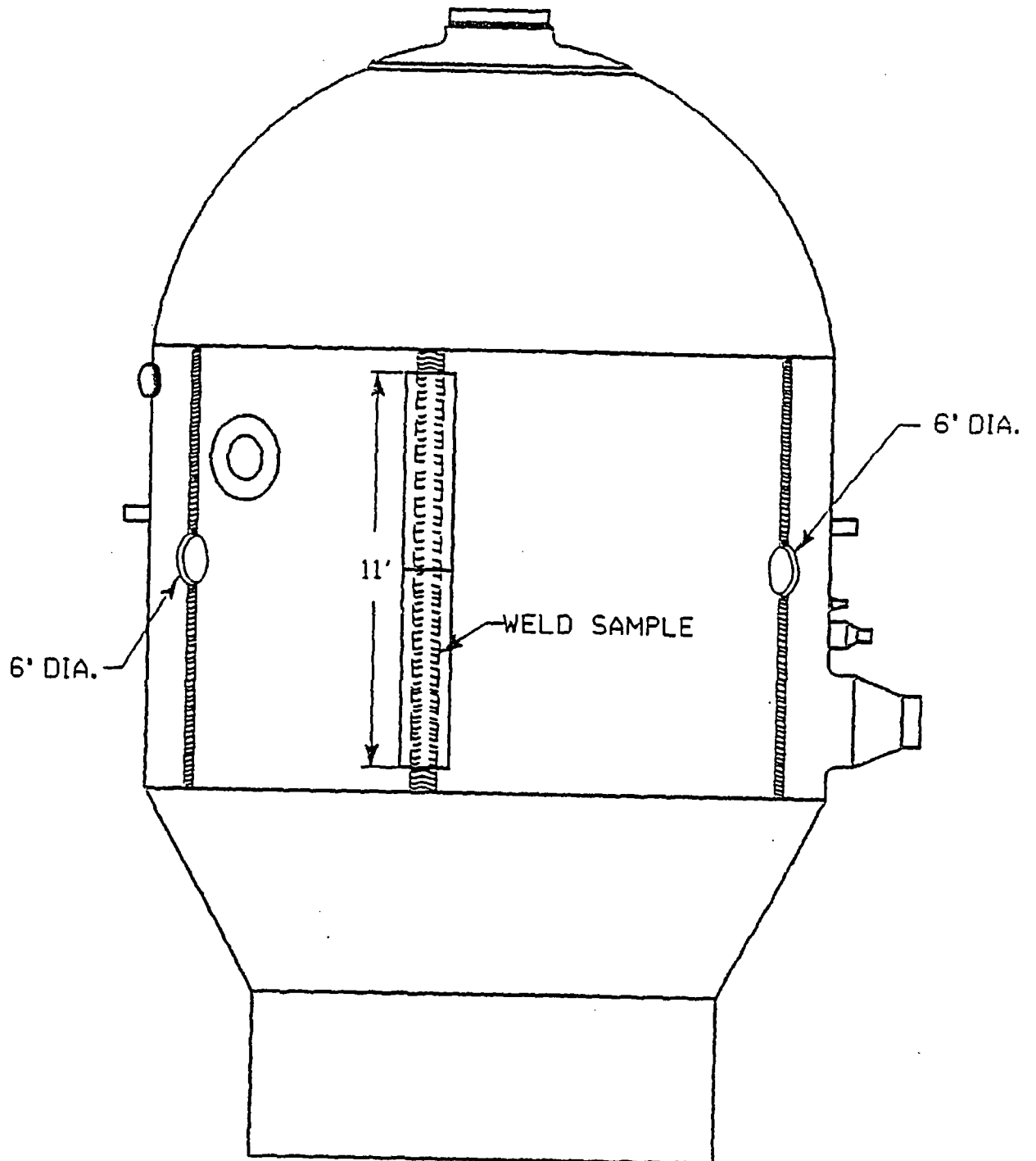
- GATHER ADDITIONAL MATERIALS PROPERTIES DATA FROM ITS RETIRED STEAM GENERATORS (WELDS FABRICATED USING W5214 AND 34B009 WELD WIRE)

- INSTITUTE AN AUGMENTED SURVEILLANCE PROGRAM THAT WOULD CONTAIN THE LIMITING WELD METAL

- EVALUATE ANNEALING OF THE REACTOR VESSEL

- CONSIDER INSTITUTING AN "ULTRA LOW" LEAKAGE FUEL STRATEGY

SGA W5214/SG6 34B009



PALISADES PTS cont.

STAFF ISSUED AN INTERIM SER ON JULY 12, 1994 AND ISSUED A COMMISSION PAPER AND NUREG REPORT ON RPVs ON OCTOBER 28, 1994. THESE DOCUMENTS STATED:

-BASED ON PREVIOUS NUCLEAR INDUSTRY DATA THE PALISADES REACTOR VESSEL WAS PROJECTED TO REACH THE PTS SCREENING CRITERIA IN 2004, PRIOR TO EOL, 2007

-STAFF SER NOTED THAT THE PTS EVALUATION COULD CHANGE BASED ON THE INFORMATION TO BE ACQUIRED FROM THE SG WELDS

ON NOVEMBER 1 THE LICENSEE INFORMED THE STAFF BY TELEPHONE THAT THE CHEMISTRY DATA FROM THE W5214 WELDS INDICATED HIGHER COPPER CONTENTS THAN PREVIOUSLY ASSUMED.

-EVALUATION OF THE STEAM GENERATOR WELD MATERIAL ALSO INDICATED A HIGHER INITIAL RT_{NDT} VALUE THAN THE MEAN GENERIC VALUE.

ON NOVEMBER 18 THE LICENSEE SUBMITTED THEIR ASSESSMENT OF THE IMPACT OF THESE NEW DATA ON THE RT_{PTS} VALUE. THIS ASSESSMENT INDICATES THAT PALISADES REACTOR VESSEL WOULD REACH THE PTS SCREENING CRITERIA IN 1999

STAFF MET WITH THE LICENSEE ON NOVEMBER 21, 1994 TO DISCUSS THE NEW INFORMATION.

STAFF REQUEST FOR ADDITIONAL INFORMATION SENT TO LICENSEE ON NOVEMBER 30, 1994.

STAFF EVALUATION IS SCHEDULED TO BE COMPLETED BY JANUARY 31, 1995.

PALISADES PTS cont.

THE STAFF IS CURRENTLY REVIEWING THE LICENSEE'S
NOVEMBER 18 SUBMITTAL.

CRITICAL AREA BEING ASSESSED INCLUDE:

-EFFECT OF THERMAL AGING, HEAT TREATMENT AND TEST
METHOD ON UNIRRADIATED REFERENCE TEMPERATURE

-BEST ESTIMATE CHEMICAL COMPOSITION FROM STEAM
GENERATOR AND NUCLEAR INDUSTRY DATA

DEPENDING UPON HOW THE NEW DATA ARE USED IN THE
ANALYSIS THE PTS SCREENING LIMIT COULD BE REACHED
BEFORE 1999

STAFF WILL RECEIVE TECHNICAL ASSISTANCE FROM RES
CONTRACTOR, ORNL

GENERIC IMPLICATIONS OF NEW DATA

**REVIEW OF OTHER RPVs WITH PALISADES WELD MATERIAL
(i.e. W5214 or 34B009 WELD METAL)**

**-OTHER PLANTS STILL SATISFY PTS SCREENING CRITERIA
AND UPPER SHELF ENERGY CRITERIA**

-LOWER FLUENCE OR USE OF ACTUAL SURVEILLANCE DATA

**OTHER PLANTS THAT ARE PROJECTED TO BE NEAR THE PTS
SCREENING CRITERIA BEFORE END-OF-LIFE ARE BEING ASSESSED**

-SENSITIVITIES BEING STUDIED

-PROACTIVE MEASURES MAY BE APPROPRIATE

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FINANCIAL DESK

Cheap and Abundant Power May Shutter Some Reactors

By MATTHEW L. WALD (NYT) 1518 words

Published: April 14, 1992

Nuclear plants that provide 10 percent of the nation's nuclear power may be closed this decade because their operating costs are too high to compete against a rising tide of cheap surplus electricity, experts say.

More than 100 plants under construction were abandoned in the 1970's and 80's because of their cost. But the idea that an operating nuclear plant is not competitive with other sources of electricity violates the fundamental logic of nuclear power, which is that plants may be expensive to build but are cheap to run.

"It used to be that everyone said, once you built it, there wasn't any question that costs were lower," said Victor Gilinsky, an energy consultant and former member of the Nuclear Regulatory Commission. "Now they are more expensive to run than other plants." Aging Steam Generators

In the next few years, at least 10 utilities will need to replace steam generators, which are giant heat exchangers that have shown a tendency to rust and crack, said Gary R. Doughty, an expert on plant life extension with the Nielsen Wurster Group, a consulting firm in Hartford. The job generally runs about \$150 million for each reactor.

Other utilities face questions about the condition of their reactor vessels, the great steel pots that hold the fuel. Years of bombardment by neutrons, the subatomic particles that sustain a chain reaction, are known to make metal more brittle, but the extent of the problem is not clear.

Some utilities that operate a single reactor may be tempted to pull the plug, he said, because that would allow elimination of an entire division.

In Rowe, Mass., the owners of the 32-year-old Yankee Rowe reactor decided in February that the plant was too small and too old to justify the investment needed to keep it in service, given the general power surplus in its region. Southern California Edison reached a similar judgment recently about its 24-year-old San Onofre 1 plant near San Clemente, although the plant has not yet been shut. And last year the Sacramento Municipal Utility District decided to shut the Rancho Seco plant as uneconomic at the age of 15. Others around the country were retired in earlier years, some at even younger ages.

With only a handful of additional plants likely to be finished and no new ones on order, the result could be an accelerated march to the extinction of nuclear power in the United States. Currently, 108 are

operating, producing about 20 percent of the nation's electricity. Some of those, however, are doing very well; in 1991, 25 plants set records for themselves in the number of kilowatt-hours produced.

John F. Ahearne, a former member of the Nuclear Regulatory Commission and now the director of Sigma Xi, the Scientific Research Society, said that plants that were not economic were more likely to be shut now than they would have been a few years ago. In the last 10 years, he said, the utilities have come to be dominated by business managers, replacing what he called "technologists," or "people who were committed to nuclear power because they thought it was just a good thing for this country." The Bottom Line

In the view of the business managers, he said, "the role of a utility is to make money." They are the people who canceled over-budget reactor construction projects in the 1980's, he said, and they are willing to shut plants now if there are cheaper alternatives.

The price of oil, which is currently low, plays a small role in keeping the electricity market highly competitive, especially in places like New York, which uses oil for about 20 percent of electricity generation. But nationally, electricity made from oil is less than 5 percent of total generation.

Natural gas plays a far larger role, because it represents about 10 percent of the utilities' fuel use nationally, and about half the generators recently completed or under construction use natural gas. On the basis of energy content, natural gas prices have been substantially below oil prices recently.

In addition, overall demand for power has been driven down by recession and by conservation measures, with utilities often subsidizing customers' installation of light bulbs, motors and other devices that will do the same work with less power. Price May Rise

Some experts believe that as the economy turns around, the demand for power will rise and hence its price. In addition, requirements of the new Clean Air Act will raise the cost of coal-fired power, and if the United States institutes a carbon tax in the next few years to stave off global warming, that would make nuclear power more competitive, too.

Experts are not sure how many nuclear plants will shut in this decade. The chairman of the Nuclear Regulatory Commission, Ivan Selin, said in a telephone interview that three or four were vulnerable soon. Mr. Ahearne said it could be 10 by the end of the decade.

Mr. Selin said it was unlikely that any utility would decide to close a plant that was running smoothly and was not in immediate need of any big investment. But if a plant required a large investment, he said, "that could push it over the brink." In that category he put the Consumers Power Company's Palisades plant, near South Haven, Mich., which opened in 1971, where the pressure vessel may now be brittle, the same weakness that was suspected at Yankee Rowe; Consumers Power's Big Rock Point plant, in Charlevoix, Mich., opened in 1965, which has no known significant flaws but is by far the smallest still operating, and Rochester Gas and Electric's Robert E. Ginna plant, near Rochester, which opened in 1970 and faces the expensive replacement of its steam generators.

All those plants are old and fairly small. Mr. Selin said it was far from clear whether the problem would extend into the large plants that entered service in the mid-1970's. But it might, he said in a telephone interview.

"There are two ways of looking at it," Mr. Selin said. "You can say each is different, and there is no trend, or you can say there's an underlying trend here. The financial people are beginning to worry

about an underlying trend."

In fact, Lehman Brothers organized a conference for utility investors last month on the question of whether old plants were still economic. It drew two dozen investment managers.

The Utility Data Institute, a firm in Washington that charts operating costs, reported recently that in 1990 fuel, operating and maintenance expenses at nuclear plants came to \$21.89 for one thousand kilowatt-hours produced, about as much electricity as a typical household uses in two months. At a coal plant, the fuel, operating and maintenance cost for the same amount of energy was \$20.24. The coal cost was up slightly in 1990 and the nuclear cost down compared with 1989, but nuclear has exceeded coal for the last several years.

Those figures are an average for all nuclear plants, meaning that some are significantly higher.
Relicensing a Question

The old reactors have a variety of factors working against them.

Mr. Doughty of Nielsen Wurster pointed out that a plant that was nearing the expiration of its 40-year operating license and needed major investments would have to face the economics of amortizing the expenses over the few remaining years of operation. The Nuclear Regulatory Commission has established a policy for granting license extensions, but no plant has yet applied and no one is sure how easy it will be to get one.

Carl A. Goldstein, a spokesman for the U.S. Council for Energy Awareness, the nuclear industry's public relations arm, said that more plants would probably be found to be uneconomic, but that the point at which a plant should be written off could not be defined until the Nuclear Regulatory Commission made clearer what would be required for a plant to be re-licensed. And nuclear economics could improve, he said, because plant operating and maintenance expenses could decline.

Mr. Doughty said that investing new money still made good sense for most plants, but that he feared that reactors with 6,000 megawatts of capacity, or about 6 percent of the nation's total nuclear capacity, would shut in the next few years. Reason to Stay Open

How much is ultimately closed may depend on how state rate regulators handle the costs, said Peter Bradford, the chairman of the Public Service Commission in New York and also a former member of the Nuclear Regulatory Commission. Mr. Bradford, a speaker at the Lehman Brothers session, said a utility with a large investment in a reactor might seek to keep it running so it could continue to collect depreciation, even if cheaper power were available elsewhere.

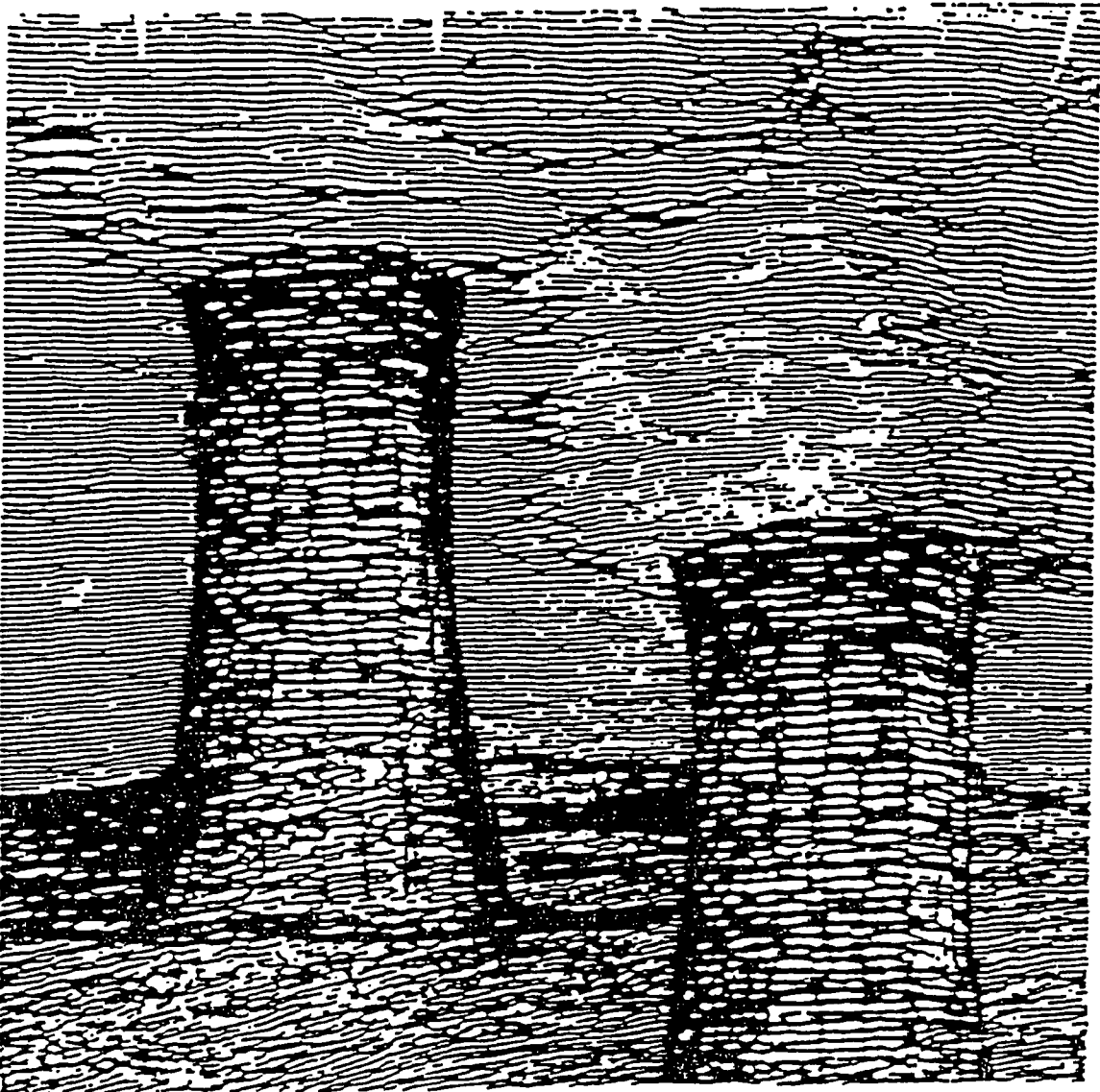
That, he said, would create a conflict between the interest of customers, who would want the plant closed, and the interest of the utility, which would want to let it run. The solution, he said, would be to allow utilities to write off plants that had become economically obsolete, and collect the investment from customers.

"Otherwise, the utility doesn't have the incentive to make the right decision," he said.

Photo: Utilities may be tempted to pull the plug on existing nuclear plants as they become too expensive to operate. Owners of the 32-year-old Yankee Rowe reactor in Rowe, Mass., closed it in February because the plant was too small and too old to justify the investment needed to keep it in service. (Associated Press) (pg. D25) Table: "Nuclear Plant Retirements" Plant, location Years in operation

Size, in megawatts San Onofre 1, San Clemente, Calif. 1968-1992 or 1993 436 Yankee Rowe, Rowe, Mass. 1961-1991 175 Rancho Seco, Sacramento, Calif. 1975-1989 918 Fort St. Vrain, Platteville, Colo. 1979-1989 330 La Crosse, Genoa, Wis. 1969-1988 50 Dresden 1, Morris, Ill. 1959-1978 207 Humboldt Bay, Eureka, Calif. 1962-1976 65 Shippingport, Shippingport, Pa. 1957-1982 60 Indian Point 1, Buchanan, N.Y. 1962-1980 265 Peach Bottom 1, Peach Bottom, Pa. 1966-1974 40 Fermi 1, Newport, Mich. 1963-1972 61 Elk River, Elk River, Minn. 1962-1968 22 CVTR, Puerto Rico 1962-1967 17 Pathfinder, Sioux Falls, S.D. 1964-1967 59 Piqua, Piqua, Ohio 1962-1967 59 Hallam, Hallam, Neb. 1962-1964 75 Graph: "At What Cost" shows average cost, in cents per kilowatt hour, for fuel, operation and maintenance of nuclear power plants, 1982-1990. The cost at the most economical nuclear plant was 1.21 cents per kilowatt-hour in 1990. The highest cost was more than 5 cents. (Source: Utility Data Institute) (pg. D25)

The Aging of Nuclear Power Plants: A Citizen's Guide to Causes and Effects



Nuclear Information and Resource Service

The Aging of Nuclear Power Plants: A Citizen's Guide to Causes and Effects

**by James Riccio
and
Stephanie Murphy**

**Copyright 1988 by
Nuclear Information and Resource Service
1424 16th Street NW, Suite 601, Washington, DC 20036
(202) 328-0002**

IV. Embrittlement of Reactor Pressure Vessels and Reactor Pressure Vessel Supports in Pressurized Water Reactors

Irradiation embrittlement of the reactor pressure vessels (RPVs) may be the single most important factor in determining the operating life of a PWR. The design of pressure vessels is generally the same for all PWRs. Combustion Engineering (CE) and Babcock and Wilcox (B&W) manufacture their own vessels while Westinghouse either purchases its vessels from CE, B&W, Chicago Bridge and Iron or Rotterdam Dockyard Company. Regardless of the manufacturer, PWR vessels are generally constructed from eight inch thick steel plates, formed and welded to create the vessel structure.

The major age-related mechanism associated with this component is embrittlement. Embrittlement is the loss of ductility, i.e., the ability of the pressure vessel metals to withstand stress without cracking. It is caused by neutron bombardment of the vessel metals and is contingent upon the amount of copper and nickel in the metal and the extent of neutron exposure or fluence. As the metal in the reactor pressure vessel is bombarded with radiation, high-energy atomic particles pass through the steel wall. In doing so, these atoms collide with atoms in the metal and knock them out of position. Over time this results in a loss of ductility.

In an unirradiated vessel the metal loses its ductility at about 40 degrees Fahrenheit. As the vessel becomes embrittled, the temperature at which it loses its ductility rises. This change in the mechanical properties of the metal from ductile to brittle is characterized as the "reference temperature for nil ductility transition" or RT_{ndt}. Thus as the reactor ages and the pressure vessel is exposed to more radiation, the RT_{ndt} can shift from its original 40 degrees F to as much as 280-290 degrees F or more in extreme cases.⁴⁸

Embrittlement is of even greater concern to those plants constructed prior to 1972. According to thermal shock experts from the Electric Power Research Institute (EPRI), records show that there is copper in the walls of older vessels. Theodore Marston, who works on thermal shock for EPRI, stated that, "(w)e used a lot of auto stock (for the vessel metal), when you melt it you can't get all the wire out." The use of copper was also extensive in the welds of the vessel walls in older reactors. Copper coated wire was routinely used to weld together the large plates which make up the RPV. The NRC's director of safety technology stated that "the copper was used to prevent rust, someone probably got a \$10 prize for the suggestion."⁴⁹

The significance of reactor pressure vessel embrittlement and the

concomitant shift in RTndt is the increased susceptibility to pressurized thermal shock (PTS). Pressurized thermal shock occurs when the reactor pressure vessel is severely overcooled. RPV technical specifications generally limit cool down to a rate of 100 degrees F. per hour. However, during an overcooling event the vessel may experience a drop in temperature of several hundred degrees per hour. This extreme drop in temperature of the vessel creates thermal stresses through the RPV wall. As the RPV is overcooled, there is a drop in the pressure of the primary coolant loop. This rapid decrease in the pressure of the primary coolant causes the high pressure injection pumps in the emergency core cooling system to automatically inject coolant into the primary loop. As the injection of coolant repressurizes the RPV, the vessel is subjected to pressure stresses. The stresses placed on the reactor pressure vessel by overcooling and repressurization cause pressurized thermal shock.⁵⁰

Pressurized Thermal Shock (PTS) can be initiated by a host of mishaps including: instrumentation and control system malfunctions; small-break loss-of-coolant accidents; main steam line breaks; feed water pipe breaks; and steam generator tube ruptures. Any of these incidents can initiate a PTS event, but as long as the fracture resistance of the reactor pressure vessel remains high, i.e. the RTndt remains low, such transients are not likely to cause the RPV to fail. After the fracture resistance of the RPV is reduced through neutron bombardment, however, severe overcooling accompanied by repressurization could cause flaws in the inner surface of the RPV to propagate into a crack which breaches the vessel wall.⁵¹

For failure of the reactor pressure vessel to occur several factors must be present: (1) the vessel must have a flaw of sufficient size to propagate; (2) the vessel material must be susceptible to irradiation embrittlement due to copper and nickel content; (3) the vessel must be sufficiently irradiated to cause a decrease in ductility, represented by an increase in the RTndt value; (4) an event must initiate a severe overcooling transient with repressurization; and (5) the resulting crack must be of such a size and location that the RPV's ability to maintain core cooling is affected. This type of failure is beyond the design basis of PWRs: the safety systems, including the emergency core cooling system and the containment, are not designed to withstand cracks in the pressure vessel. Without the reactor pressure vessel surrounding the radioactive fuel, it would be impossible to sufficiently cool the reactor core and a meltdown would ensue.⁵²

Pressurized thermal shock is a safety issue for every pressurized water reactor. PTS is of lesser concern for boiling water reactors because radiation embrittlement is not as severe a problem with BWR vessels. This is due to the greater amount of water between the reactor core and the vessel walls in BWRs. The

additional water absorbs a greater amount of neutrons so that fewer bombard the walls of the RPV. The walls of a BWR vessel are also thinner than that of a PWR. Therefore, there is less of a temperature differential between the inner and outer walls of the vessel during a cooldown and thus less stress.⁵³

While every PWR vessel is susceptible to pressurized thermal shock, those designed by Babcock & Wilcox (B&W) are inherently more susceptible to accidents that can initiate PTS. This is primarily due to the unique design of the B&W steam generators. B&W reactors use once through steam generators, or OTSGs (see Appendix D). OTSGs differ from other PWR steam generators in that the generator tubes are only partially covered with water and contain a smaller volume. This makes the B&W reactor much more sensitive to changes in feed water flow--changes in the flow can cause large rapid changes in the temperature of the reactor. As a consequence, incidents which interrupt feed water flow present more severe challenges to the safety systems than would be experienced in other PWRs. The result is an increased incidence of overcooling events in B&W reactors and an increased probability of pressurized thermal shock.⁵⁴

On December 26, 1985, a severe overcooling event occurred at a B&W facility near Sacramento, California. A loss of power to the "non-safety" integrated control system at the Rancho Seco facility caused a reduction in the main feed water flow to the steam generators. Coolant level in the steam generators decreased, reactor temperature and pressure increased and the reactor scrambled. Feed water valves controlled by the integrated control system could not be operated and remained open. A rapid and severe overcooling event ensued and was exacerbated by the start up of the auxiliary feed water system which sprayed even colder water directly onto the steam generator tubes. The reactor temperature dropped 180 degrees F in 24 minutes, easily violating the technical specification limits of 100 degrees/hour. Additionally, the recommended pressure/temperature limits for pressurized thermal shock were exceeded, although the RTndt limit was not.⁵⁵

If the overcooling event had been more severe or the reactor pressure vessel more embrittled, the RTndt limit may have been reached and the vessel could have ruptured precipitating a meltdown. Equally as disturbing as the accident itself is the fact that the failures and consequences of the event were essentially the same as those previously experienced at Rancho Seco and other plants designed by B&W. In fact, many of the safety problems experienced during the transient were identical to those supposedly resolved by the "short-term" modifications imposed on B&W plants by the NRC in the wake of the Three Mile Island accident.⁵⁶

In May 1979, after the TMI accident, the NRC shut down every B&W

facility, including Rancho Seco. The Commission ordered that procedures and training be implemented to assure that steam generator levels could be maintained if the integrated control system failed. Approximately a month later, the NRC staff concluded that "the licensee has developed adequate procedures and operator training to control AFW (auxiliary feedwater) flow to the steam generators to specific values independent of the ICS, should a failure of the ICS occur, and therefore, is in compliance with this part of the order."⁵⁷ However, on December 26, 1985, the staff's conclusions were proven incorrect when operators at Rancho Seco were unable to control the feedwater flow to the steam generators. The NRC's reaction was to conduct a year-long review of problems that were supposedly resolved six and a half years earlier.

The Nuclear Regulatory Commission has vacillated on the issue of pressurized thermal shock for over ten years now. As early as 1977, test samples placed in B&W reactors were indicating that embrittlement was progressing at a faster rate than had been expected. RTndt limits had been originally set at 200 degrees Fahrenheit. However, as these limits were reached in the early to mid 1980s, the NRC began developing new limits within the framework of the PTS rule.

In a briefing to its Advisory Committee on Reactor Safeguards in 1982, the NRC staff considered RTndt limits of 230 and 250 degrees F for longitudinal and circumferential welds respectively. However, by 1985, the NRC sought to amend its regulations on pressurized thermal shock. The proposed amendments would establish an RTndt below which the risk from a PTS event is considered acceptable. These new reference temperatures established limits of 270 degrees F. for plate materials and axial welds and 300 degrees F. for circumferential welds.⁵⁸

The Commission attempted to gloss over the fact that an increase in the RTndt translated into a decreased margin of safety. The NRC press release said the rule constituted "further protection from pressurized thermal shock." At least one expert was not buying the NRC's line. Demetrios Basdekas, an NRC safety engineer and long time critic of the Commission's handling of the PTS issue, opposed the new rule on the grounds that the reference temperatures were unrealistically high.

Dissatisfied with the NRC's handling of the PTS issue, Basdekas made his opinion known in a letter to the New York Times. The letter stated that while, "(t)he Nuclear Regulatory Commission is charged with ensuring that nuclear plants are operated 'with adequate protection' of the public health and safety. . . bureaucratic foot dragging and preoccupation with public relations and financial problems of the industry are contributing to a shortsighted view - that technical problems can wait or do not exist."⁵⁹

Basdekas contended that the new PTS rule was flawed in that it failed to recognize control system failures as a possible initiator of accidents that could challenge the pressure vessel. The NRC was not only failing to acknowledge Basdekas' contentions but plant operating experience as well. On March 20, 1978, the B&W designed Rancho Seco nuclear power plant experienced a PTS event precipitated by a control system failure. While replacing a light bulb in the integrated control system, an operator dropped the bulb into the control panel shorting out the control room instrumentation which eventually led to an overcooling of the reactor accompanied by repressurization of the vessel. The event is believed to represent the most severe and prolonged overcooling event to date with a change in temperature of 300 degrees F. per hour.⁶⁰ Basdekas was able to convince the NRC that control system failures were an unresolved safety issue, but the Commission continued to ignore these failures in their calculations on pressurized thermal shock.

In response to the NRC's ambivalence, Basdekas wrote the Commissioners suggesting an independent panel review the PTS issue. The nuclear safety engineer stated that,

. . . our understanding and treatment of both the systems/process and materials/mechanics aspects of this issue remain wanting. I also believe that the agency and the public would benefit from the opportunity of an independent panel of experts to contribute to your decision making. . . . I might not have accomplished a great deal beyond receiving punishment and intimidation, but I am satisfied that I have stayed away from what appears to be increasingly in vogue within the agency to literally give the store away.⁶¹

Basdekas further explained the prevailing attitude within the NRC when asked by the Chairman of the House Subcommittee on Energy and the Environment, Rep. Morris K. Udall (D-Ariz.), to comment on NRC responses to the Committee on the topic of pressurized thermal shock. Basdekas stated that:

A satisfactory resolution, however, cannot be achieved under currently prevailing attitudes within the NRC. On one hand the NRC left it up to the utilities operating the plants chosen for evaluation to provide design and operational information on a voluntary basis, and on a schedule of their convenience, while internally establishing an arbitrary schedule for producing a "resolution" document and withdrawing previously allocated resources while engaging in a variety of prohibited personnel actions and abuse of authority to intimidate and impede if not silence those voicing concern or disagreement.⁶²

The NRC adopted the PTS rule in July 1985. In less than six months from the date of its adoption, control system failure had precipitated a severe overcooling event at the Rancho Seco facility (discussed above). Yet the NRC still failed to acknowledge control system failures in their analysis of embrittlement and pressurized thermal shock.

The NRC has continued its research on the PTS issue, focusing on methods to calculate and mitigate embrittlement of reactor vessels. To cope with the most severely embrittled reactors, the NRC has allowed some plants to redesign the configuration of the fuel rods so that fewer neutrons bombard the pressure vessel wall. The NRC has also released for comment a second revision of a regulatory guide (1.99) which specifies how utilities are to calculate the extent of embrittlement and the limits for operating with embrittled pressure vessels. The revision is an improvement in that it takes into consideration the copper and nickel content of the RPV materials. However, a major source of uncertainty still exists due to the limited accuracy and the variable range of the data base (a comparison of embrittlement limits under each revision of regulatory guide 1.99 is provided for each plant in appendix E).⁶³

The NRC has attempted to put the PTS issue behind it, but the problem of embrittlement has been recurring like a bad dream. New questions involve the reactor pressure vessel supports. These hold the pressure vessel in place and, depending upon the design, can be exposed to substantial amounts of radiation. There are five major types of RPV supports, four of which are used in PWRs. The major factor in determining embrittlement of the supports is their exposure to reactor core beltline neutron flux. Two types of supports are directly exposed to irradiation from this area of the reactor, the neutron shield tank supports and the column supports. These two types of supports are used in 90% of the operating PWRs in the United States.⁶⁴

The danger of embrittlement of the structural steel supports is the possibility that the neutron bombardment has so irradiated the metal that it cracks under the stress of the combined loads it was designed to bear. In the NRC jargon this is known as catastrophic brittle failure. This type of accident is beyond the design basis for safety systems and could result in total loss of reactor cooling capability. For catastrophic brittle failure to occur three conditions must be present: (1) there must be a flaw of critical size; (2) there must be a sufficient load on the support to create critical stress at the crack tip of the flaw; and (3) the temperature must be low enough to promote a cleavage fracture at the crack.⁶⁵

It appears that the NRC is once again attempting to finesse the issue of embrittlement. In May of 1975 it was discovered that the

asymmetric loads placed on reactor pressure vessel supports because of postulated loss-of-coolant-accidents were not taken into consideration in the design of the supports for the reactors at North Anna units 1 and 2. This underestimation of the potential burden on the RPV supports, coined the "North Anna syndrome," prompted the NRC to require all PWRs to reevaluate the loads placed on the structures. It was discovered that the additional load resulting from a double ended rupture of the reactor coolant piping, also known as a guillotine break, was equal to the combined loads the structures were thought to support.⁶⁶

The Commission responded to this issue in April of 1986 by exempting guillotine breaks from consideration. The NRC has stated that:

...the dynamic effects associated with postulated pipe ruptures of primary coolant loop piping in pressurized water reactors may be excluded from design basis when analyses demonstrate the probability of rupturing such piping is extremely low under design basis conditions.⁶⁷

The NRC bases this exemption on the "leak-before-break" theory. In essence the NRC is saying that the additional load placed on the RPV support in the event of a guillotine break need not be taken into consideration because the pipes will leak before they break. However, as previously noted, leak-before-break is neither an "established law", nor should it be the, "sole basis for continued safe operation."

Another factor contributing to the issue of embrittlement of RPV supports is the accelerated shift in RTndt of the support materials. Data from the test reactor at the Department of Energy's Oak Ridge National Laboratory (ORNL) has shown a greater than expected rate of embrittlement for steel that has been exposed to low temperature irradiation. A letter from the Advisory Committee on Reactor Safeguards (ACRS) to Victor Stello, NRC Executive Director for Operations, stated that the RTndt of steel, "irradiated slowly at 120 degrees can rise much more rapidly with exposure to fast neutrons than would be expected from the available experimental work obtained in test reactors."⁶⁸

The ACRS requested that Stello look into the implications of the ORNL findings on embrittlement and the impact on the NRC's plans to extend reactor life past the 40 year license. Stello's response stated that, "(t)he ORNL summary coincides with our evaluation that the neutron shield tanks and support structures do not appear to pose any safety problems." However, close examination of the report reveals that the ORNL did not conclusively state that embrittlement was not a problem. In fact

the report found that, "plant specific data are required for an accurate evaluation of the potential for LWR vessel support failure."⁶⁹

The ACRS was understandably "concerned and perplexed" by Mr. Stello's response. Interpretation of the data revealed that structural steel supports are experiencing 2 to 3 times the embrittlement as might have been predicted. However, Mr. Stello failed to draw any inferences from this information. The ACRS stated that they could, "see no reason to be sanguine about the safety of operating nuclear power plants with the largest, heaviest component in the primary system supported on a structure, parts of which are fully brittle. This is unsafe by any type of analysis."⁷⁰

The NRC's final word on embrittlement of RPV supports is still out as the staff seeks further documentation. In the meantime, support reliability has been judged to be adequate. It escapes comprehension how the supports could be found adequate without inspecting them or determining the extent of actual embrittlement.

Official Transcript of Proceedings

**NUCLEAR REGULATORY
COMMISSION**

Title: Advisory Committee on Reactor Safeguards
Joint Subcommittees:
Materials and Metallurgy
Thermal Hydraulic Phenomena
Reliability and Probabilistic Risk Assessment

Docket Number: (not applicable)

Location: Rockville, Maryland

Date: Wednesday, December 1, 2004

Work Order No.: NRC-114

Pages 1-137

**NEAL R. GROSS AND CO., INC.
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1 rationale.

2 MR. ERICKSONKIRK: Yes. What we do find
3 on the graph on the lower right-hand side is that the
4 flaws that are driving the through-wall cracking
5 frequency fully 90 percent of them are fairly small
6 flaws and that's the observation.

7 DR. WALLIS: Because there aren't very
8 many big ones? Is that what it is? It's more
9 probable that you would have a small flaw under the
10 surface?

11 MR. ERICKSONKIRK: Absolutely. There's a
12 very low probability of having big flaws and even if
13 you increase the big flaw probability by credible, or
14 even incredible factors, it wouldn't matter much. I
15 apologize for that. You are absolutely correct. The
16 first rational was erroneous.

17 DR. WALLIS: This flaw distribution is
18 based on rather skimpy evidence. This is one of the
19 areas where -- I mean, heat transfer Dittus-Boelter if
20 you believe that. It's based on data points. But the
21 floor distribution in these walls is based on a few
22 examinations. Isn't it?

23 MR. ERICKSONKIRK: A few examinations but
24 infinitely more than we had the first time.

25 DR. WALLIS: It's much better than you had

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1 the first time.

2 MR. ERICKSONKIRK: Much better than we had
3 the first time. I think as a laboratory geek at heart
4 I have to admit I would really like to have more data
5 on this and I don't think there's anybody in the
6 technical community that would disagree with this.

7 But I think it's also important to
8 recognize that the flaw distribution doesn't rest on
9 experimental evidence alone. Certainly we started
10 with -- excuse me. We start with experimental
11 evidence both from destructive and nondestructive
12 evaluations but that's then also bolstered by --

13 DR. WALLIS: But those were of individual
14 reactor vessels.

15 MR. ERICKSONKIRK: That's right.

16 DR. WALLIS: But there are a hundred
17 reactor vessels. I don't know how convincing it is
18 that the flaw distribution that you measured in a
19 couple of vessels which were taken apart is typical of
20 all other vessels.

21 MR. ERICKSONKIRK: No. I think it would
22 be unfair to say that a single experimental
23 distribution derived from two vessels could be just
24 looked at and thought to be representative of the
25 other vessels.

PALISADES COULD REACH ITS PTS SCREENING LIMIT EARLIER THAN EXPECTED

Consumers Powers' Palisades may reach its PTS screening limit, a key indicator of reactor vessel brittleness, next year—eight years earlier than NRC staff reported to the commission as recently as late October—according to testimony at a December 8 commission meeting.

Consumers Power advised NRC on November 18 that new information on reactor vessel integrity showed that the critical PTS limit likely will be reached by 1999, five years earlier than an NRC staff analysis in late October showed. Jack Strosnider of the Office of Nuclear Reactor Regulation's (NRR) Division of Engineering told Commissioners Kenneth Rogers and Gail de Planque that information developed even more recently by testing of material from the plant's decommissioned steam generators may have pushed up the date—perhaps to as early as next year. NRC staff said they hope to produce a new evaluation of Palisades data by the end of January.

According to NRC regulations, a plant that has reached its PTS (pressurized thermal shock) screening limits may not operate unless the licensee presents additional information to justify the safety of the decision.

A Consumers Power executive who observed the meeting expressed disappointment that the new information showed the Palisades reactor vessel might reach the limits earlier than previously thought. The purpose of the testing was to justify operation to the end of the plant's original operating license in 2007.

The inability of Yankee Atomic Electric Co. to provide sufficient information about the integrity of Yankee's reactor vessel, together with economic issues, prompted the Yankee to shut that unit permanently in 1992.

As recently as October 28, when NRC staff issued Secy 94-267, "Status of Reactor Pressure Vessel Issues," the agency projected that Palisades would reach its PTS screening criteria in 2004. On November 18, Consumers Power submitted a revised evaluation of the PTS issue that indicated the vessel would reach the critical level in 1999.

Analysis of the critical beltline welds, along the axis of the reactor vessel, depends a lot on exactly what proportion of copper is present in the weld wires used to join the metal plates. Analysis of the metallurgy of the welds continues apace at Palisades, a nuclear engineer for the company told Inside N.R.C.

In a separate development at the meeting, NRC staff told the commissioners that they would, if necessary, compel ABB Combustion Engineering to divulge data on reactor vessel weld integrity that the vendor seeks to keep confidential.

The clash over the data from the Combustion Engineering Reactor Vessel Owners Group—data owned by ABB C-E—attracted attention from Commissioner Rogers, who told staff, including Office of Nuclear Reactor Regulation (NRR) chief William Russell, that "I would like to be kept informed of the discussions with the industry group (led by ABB C-E).

"I think the commissioners would be interested (in updates on the matter)," Rogers continued. "What are the proprietary aspects here that they are concerned about? I would hope that we could get over that hurdle."

Russell told Rogers that the basis for ABB C-E's request that the data be kept confidential is that it contains information on how C-E reactor vessel welds were carried out—"using the methods of twenty to thirty years ago that are no longer used." Russell said he was hopeful that the agency and the company would come to a voluntary agreement on the issue.

At the end of the meeting, Rogers repeated his call for the data to be made public. "I hope we'll be successful, ultimately, in filling out that data set."

NRC wants to include the data in a database called the Reactor Vessel Integrity Data Base, or RVID.

RVID summarizes the properties of reactor pressure vessel materials for all plants; it is based on docketed information and is scheduled for public availability in the first quarter of 1995.

David Jaffe - Palisades phone call Page 1

David Jaffe - Palisades Phone call Page 1 H

From: Stephanie Coffin
To: Hoffman, Stephen
Date: 11/24/04 3:05PM
Subject: Palisades phone call

We had a phonecall with them Monday.

They no longer plan on submitting an exemption to apply "Master Curve" at their facility. Instead, they will be managing it in accordance with the May 27, 2004 guidance from Reyes to the Commissioners. They are following Point Beach and Beaver Valley closely.

I gave them feedback especially about the flux reduction requirements of the current rule and suggested they review the Point Beach submittal and our associated SER with Open Items, and to check for applicability to their plant.

FYI for Matt and Barry and Neil:

If they see that the new PTS rule will not be published in time for them (they currently exceed the screening criteria in 2014 - I don't know if we agree with that), they will submit the Master Curve exemption in 2007.

Stephanie

CC: Duvigneaud, Dylanne; Elliot, Barry; Mitchell, Matthew; Ray, Nihar; Stang, John

Outlook On Life Extension

EXHIBIT 1 H

SPECIAL REPORT TO THE READERS OF NUCLEONICS WEEK,
INSIDE N.R.C., AND NUCLEARFUEL

As the nuclear industry tries to hang on in an increasingly competitive marketplace, considerations of extending plant lifetimes beyond their allotted 40 years sometimes seem an academic exercise. Yet whether the U.S. will have nuclear power as a future energy option—regardless of the cost or availability of other options—depends in large degree on license renewal and life cycle management decisions being made today.

The licenses of 49 of the 110 nuclear units in the U.S. are set to expire in the coming two decades, by 2014 (though some could be further delayed by recapturing their construction period and adding it to the license period). Will utilities refurbish and recertify them as safe to produce power beyond their current 40-year licenses? Or will they be shuttered one by one as their licenses run out, with some forced into premature shutdown?

NRC Chairman Ivan Selin counts license renewal as the "number one topic" before the commission. He is optimistic that at least some utilities will apply to extend the operating lives of their plants. "Interest is higher now than it has been for two years. I'm certain that many reactors will come in for license renewal," he asserted.

Selin says the NRC is on the verge of coming out with a rule that will make the process of applying for plant life extension simple, cheap, and predictable: "I feel good about the license renewal process we're developing—though my satisfaction is tainted by the fact that we should have got things right the first time."

Among government and industry experts, the NRC chief's may be a lone voice of optimism. A recent study by the Edison Electric Institute concluded that—far from life extension being the question—cost-related, premature shutdowns are likely to be an issue for utilities as early as this year (Nucleonics Week, 17 March, 1).

Even traditional boosters of nuclear energy express serious doubts about how many—if any—plants will see life beyond their 40th birthdays. "I'm relatively sure some plants will go in for license renewal, although it all depends on load growth at the time they go in," said Scott Peters, a spokesman for the Nuclear Energy Insti-

tute (NEI). The organization—born March 16 when four U.S. nuclear trade groups consolidated—is emblematic of the squeeze nuclear utilities face: paring down and cutting costs as they navigate the uncertainties economic competitiveness has thrust on the industry. Ultimately, the decision to seek license renewal "will be an economic decision utilities will make, taking into account many factors," said Peters.

"There may be people who, out of sheer stubbornness, continue to pursue license renewal—and NRC may let them—but whether it will be viable for these plants to continue after 30 years is questionable," said Jim Riccio, an attorney with Washington, D.C.-based Public Citizen, a Ralph Nader lobby. Riccio doubts that any of the U.S. nuclear units will even get to the ends of their licenses. "It won't be the antinuclear forces that force them to close, but the people who do their ledger books," he said, adding, "Economic and safety considerations will shut these plants down."

Only 46% of electric utility executives expect to see operating licenses extended for most plants, according to a survey released by the Washington International Energy Group in January. Odds remain in favor of most units continuing to operate through their first 40 years, the executives said. But only 37% of respondents believed there would be a resurgence of nuclear power in the U.S. "Privately, CEOs talk about someday turning over title of [nuclear] plants—even the best run ones—to the government," said the report, "1994 Electric Utility Outlook."

Those utilities that set their sights on plant life extension will have to brave uncharted territory. A few years ago, the path appeared relatively straightforward. The industry would develop pilot license renewal submittals for a lead BWR and a lead PWR, which would pave the way for other utilities to follow with renewal applications. But the process has taken unexpected turns. Yankee Rowe's experience as a lead PWR led ultimately to its shutdown, and the other utilities have hung back.

Competition has changed the landscape of the electric utility industry entirely in two years. Economic decisions to seek license renewal will be made on a

plant-by-plant basis, industry experts say. Few generalizations can be drawn to predict likely candidates: some utilities view their nuclear units as albatrosses, others embrace them as assets. The price of other energy sources in a given region, the philosophy of state regulators, public perceptions about nuclear power in a county or state, the number of units a utility is operating, and the age, condition, and operating history of each plant—not to mention the cost and degree of hassle involved in meeting NRC's forthcoming rule—will all influence the life extension decision.

Key players and issues to watch include:

- Virginia Power, the only utility to announce plans to apply for life extension. It surprised industry peers and NRC by unveiling plans to initially seek five-year license renewals—instead of 20 years—for Surry and North Anna.

- The Babcock & Wilcox Owners Group, which plans to submit a license renewal application on one of

its PWRs by 1997. Duke Power's Oconee-1 is one of the top candidates for their submission.

- Baltimore Gas & Electric Co., which has spent \$15-million on a combined life cycle management and license renewal program. The company may decide to apply to extend the Calvert Cliffs licenses for 20 years.

- NRC's rule rewrite, ordered by the commissioners in February. Will the new rule provide the cheap, simple, predictable application basis Selin has promised? And how will utilities implement it?

- Other nations' experience. Electricite de France (EDF) has taken the lead in grappling with many of the aging issues that U.S. utilities must evaluate in the technical assessments of their plants. EDF has developed a list of 18 essential components. In Sweden, the clash between politics and performance once again is coming to a head, where nuclear power opponents want to see lifetimes limited on plants considered by U.S. analysts to be among the best performers in the world.

VIRGINIA POWER TAKES THE BULL BY THE HORNS

Virginia Power Co. could be the first utility to test NRC's promise of a simpler and cheaper approach to license renewal. The company unveiled plans in February to file an application early in 1995 to renew the operating licenses for the Surry and North Anna nuclear stations for five years (Inside N.R.C., 21 Feb., 1).

Virginia Power's nuclear units are "very competitive," said William Stewart, vice president-nuclear. "Our production costs are excellent. Our units were built in the 1970s, so the [capital] cost was low." Stewart characterizes the decision as one that could make the utility even more competitive. "We're not in a scramble here," he said. "We're just looking ahead."

Stewart said the five-year life extension initiative has received the support of Wall Street utility analysts, whom he briefed on the plan in February. "Their response was favorable. The feeling was that a five-year renewal is feasible."

Reducing Busbar Costs

Company officials concede the decision to pursue five-year license renewals is "an economic rather than an operational" one, primarily driven by the current climate of economic competitiveness. Martin Bowling, manager of the utility's nuclear licensing programs, said that renewing the licenses at its two dual-unit nuclear stations by five years would lower "busbar" costs—the amount it costs to produce electricity at the point it leaves the plant, including capital costs, taxes, fuel, and operations and maintenance costs.

In 1992, Virginia Power's busbar costs were 2.84 cents per kilowatt-hour (KWH) at Surry and 3.42 cents/KWH at North Anna. Overall busbar costs for nuclear generation are 3.1 cents/KWH, Stewart said.

Costs would be lowered by changing depreciation rates and reducing near-term decommissioning trust collections. Lower costs would help hold down future rate increases and keep the utility competitive, Bowling explained. In their economic analysis, utility officials calculated that, as a near-term effect, "depreciation expense is reduced each year, \$21-million the first year and up to \$49-million by 2011."

Virginia Power has replaced steam generators at three of the four units and plans to replace the steam generators at North Anna-2 in 1996 at a 1996 dollar equivalent to the \$120-million spent last year to replace the steam generators in unit 1.

Stewart said the company has spent more than \$5-million to date on license renewal work, most of it on technical analyses under the old NRC rule. Surry-1 began operating in December 1972 and its license expires in May 2012; Surry-2 started up in May 1973 and its license expires in January 2013. North Anna-1 started operating in June 1978 and its license expires in April 2018; unit 2 began operations in December 1980 and its license expires in August 2020.

Company officials recently proposed a streamlined integrated plant assessment (IPA) process to NRC staffers. They say the technical analyses under their IPA would be done no differently whether they were applying for a five-year extension or a 20-year one. Utility plans call for submitting a license renewal application during the first quarter of 1995, but that could change if NRC's revised license renewal rule is not out yet, Stewart noted.

Assuming Virginia Power's license renewal application proceeds on track, the utility should provide a case study on how NRC will have utilities show compliance

reliance on the maintenance rule, completing the reviews needed for a license renewal application is not going to be a piece of cake. There will be considerable documentation required.

Thermal fatigue monitoring of the primary system is an example of how life extension work provides short-term and long-term benefits, Doroshuk said. Engineers analyzed all the Class 1 piping, for instance, and created a computerized data bank that not only is used to track aging mechanisms like fatigue, but can be used in operations. "We've been able to provide an analysis of the plant and respond to transients that [operators] see during a startup and allow them to continue on without doing holds and analysis," an engineer on the team said.

A priority of the life cycle management program has been evaluating the reactor pressure vessel. Calvert Cliffs-1 is currently going to exceed NRC's pressurized thermal shock (PTS) screening criteria between 2004 and 2006. Unit 2 was built using lower-copper weld

material, so it doesn't have the same problem.

"There are plant-specific differences that make us believe unit 1's embrittlement is much less than NRC's correlation would predict," said Marvin Bowman, an engineer on the life cycle management team. "These include fabrication process differences, heat treatment differences, materials differences, weld materials, weld fluxes that were used—they're all part of that embrittlement process."

BG&E officials submitted the technical evaluation to NRC last November and are expecting to receive NRC's review by this summer. "We think we have a very sound technical basis for continued operation of unit 1," Doroshuk said.

"We've done substantial flux reduction and we can do much more aggressive flux reduction if we have to, involving radical fuel management," Bowman added.

The conclusion of BG&E's plant assessment activities to date: "We've found that, materially, the plant should last for 60 years," Doroshuk said. "We haven't found the show-stopper—even in the reactor vessel."

REACTOR VESSEL INTEGRITY, COSTS, CRUCIAL TO LIFE EXTENSION

Coping with reactor vessel embrittlement is a priority for managing plant life extension, as several U.S. reactors likely will face the problem after about 40 years of operation.

PWR vessels are more susceptible than BWRs' because the PWR vessels are narrower and contain less coolant, so more neutrons reach the vessel walls. Most PWR vessels in the U.S. are made of steel known as A533-B alloy, an alloy of iron, carbon, and manganese with some nickel. In a number of older vessels, the welds joining the vessel's curved plates contain some copper. As neutrons from the core strike the steel, they change the crystalline structure of the A533-B alloy. The weld material is especially affected, with the neutrons disrupting the crystal lattice, creating clumps of copper atoms and vacancies in the matrix. This process makes the steel more brittle.

The brittleness is measured in two ways: the upper shelf energy loss and the reference temperature at nil ductility temperature (RT-NDT). The loss of ductility can leave the metal vulnerable to ductile fractures, a tearing that can take place in seconds or minutes, and to pressurized thermal shock (PTS). The latter could occur if, during an accident, coolant is suddenly restored to an overheated vessel, and it could cause an abrupt fracture of the metal. Reactor operators must show NRC that their vessels are proof against both types of failure.

Because ductility loss is cumulative, operators plot the time it will take their vessel to reach the RT-NDT and upper shelf criteria that NRC selected as a conser-

vative danger signals of growing embrittlement, set in 10 CFR 50 and its Appendix G. Utilities have a number of ways to cope with embrittlement as operating lifetime progresses, including flux reduction through fuel management, such as installing neutron absorbers on the core periphery. Utilities can also analyze their vessels' metal to prove they won't approach the NRC criteria within their operating lives, and monitor the accuracy of those analyses by regularly removing and testing specimens of vessel material, which are kept inside the vessels in capsules.

As vessel lifetime is lengthened, a rate of embrittlement which was no concern for 40 years of operation may become a barrier to reaching 60 years, and utilities that did not previously have to be concerned about PTS are having to look again.

NRC has required utilities to submit information on the status of their vessels with regard to PTS and upper shelf energy. From this information, the agency has deduced a list of especially vulnerable reactors that has fluctuated from around one to six reactors, as utilities take measures to alter the rate of embrittlement. Calvert Cliffs, Duquesne Light Co.'s Beaver Valley, and Consumer Power's Palisades have been mentioned as particularly vulnerable. While opinions within NRC and the industry appear to vary, the utilities generally hold that further analysis of the metallurgy of their reactors will prove that the vessels will last to the ends of their license periods.

According to the latest NRC list, seven units' vessels likely will encounter PTS concerns before the ends of

REACTOR VESSELS WITH PRESSURIZED THERMAL SHOCK (PTS) CONCERNS

Plant Name	Estimated Year PTS Screening Criteria will be Reached	License Expiration Date per NUREG 1350
Palisades	1997-2005	03/14/2007
Fort Calhoun	2013	06/07/2008
Calvert Cliffs-1	>2005	07/31/2014
Point Beach-2	>2013	03/08/2013
Point Beach-1	>2010	10/05/2010
Beaver Valley-1	2014	01/29/2016

PTS CONCERNS BEYOND CURRENT END-OF-LICENSE LIFE

Zion-1	2011	12/26/2008
Oconee-2	2019	10/06/2013
Surry-1	>2012	05/25/2012
Salem-1	2020	09/25/2008
Zion-2	2023	12/26/2008
Genoa	2026	04/25/2006
Diablo Canyon-1	2034	04/23/2008
Cook-1	2037	03/25/2009
Farley-1	>2050	06/25/2007
St. Lucie-1	>2050	03/01/2016

Source: NRC

their licenses, and nine other units' vessels will fall in the category after their current licenses expire (see table).

Annealing: The Last Ditch

Utilities that look soon enough can alter the rate of embrittlement early in a vessel's life, but for older reactors the standard methods may not be able to change the rate enough. That can leave utilities facing an expensive problem for life extension. YAEAC chose to close Yankee because the process of proving the vessel's stage of embrittlement was too expensive—and NRC's requirements for that proof too open-ended—to be justified economically for a 185-MW reactor.

One option is to replace the vessel, which has never been done and is estimated to cost as much as \$100-million. Another choice being viewed with increasing favor by reactor owners is annealing the vessel, or heating it to the point where the crystalline structure of the steel is partly or fully restored to its original fracture resistance. Estimates for annealing range around \$10-million.

Annealing is a routine process in metallurgy and has been extensively modeled, but it is complicated by vessel radioactivity. For U.S. vessels, it would involve heating the beltline weld, and in some cases the axial welds or some vessel plates, to about 850 degrees F for

about a week. The longer the heat is applied, the more complete the restoration of the metal's crystalline structure. Theoretically, heating the vessel for as much as two weeks could restore the metal 100%.

Different annealing specialists offer different estimates of how long the repair done by an annealing job would last. Some estimate annealing could restore a vessel to service for five or six years, while others say field experience indicates 60 to 70 years. Researchers say more study is needed.

Alan Hiser, of the materials engineering branch of NRC's Office of Nuclear Regulatory Research (RES), said that the level of restoration of embrittlement due to annealing, and the rate of re-embrittlement, is dependent on a number of factors. If the material is a weld, rather than a plate, the annealing repair will be less effective and the re-embrittlement rate faster. The chemistry of the material is crucial, as well—steels or welds containing nickel or copper are more subject to both embrittlement and re-embrittlement.

Hiser emphasized that the difference between the reactor operating temperature—around 550 degrees F—and the temperature of annealing (850 degrees) has an important effect. The greater the difference between the two temperatures, the more successful the annealing will be and the longer its effects will last. NRC has funded research on annealing that was carried out by

DOE at Oak Ridge, and Hiser's views also take into account research performed by Westinghouse on behalf of EPRI, the U.S. Navy, and Russian annealing specialists.

Hiser said that most studies have considered annealing for 168 hours, or one week. On the basis of 168 hours and 850 degrees, Hiser said that an annealing job

can restore as much as 100% of the damage due to neutron flux, depending on the factors mentioned. "From the data we've seen so far, it appears that (after annealing) you get the same embrittlement rate you got initially," he said.

The American Society of Testing & Materials' Standard E509-86 model posits that re-embrittlement occurs

YANKEE EFFORT FOUNDERED ON VESSEL

Zeus does not bring all men's plans to fulfillment.
—Homer

At the time, it seemed logical. Yankee Atomic Electric Co.'s (YAEC) Yankee was by far the oldest PWR operating in the U.S. Though small and unique in design, it had a good operating record and YAEC wanted to extend the operating license that was to expire in 2000.

When DOE and the Electric Power Research Institute (EPRI) were looking for candidates to test the license extension waters, the 185-MW Yankee got the nod for PWRs, despite EPRI's expressed reservations about using older, smaller plants as license extension guinea pigs and despite the fact that Virginia Power had already done extensive initial screening of possible license extension roadblocks for Surry-1, an 824-MW PWR of a more common design.

The issues were timing and money. Surry's license wouldn't expire until 2012. The Yankee plant was YAEC's only asset. Therefore, YAEC had no choice but to go forward with license extension, even if it wasn't chosen as a lead plant. "We were going to file a license extension application," said YAEC's Bill Szymczak, a member of the Yankee license extension team. "There was sentiment at the time that (the lead plant) should have been Surry, but we were going to be in the queue anyway."

"As a single-asset company, regardless of what anyone else was doing, we were going forward," Szymczak added. Having YAEC before the NRC for a license extension at the same time the pilot plants were going through would have been a "complicating factor," he said.

DOE and EPRI were, in fact, very concerned about maintaining a uniform front on license renewal before the NRC. When YAEC signed on as lead PWR, a provision in its contract with DOE and EPRI required that its licensing submittals be "sufficiently consistent" with those filed by Northern States Power Co. for the lead BWR, Monticello, that NRC wouldn't be able to "leverage one plant against the other."

If YAEC had filed a license extension application as a third party, it would not have been constrained

to maintain that uniformity.

Ultimately, Yankee's unique design proved to be its undoing. On February 26, 1992—41 months after YAEC received DOE's proposed contract for the five-year lead plant effort—the YAEC board voted to permanently close the unit. Yankee had been "voluntarily" shut down the previous October after the NRC staff recommended that it be laid up until questions regarding the degree of embrittlement of its reactor pressure vessel (RPV) could be resolved. They never were.

Yankee's RPV design made it virtually impossible—or at least extremely expensive—to answer the questions NRC and intervenors had posed. The RPV's configuration severely limited inspection of the beltline weld region. Yankee's vessel consists of a rolled 0.109-inch-thick stainless steel sheet welded in several locations—but not completely bonded—to the shell. That incomplete bond made ultrasonic inspection of the welds very difficult, because the "gap" between the cladding and the vessel shell hindered the ultrasonic instruments' ability to accurately identify and size weld flaws.

Yankee's RPV also has a thermal shield just inside the vessel wall. The proximity of the shield to the vessel shell restricts the accessibility to the beltline region and restricts inspections of critical welds. To position instruments for inspection, the thermal shield would have to be destroyed and removed, unless new tools were manufactured to make the welds accessible. YAEC started investing in new inspection equipment, but that cost a lot and the economics of saving Yankee—which already wasn't selling electricity at a competitive price in recession-ravaged New England—just didn't add up.

YAEC even briefly considered replacing the RPV. Though DOE's Sandia National Laboratories concluded that the replacement was "technically achievable," the decision on replacement was ultimately an economic one. It was estimated that RPV replacement could be paid off over 20 years with a rate increase of 1/2 to 1 cent per KWH for the first year, which would drop to 0.1 cent the last year. Of course, that payback scenario assumed license extension.

at the same rate as before annealing, but that embrittlement restarts from a point of greater ductility—a "lateral shift" in the embrittlement curve. Russian experience in annealing 13 reactor vessels has verified the lateral shift approach to analyzing re-embrittlement, Hiser said. Even if an annealing job does not repair all flux damage, he said. "You will always end up better (after an annealing), but there's no significant impact on the rate of embrittlement."

However, each reactor vessel responds to fluence according to the particular circumstances of its construction, including the type of material used in the steel and the welds. The rate of fluence accumulation before and after annealing will also have an effect, Hiser said.

"Assuming the same rate of fluence accumulation of the vessel and 100% recovery (from embrittlement), the vessel should be good for the same period as before you annealed," Hiser said.

Hiser's views on annealing and re-embrittlement are based on more than a decade of research on the topic in the U.S., where sample coupons have been tested many times for embrittlement rates and response to annealing, and on full-vessel annealing in Russia.

Westinghouse has moved strongly into the nascent field. David Howell, manager of engineering services for the vendor, said, "The nuclear industry needs this program for life extension and to meet license requirements, plus we see annealing as a sales opportunity."

Westinghouse has raised more than \$2-million of \$4-million it is seeking from the industry to conduct an annealing demonstration at the never-completed Marble Hill reactor in Indiana. Westinghouse plans to use indirect gas-fired heating to raise the vessel's temperature. Extensive monitoring will be designed to answer critical engineering questions, such as how the process affects nozzles and pipes attached to the vessel.

Westinghouse faces competition from a team formed of Framatome subsidiary B&W Nuclear Technologies, MPR Associates Inc. of Alexandria, Va., and a consortium called Russian Annealing Moht. The moht, or consortium, is formed of Moscow's Kurchatov Institute; vendor Gidropress; Cnittmash; and other Russian organizations, which has annealed 13 vessels in Russia. MPR Associates principals Bill Schmidt and Noman

Cole praise the Russian technology, which relies on electric resistance heating, as simple and reliable. Schmidt said that Electricite de France (EDF) specialists who met with his company said that they were concerned that the Westinghouse process could not be licensed in France because of the dangers of working with natural gas.

U.S. annealing specialists visited Novovoronezh in 1992 to witness the annealing of a VVER-440 vessel. The Russian approach is different, the specialists say, because Russian vessels are made of ring forgings, so the circumferential weld area to be annealed is only about three feet wide. U.S. reactors, which are longer and have axial welds, would have to be annealed in a band about 12 feet wide. Also, some U.S. reactors would require annealing on plate sections.

MPR's Cole said that the recovery in RT-NDT at Novovoronezh was greater than 80%. While Russian annealing specialists have achieved recovery of 100% in that index of PTS vulnerability from some annealing projects, they guarantee recovery of 80% from their annealing process.

Keith Wichman, annealing specialist with NRC's research arm, agreed Russian annealing projects have achieved recovery rates over 90%. That level of recovery is equivalent to full recovery for his purposes, Wichman said, adding that above 90% recovery, distinctions are meaningless.

No full-scale annealing project is now on the drawing boards at an operating U.S. reactor, despite the optimism of the annealing vendors. Utilities have reason to be cautious, since the first utility to anneal almost certainly will have to pay extra to defray the costs of licensing the process and the extra costs associated with the learning curve on the technology.

In any event, the first U.S. annealing likely will not take place before the turn of the century, since other methods of lowering embrittlement rates will work until then. Jack Hanson, an annealing specialist at Palisades, said his utility's decision on annealing would be governed by the economics of the process when license renewal is evaluated years from now. Hanson added that the most important factor in that calculation will be the price of natural gas—the strongest competitor to nuclear power plants.

NRC DRAFT ENVIRONMENTAL REVIEW RULE ANGERS STATES

In addition to the safety reviews, NRC will require an environmental review as part of the license renewal process. NRC's proposed amendments to tailor the existing environmental review rule (10 CFR Part 51) to the license renewal process have come under attack by states for what they view as an attempt by NRC to preempt their traditional review of need for generating

capacity and alternate energy sources.

The amendments include a draft Generic Environmental Impact Statement (GEIS), published in September 1991, in which NRC decided to treat the issues of need for power and alternative energy sources in the same way they are handled in an operating license review. While the agency performs a detailed analysis



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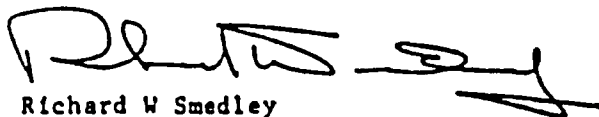
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COMPLIANCE WITH PRESSURIZED THERMAL SHOCK REGULATION 10CFR50.61 AND REGULATORY
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Consumers Power Company (CPC) submittal on April 3, 1989 provided a revised report on reactor vessel fluence for Cycles 1 - 8. Attached is the vessel fluence reduction report describing the effect of incorporating low-leakage fuel management for the Cycle 9 core loading pattern. In this proposed Cycle 9 design, 16 thrice-burned fuel assemblies with zircaloy-clad hafnium absorber rods will be used at the selected core peripheral locations to protect the vessel axial welds from neutron fast flux $E > 1.0$ MeV. Remaining core peripheral locations will be loaded with twice-burned fuel assemblies. All once-burned and fresh fuel assemblies will be inside the core away from the peripheral locations.

This report reflects results based upon the development of in-house methodology utilizing the DOT 4.3 discrete ordinates transport code and Reactor Engineering Analyses performed during the period of 1987-1990. It concludes that the PTS screening criteria will be exceeded at the axial welds in September, 2001, as opposed to the previously reported exceed date of March, 2002. The difference reflects an improvement in vessel flux reduction in Cycle 9 relative to Cycle 8 and slightly higher vessel flux levels calculated by the refined in-house transport methodology relative to the Westinghouse methodology previously utilized. Thus, the previously

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Palisades Nuclear Plant
Thermal Shock Reg 10CFR50.61/Reg Guide 1.99 Rev 2
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derived conclusion that the flux reductions achieved in the Cycle 8 and 9 core loading patterns are, by themselves, insufficient to allow plant operation to the current expected end of life in 2011 remains valid. Further measures, eg, greater flux reduction, Regulatory Guide 1.154 analysis, vessel shielding etc, are necessary to allow plant operation to the nominal end of plant life and beyond.



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**ANALYSIS OF THE REACTOR PRESSURE VESSEL FAST NEUTRON FLUENCE
AND PRESSURIZED THERMAL SHOCK REFERENCE TEMPERATURES
FOR THE PALISADES NUCLEAR PLANT**

May 1990

Performed by the
Reactor Engineering Department
Palisades Nuclear Plant
Consumers Power Company

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1.0 INTRODUCTION

Consumers Power Company previously submitted to the NRC a report describing Cycle 8 fluence reduction measures for the Palisades Nuclear Plant reactor pressure vessel [1]. It was committed that an additional fluence report reflecting Cycle 9 fuel management and extrapolated to nominal plant end-of-life would be submitted to the NRC. The information contained herein is intended to address the fluence re-evaluation and reduction program as previously committed to and to describe the methodology utilized for determining vessel incident fast fluxes and fluence levels.

In order to accurately calculate pressure vessel fluence levels, in-house methodology was developed utilizing the DOT 4.3 discrete ordinates transport code as the base model. Training in the use of DOT 4.3 and associated cross section libraries and support codes was obtained from Combustion Engineering. The scope of the training included code usage and model development as well as results evaluations. In-house methodology of flux calculations was further refined via consultation with Westinghouse Electric Company, Radiation and Systems Analysis-Nuclear Technology Division. Westinghouse determined that Consumers Power's neutron transport methodology represented state-of-the-art practice consistent with Westinghouse methodology [2,8].

The modeling of the vessel and fluence analysis was performed using DOT 4.3 and the SAILOR cross-section library. Cycles 1 through 7 core loading patterns were typical of out-in fuel management in that the fresh fuel was placed on the core periphery. This approach results in the maximum overall core neutron leakage and flux to the reactor pressure vessel. The Cycle 8 core was loaded with thrice burned fuel assemblies with stainless steel shielding rods located near the axial weld locations. In the previously submitted report [1], flux reductions of a factor of two were achieved at the axial weld locations from the Cycle 8 loading pattern. The design goal for Cycle 9 was to meet or exceed the flux reductions achieved in Cycle 8. The proposed Cycle 9 loading pattern consists of thrice burned fuel assemblies with hafnium absorbers located at the same core peripheral locations that utilized stainless steel shielding rods in

Cycle 8. The remaining core peripheral locations will be loaded with twice burned fuel assemblies. All of the new fuel assemblies will be located within the core interior.

In this report, cycle-specific calculations have been performed for Cycles 1 through 9. Results presented address the accumulated vessel fluence through the end of Cycle 7 as well as the flux reductions obtained for the Cycle 8 (currently in operation) and Cycle 9 (under design) low leakage loading patterns. Vessel fluence limits based on the 10CFR50.61 PTS screening criteria and both the 10CFR 50.61 and Regulatory Guide 1.99, Revision 2, reference temperature correlations are calculated based on the vessel material chemistries. Vessel lifetimes are calculated relative to the fluence limits assuming the flux-reduction fuel management for Cycle 9 and beyond utilizing the Regulatory Guide 1.99, Revision 2 reference temperature correlations. In addition, details are provided about the in-house methodology and data [3] and the status of Consumers' in-house flux reduction and measurement program.

2.0 SUMMARY

Neutron transport calculations were performed using the DOT 4.3 computer code and SAILOR cross section library. The 2D R-8 neutron fluxes ($E > 1.0$ MeV) were computed using DOT 4.3 with consideration of axial flux peaking. For each of Cycles 1 through 9, cycle specific DOT runs have been made. For Cycles 1 through 7 on-line core monitoring energy generation data and actual cycle operational history data were utilized for vessel flux and fluence calculations; calculations for Cycles 8 and 9 utilized predictive core simulator data. A comparison between calculated and measured fluxes at the W-290 wall capsule location, analyzed at the end of Cycle 5, was made. It was found that the calculated fluxes were about 4X higher than the measured values, thus assuring reasonable flux predictions for the models.

Flux levels for Cycle 8 were compared with that of Westinghouse methodology [1]. The in-house model indicates a positive bias in the flux calculations relative to the Westinghouse methodology and this bias varied with the azimuthal locations. Maximum variation was on the order of about 12% at 45° location [3].

Pressure vessel fluence limits based on the PTS screening criteria of 10CFR50.61 were calculated using the reference temperature (RT) correlations of both 10CFR50.61 and Regulatory Guide 1.99, Rev 2 using the vessel chemistries provided in Reference 4. The results are summarized in Table 2.1 and show the dramatic reduction in the vessel weld fluence limits with the use of the Regulatory Guide 1.99 RT correlation. With the pending issuance of a revised 10CFR50.61 incorporating the Regulatory Guide 1.99, Rev 2 RT correlation, the more restrictive Regulatory Guide fluence limits were utilized in this study.

Core loading patterns for Cycles 8 and 9 are designed to provide substantial flux reduction at the axial weld locations in comparison to previous cycles. The associated flux reductions for the primary vessel materials are shown in Table 2.2. Fast flux ($E > 1.0$ MeV) reductions of more than 50% were obtained at the axial weld locations for Cycles 8 and 9 in comparison with Cycle 7. For Cycle 8, at the circumferential weld and base metal (peak) locations, about 20%

flux reduction was obtained. However, for Cycle 9 the flux reductions are on the order of 48% at these locations.

Vessel lifetimes based on when the PTS screening criteria are met were determined for fuel management schemes with flux reduction for Cycles 8, 9, and beyond. Operation beyond end of Cycle 8 (September 1990) was assumed to occur at 75% capacity. With no flux reduction utilized, the PTS screening criteria would be exceeded at the axial welds in 1995; utilizing Cycle 8 flux reductions, this would be extended to 2000. With flux reduction incorporated in Cycle 9 and beyond, the PTS limit would be exceeded at the axial welds again, but not until about September, 2001. These predicted dates are far short of the assumed nominal plant operating license expiration date of March, 2011.

While the flux reduction obtained in Cycles 8 and 9 substantially reduced the axial weld flux levels, the reduction is insufficient to remain within the PTS screening criteria through the minimum plant life (nominal end of operating license). Some additional flux reduction will be possible through more aggressive low-leakage fuel management in Cycle 10 and beyond. However, in order to allow plant operation at least until the nominal license expiration date, additional PTS-addressing measures will have to be implemented (eg, Regulatory Guide 1.154 analysis, vessel shielding, etc). Activities are currently underway with the Combustion Engineering Owners' Group in the areas of additional vessel surveillance data and model development for a Regulatory Guide 1.154 analysis; initial conceptual discussions are underway with other vendors for incorporation of weld specific vessel shielding in Cycle 10.

An ex-vessel dosimetry program was developed by Westinghouse and hardware installation was completed during the end of Cycle 7 refueling outage. This program would supplement the existing surveillance program. In addition to the ex-vessel program, Combustion Engineering will install an in-vessel dosimetry capsule at the W-290 capsule holder vacated following Cycle 5. These in-vessel and ex-vessel dosimetry programs will provide measured data for use in vessel wall and vessel support fluence evaluations.

Updates on vessel fluence levels and adjusted reference temperatures will be provided to the NRC as actual operational data including vessel dosimetry information is obtained. In addition, developments in fuel management, vessel materials information, vessel shielding and other PTS-related areas that substantially impact the vessel lifetime will be reported as required in 10CFR50.61.

3.0 METHODOLOGY

3.1 Overview

The pressure vessel fast neutron fluence levels ($E > 1.0$ MeV) were calculated utilizing available historical and predictive fuel cycle information.

The primary analytical model was based on a two dimensional (R, θ) discrete ordinates code DOT 4.3 representation [5] of the Palisades reactor vessel configuration. The representation includes a model of the core/vessel geometry, the neutron source distribution, and nuclear interactions as represented by cross section data. Measurement data was available for comparison from an analysis of radiometric dosimeters irradiated in the W-290 vessel wall surveillance capsule [6], which was removed at the end of Cycle 5. The measured fast neutron flux as calculated from the measured activities using reactor power history, dosimetry cross sections and basic nuclear data was used to compare the DOT calculated neutron fluxes for Cycles 1 through 5. Individual DOT calculations for remaining Cycles 6 through 9 were also made. To-date fluence levels were calculated and end-of-life fluence levels were extrapolated based upon anticipated capacity factors for the remaining life of the Palisades Plant.

3.2. Fuel Management

Palisades followed a standard out-in fueling scheme through Cycle 7 (Figure 3.1). In this scheme, only fresh fuel was placed around the core periphery. This approach results in the maximum overall core neutron leakage and fast flux to the reactor vessel, but minimizes power peaking and generally provides the greatest thermal margin.

Utilization of the Regulatory Guide 1.99, Rev 2, reference temperature correlations for comparison to the 10CFR50.61 PTS screening criteria determined that the axial welds would be responsible for limiting the life of the Palisades reactor vessel. It was decided to alter the fuel management strategy to

distribute the power away from these critical weld locations for Cycle 8 operation. A low leakage loading pattern was adopted to improve the neutron economy and to reduce the fluence levels at the axial welds.

A total of 16 thrice-burned stainless steel shielded assemblies were installed at the core periphery. In addition, eight twice burned assemblies were placed on the core periphery. The remaining 24 peripheral locations were filled with fresh fuel assemblies (Figure 3.2). With this arrangement, it was anticipated that the reduced power in the peripheral assemblies would reduce the primary source of fast neutrons reaching the reactor vessel axial welds.

Design of the Cycle 9 core is based upon 52 fresh, 60 once-, 76 twice-, and 16 thrice-burned fuel assemblies. All thrice burned assemblies will have zircaloy-clad hafnium rods placed in eight guide tube locations. These assemblies will be placed on the edge of the core near critical weld locations (Figure 3.3). Hafnium is an effective absorber primarily for neutrons in the thermal through epithermal energy ranges. It is anticipated that the power in these thrice-burned fuel assemblies will be greatly reduced along with the neutron source. Therefore, there will be fewer neutrons reaching the vessel at the critical weld locations.

3.3 Geometry

The Palisades reactor exhibits one-eighth ($1/8$) core symmetry, thus only a zero to 45 degree sector has been included in the DOT model (Figure 3.4). In this figure two surveillance capsules attached to the inner vessel wall are shown. A plan view of the Palisades capsule arrangement is shown in Figure 3.5, with specific surveillance capsules dimensions shown in Figure 3.6. Figure 3.5 shows that four of the 45 degree sectors do not have any capsules. Two other sectors have one accelerated (attached to core support barrel) and one wall capsule. The remaining two sectors have two vessel wall capsules at the 10° and 20° locations. The utilized DOT model contains two wall capsules at the 10° and 20° locations. This model utilizes 99 radial and 98 azimuthal intervals for a total of 9702 meshes in polar (R, θ) geometry. Fine mesh detail has been utilized as necessary in setting up the geometry model to accurately represent the reactor core, shroud, bypass flow, core support barrel, inlet

flow, surveillance capsules, vessel clad and the vessel wall regions. A total of 15 outer assemblies have been modeled to represent the detailed core; the total model mesh extends to just outside the vessel in the reactor cavity area. Various regions of the DOT model are represented in such a way that their volumes are close to that of the physical volumes of the reactor internals.

3.4 Material Cross Sections

The DOT model analysis employed a P_3 expansion of the scattering cross sections. The microscopic cross sections used in the analysis were obtained from the SAILOR cross section library. Macroscopic cross sections were calculated for each region in the model using the computer code GIP. Plant specific material compositions and the corresponding atomic densities were used for this analysis.

3.5 Neutron Source

Assembly-wise radial power distributions were obtained from the Palisades incore monitoring system (INCA) for Cycles 1 through 7; fuel vendor-generated discrete PDQ bundle power data were used for Cycles 8 and 9. Average energy generated by fuel assemblies was obtained from the exposure data and the heavy metal weight of the assemblies to calculate cycle average assembly powers. Figures 3.7 through 3.15 exhibit the fifteen (15) outer peripheral normalized bundle powers for Cycles 1 through 9. Cycle 8 actual assembly power data to date is adequately modeled by utilizing the predictive core simulator information. Local pin power distributions were derived from discrete PDQ model calculations. The local pin power distributions and the average assembly powers were combined to determine core normalized pin power distributions.

Axial peaking was accounted for by applying the bundle specific axial peaking factors to the normalized pin powers of the fifteen modeled fuel assemblies. This approach conservatively defines the axial variation of the vessel incident neutron/source. Axial power information was obtained from INCA core monitoring data for Cycles 1 through 7 and 3D XTC core simulator models for Cycles 8 and 9. The core power distributions were initially calculated in Cartesian (x,y) geometry from the original data sources. The Cartesian geometry was converted to a polar (R, θ) geometry using an algorithm that maintained equivalent average source strength over the affected surface area between coordinate systems.

3.6 Burnup Corrections

As the fuel starts to deplete in the core during plant operation, exposure of the individual fuel assemblies increases and a build up of plutonium isotopes occurs. Plutonium isotopes have higher ν (neutrons/fission) and κ (energy/fission) values and exhibit fission spectra shifted towards the higher energies (harder spectra) than uranium isotopes. The contributions of the individual isotopes U235, U238, Pu239 and Pu241 to the core neutron source have been accounted for in the present set of flux calculations. Since the fission spectra and effective neutron yield differs for the above isotopes, the core neutron source and the vessel wall flux will generally increase with the fuel depletion for given peripheral assembly power levels. This is especially important for the twice and thrice burned fuel at the core periphery for Cycles 8 and 9. Composite fission spectra for each of Cycles 1 through 9 have therefore been developed. Individual isotopic fission spectra were obtained from ENDF-B/V for the uranium and plutonium isotopes. The spectra were collapsed to 47 energy groups similar to the SAILOR Library [7]. The exposure dependent neutron source for each cycle was then determined by weighting the individual group-wise neutron yields with the corresponding exposure dependent isotopic fission fractions based on the cycle average exposure of five peripheral assemblies. Only 19 groups above 1 MeV have been employed in the DOT model for the fast flux calculations. Cycle specific fission spectra are shown in Table 3.1 in comparison with the SAILOR Library fission spectra. Fission spectra are normalized to one (1) neutron in the 47 groups, similar to the SAILOR Library. From Table 3.1, it can be noted that high energy neutron groups have higher yields for Cycles 8 and 9, compared to the previous seven cycles.

In the DOT model, cycle-specific ν/κ ratios for fifteen (15) fuel assemblies were obtained from CASMO lattice depletion code data for a standard Palisades fuel type, utilizing middle-of-cycle exposure values. The effect of neutron yield and energy generated in these assemblies were incorporated in the neutron source. These effects are more important on the fast flux at the reactor vessel for Cycles 8 and 9 as compared to previous Cycles 1 through 7.

3.7 Neutron Transport Analysis

The spatial distribution of neutron flux in the reactor was calculated using the DOT 4.3 computer code. The DOT program solves the Boltzman transport equation in two-dimensional geometry using the method of discrete ordinates. Third order scattering (P_3) and S_8 angular quadratures were used. The cycle-by-cycle neutron flux distributions were calculated using the cycle-dependent neutron sources and material compositions.

3.8 Vessel Fluence Calculations

Fluence levels of a given cycle were obtained by multiplying the flux at the clad-base metal interface by the effective full power seconds at 2530 MWTM for that cycle. Accumulated fluence values at the EOC 8 were calculated by adding the fluence for all the Cycles 1 through 8. Further extrapolation to end-of-life fluence is based upon the estimate that the plant will operate at 75% capacity factor after EOC 8 at the calculated fluence rate for the Cycle 9 proposed core loading scheme.

3.9 Fluence Limits/Reference Temperature Calculations

Target fluence limits for pressure vessel welds and base metals are calculated using the 10CFR50.61 correlation for RT_{PTG} and the vessel material PTS screening criteria. The reference temperature correlation is given as:

$$RT_{PTG} = I + M + (-10 + 470Cu + 350CuNi)F^{0.270}$$

where:

RT_{PTG} is the adjusted reference temperature for pressurized thermal shock considerations ($^{\circ}F$)

I is the initial reference temperature ($^{\circ}\text{F}$)

M is the margin term ($^{\circ}\text{F}$)

Cu, Ni are the copper and nickel content (in weight percent), respectively

f is the accumulated fluence ($E > 1.0 \text{ MeV}$) in units of 10^{19} n/cm^2

The corresponding fluence limits are determined by solving the RT correlation for the fluence value. Initial reference temperature and chemistry information and corresponding fluence limits are shown in Table 3.2.

Target fluence limits for pressure vessel welds and base metals are also calculated using Regulatory Guide 1.99, Rev 2 reference temperature correlation and the 10CFR50.61 PTS screening criteria. The adjusted reference temperature for each material in the beltline is given as:

$$\text{ART} = \text{Initial RT}_{\text{NDT}} + \Delta \text{RT}_{\text{NDT}} + \text{Margin}$$

or

$$\text{ART} = I + M + \Delta \text{RT}_{\text{NDT}}$$

$$\text{where: } \Delta \text{RT}_{\text{NDT}} = (\text{CF} \cdot f^{(0.25 - 0.10 \log f)})$$

I, M and f have the same meaning as above. The chemistry factor, CF ($^{\circ}\text{F}$) depends on the content of copper and nickel in the belt line materials. This factor is provided in Regulatory Guide 1.99, Rev 2. The corresponding fluence limits are determined by solving the RT correlation for the fluence value and are shown in Table 3.3.

For each Cycles 1 through 9, fluence values were obtained for the base metal, and axial and circumferential weld materials. Using the parameters of Table 3.3 and the accumulated fluence at the end of each cycle, the corresponding adjusted reference temperatures were calculated.

4.0 RESULTS

4.1 Comparison to Measured Data

The W-290 surveillance capsule was removed at the end-of-Cycle 5 and was analyzed by Westinghouse [6]. The measured average flux at the W-290 capsule was corrected for a discrepancy in the power irradiation history data (Figure 4.1) versus that utilized in Reference 6. The corrected measured flux at the W-290 capsule was 6.73×10^{10} n/cm²-sec. DOT calculations for Cycles 1 through 5 provide a cycle-energy averaged flux at the W-290 locations of 7.02×10^{10} n/cm²-sec [3], 4% higher than the measured value. It was also noted that the lead factors obtained for Cycles 1 through 5 from DOT calculations were fairly constant (between 1.24-1.27). These facts indicate that calculated flux values from the in-house DOT results can be directly used for reasonable end-of-life fluence calculations. It should be noted that these results are a slight improvement over the DOT calculations utilized in Reference 1, which exhibited a +11% bias relative to the measured W-290 fluxes.

4.2 Flux/Fluence Distribution

For Cycles 1 through 9, the maximum fast flux occurs at the azimuthal interval between 16.44°-17° at the clad-base metal interface (Table 4.1). Flux distributions for Cycles 3 through 7 are very similar. Comparison of flux distribution between different cycles is presented in Figures 4.2 and 4.3. These figures confirm that the maximum flux occurs around 17°. Wall capsules at 10° and 20° exhibit an attenuating effect in their immediate vicinities, but do not affect the peak fluxes. For Cycles 1 through 7, a second peak occurs around the 32° azimuthal location. For Cycles 8 and 9, this peak is eliminated as a result of the implementation of low leakage fuel management schemes. Substantial flux reduction for the low leakage fuel management schemes relative to the high neutron leakage loading patterns is apparent. Radial flux distributions at the 0, 17 and 30 degree azimuthal locations for Cycles 7 (representative of previous cycles), 8 and 9 are presented in Appendix 7.1.

Accumulated fast fluence distributions at the end of Cycle 9 and EOL at the clad-base metal interface is shown in Figure 4.4. Based upon Reg. Guide 1.99, Revision 2, fluence limits corresponding to base metal, axial, and circumferential welds are also presented in Figure 4.4. From this figure it can be noted that the fluence values at the axial welds at 0° and 30° are limiting the life of the Palisades reactor pressure vessel.

Table 4.2 summarizes the cycle specific fluence ($\Delta\Phi$) and accumulated fast fluence ($\Sigma\Phi$) at the clad-base metal interface for each of Cycles 1 through 9. For the selected azimuthal locations: 0° (axial weld location), 17° (maximum of peak at base metal), 30° (axial weld location) and 45°, effective full power years (Δ EFPPY) for each cycle and the accumulated EFPY's are also presented. Table 4.3 provides the fluence limit violation dates with Cycle 9 fluence rates for plant operations beyond the end of Cycle 8 date of September, 1990.

4.3 Calculational Uncertainty

A number of factors contribute to the uncertainty in the projected peak fast fluence at the reactor vessel wall. These factors are due to the conversion of measured activity data to fluxes, uncertainties in material composition, neutron cross sections, power distributions, as-built core/vessel dimensions and cycle-by-cycle variation in the fast flux lead factors. An uncertainty of $\pm 25\%$ is estimated in the calculated vessel wall fluence, typical of current neutron transport methodology uncertainties. The calculated +4% flux bias relative to actual W-290 measured fluxes indicates that vessel wall flux predictions are reasonable given the inherent uncertainty in the methodology.

4.4 Adjusted Reference Temperatures and Screening Limits

Adjusted reference temperatures (ARTs) as a function of effective full power years (EFPYs) corresponding to the fluence values at the end of Cycle 1 through 9 and projected to plant EOL, have been plotted in Figure 4.5. PTS screening limits for each of the beltline materials are provided. This figure

suggests that the axial welds are the limiting material for the Palisades reactor pressure vessel relative to PTS limits. Table 4.4 provides the summary of PTS adjusted reference temperatures for base metal, axial and circumferential weld materials. Note that for the licensed end-of-life date of March, 2011, ARTs for the axial welds at 30 degrees exceed the PTS screening limit of 270°F.

5.0 DISCUSSION

5.1 Impact of Results

Modifications to the Cycles 8 and 9 loading patterns substantially reduce the flux at the critical weld locations and delays exceeding the PTS screening criteria to about September 2001, as opposed to in 1995 if no flux reduction measures are taken. The flux reduction is insufficient, however, to allow operation of the plant within the PTS screening criteria until the minimum expected plant life, corresponding to the expiration of the pending full term operating license in March, 2011.

In-house flux calculations have a positive bias with respect to Westinghouse model [1], mainly due to the slightly larger core size in the in-house model. The bias ranges from +0.5% at 0° and increases to about +11.7% at the 45° location. In addition, more realistic plant-specific design and operational data have been utilized in the in-house model. This approach therefore does not depend very heavily on assumptions used for the flux calculations, but relies on the plant specific parameters.

In order to maximize vessel lifetime, further measures must be taken in the areas of greater flux reduction, Reg Guide 1.154 analysis to properly define the real Palisades PTS risk, and possible vessel annealing/shielding actions to reduce the accumulated vessel embrittlement rate.

5.2 Additional Flux Reduction

The most straightforward method of reducing the vessel fast flux level is reduction of the source itself, which has been initially addressed with the incorporation of low-leakage fuel management and stainless steel shield rods in Cycle 8 and thrice burned fuel with hafnium absorbers for Cycle 9. While flux reduction gains are predicted for Cycle 9, some further reductions are believed to be obtainable via fuel management alone. Cycle 9 will be the first cycle with the new steam generators installed. The new generators are expected to provide substantially higher primary coolant flow than the current generators.

The increased flow, which can be quantified accurately during Cycle 9 operation, will provide additional core operating thermal margin and thus allow higher power peaking limits to be utilized in developing the Cycle 10 loading pattern. The higher peaking will provide additional fuel management flexibility and support more aggressive low-leakage fuel management for further reductions in vessel wall fluxes.

Additionally, Cycle 9 will be the first cycle to incorporate a new high thermal performance (HTP) spacer grid design in the fresh reload fuel. Insertion of a second reload of fuel with the HTP spacers in Cycle 10, along with development of a Palisades-specific DNB correlation for the HTP fuel, will provide additional allowable peaking factor increases to be utilized in Cycle 10.

A third area design to allow greater fuel management flexibility in the Cycle 10 core design will be the installation, utilization, and optimization of a new full core power monitoring system beginning in Cycle 9. This monitoring system will allow the Cycle 10 loading pattern design to utilize 1/4 core symmetry, as opposed to current 1/8 core symmetry utilized in Cycles 1-9, and will provide more options for reducing power and flux levels in peripheral fuel assemblies.

Discussions have been held with NSSS vendors on the possibility of installing critical material area neutron shields. A shield between the fuel and the vessel wall would act to reflect, slow down, or absorb high-energy neutrons before they could reach the vessel wall. Stainless steel shielding pads could be designed to mount near the core support barrel to maximize the attenuation of the high energy neutrons of concern. The possibility exists to use other hybrid materials which are better neutron shielding than stainless steel and therefore provide further neutron flux reduction beyond that attainable with low leakage fuel management alone. It is estimated that internal vessel shielding could reduce the flux at the critical axial weld locations a minimum of 25%.

5.3 Refined Flux Measurement

In order to benchmark vessel fluence calculations, an upgraded vessel dosimetry program has been initiated to supplement the existing surveillance capsule program. An ex-vessel dosimetry program was developed by Westinghouse and hardware installation occurred during the end of Cycle 7 refueling outage. The
HI0490-0055A-OP03

dosimetry installed will provide detailed azimuthal and axial mapping of the 270-360 degree vessel quadrant, with gradient chains installed in the other three quadrants to provide accurate axial and cross-quadrant mapping. It is intended to exchange this dosimetry at the end of Cycle 8 with similar sets of dosimeters for the Cycle 9 irradiation period. The dosimetry will provide measured data for use in vessel wall and supports fluence evaluations. In addition to the ex-vessel program, Combustion Engineering has been contracted to fabricate and install a replacement in-vessel dosimetry capsule to be inserted into the W-290 capsule holder vacated following Cycle 5. Installation will occur during the next refueling outage (Fall 1990). When installed, this capsule will provide an excellent through-wall correlation with the ex-vessel dosimetry installed in the same quadrant.

In addition to implementing the supplemental dosimetry program, efforts will be made to extend the DOT model up to the reactor cavity area to analyze the ex-vessel dosimeters. A further enhancement planned to the DOT model will be to synthesize a 3-D model for flux calculations to remove some of the inherent conservatism in the calculations due to utilization of the bundle-specific peak axial power over the entire core axial height.

5.4 Other PTS Activities

Planned flux reduction measures do not appear to fully solve the vessel fluence issue relative to PTS. Consumers Power Company is pursuing a methodology through the Combustion Engineering Owners Group (CEOG) to augment plant data by correlating surveillance material and data from other plants to Palisades vessel materials. Such data could allow Palisades to reduce operating restrictions caused by Regulatory Guide 1.99, Rev 2/10CFR50.61 default margin terms and initial reference temperatures for generic weld material in absence of actual Charpy weld test specimen data.

A detailed risk evaluation based on Regulatory Guide 1.154 analysis is also being pursued through CEOG. Such analysis will identify and summarize the potential risk of a PTS event occurring. This risk would be based on the known

operating activities or transients which could lead to a PTS event. The program is being undertaken in a phased approach with the currently in-progress Phase I dealing with generic model development only. The analysis, if actually needed, would be completed at least three years prior to the predicted exceed date of the PTS screening criteria.

6.0 REFERENCES

1. Letter from R W Smedley (CPCo) to NRC, "Docket 50-255 - License DPR-20 - Palisades Plant - Compliance with Pressurized Thermal Shock Rule 10CFR50.61 and Regulatory Guide 1.99 Revision 2 - Fluence Reduction Status (TAC No. 59970)," April 3, 1989.
2. Letter from J C Hoebel (Westinghouse) to R A Klavon (CPCo) "Interim Report of Westinghouse Review of Consumers Power PTS Calculations," August 29, 1989.
3. Engineering "Analysis Package for PTS study, Reactor Engineering Department, Palisades Plant (1987-90).
4. Letter from K W Barry to NRC, "Response to Request for Additional Information - Pressurized Thermal Shock (PTS) Rule 10CFR50.61," August 7, 1986.
5. RSIC Computer Code Collection DOT IV Version 4.3 (Report No. CC-429).
6. WCAP - 10637, Analysis of Capsules T-330 and W-290 from the Consumers Power Company Palisades Reactor Vessel Radiation Surveillance Program, M K Kunka and C A Cheney, September, 1984.
7. RSIC Library Collection SAILOR DLC-76.
8. Telecopy of E.P. Lipincott (Westinghouse) to O.P. Jolly (CPCo), "Final Report on Westinghouse Review of Consumers Power PTS Calculations," April 20, 1990.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

May 19, 1995

NRC GENERIC LETTER 92-01, REVISION 1, SUPPLEMENT 1: REACTOR VESSEL
STRUCTURAL INTEGRITY

Addressees

All holders of operating licenses (except those licenses that have been amended to possession-only status) or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this supplement to Generic Letter (GL) 92-01, Revision 1, to require that all addressees identify, collect and report any new data pertinent to analysis of structural integrity of their reactor pressure vessels (RPVs) and to assess the impact of that data on their RPV integrity analyses relative to the requirements of Section 50.60 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.60), 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, (which encompass pressurized thermal shock (PTS) and upper shelf energy (USE) evaluations) and any potential impact on low temperature overpressure (LTOP) limits or pressure-temperature (P-T) limits.

Background

The staff issued GL 92-01, Revision 1, "Reactor Vessel Structural Integrity," on March 6, 1992, to obtain information necessary to assess compliance with requirements regarding RPV integrity in view of certain concerns raised in its review of RPV integrity for the Yankee Nuclear Power Station. All licensees submitted the information requested by July 2, 1992. Following receipt and review of licensee supplements responding to requests for additional information, the staff completed its review of licensee responses to GL 92-01, Revision 1, in the fall of 1994. The staff issued NUREG 1511, "Reactor Vessel Status Report," summarizing key aspects of the work in December 1994 [Ref. 1].

The staff has recently reviewed data relevant to the PTS evaluations of several plants. These reviews showed that licensees may not have considered all pertinent data in their responses to GL 92-01, Revision 1, or in their RPV integrity evaluations. It has now become apparent to the staff that no single organization has all the data relevant to RPV integrity evaluations. A major complicating element in this regard is that proprietary considerations have inhibited effective sharing of information.

It has been demonstrated that some RPV integrity evaluations are very sensitive to consideration of new data. For example, under certain conditions, changing the mean copper content for the limiting vessel beltline material by a few hundredths weight percent can change the predicted date for reaching the PTS screening criteria of 10 CFR 50.61 by several years. In addition, changes in estimates of mean copper content can affect the validity of PTS evaluations based on surveillance data. The staff will be considering the impact of these findings in plant-specific evaluations and in its longer-term reassessment of 10 CFR 50.61. PTS is a concern only for pressurized water reactors (PWRs) because boiling water reactors (BWRs) operate with a large inventory of water at saturated steam conditions and, therefore, are not subject to PTS.

However, in addition to concerns regarding PTS evaluations, consideration of additional, unreviewed RPV data can also affect evaluations for USE, P-T limits, and LTOP limits. These evaluations pertain to both PWRs and BWRs, except for LTOP limits, which apply only to PWRs. The staff recognizes that addressees have previously submitted data pertinent to these evaluations as required by the regulations and in responses to GL 92-01, Revision 1, and GL 88-11.

Based on currently available information, the staff believes that the near-term focus for RPV integrity will be the Palisades RPV which is predicted to reach the PTS screening criteria by late 1999, before any other plant. However, because of the importance of RPV integrity and the potential impact of additional, unreviewed data on existing RPV evaluations, the staff believes that this issue needs to be resolved on an expedited basis. Although the issues raised in this GL supplement were highlighted by concerns pertaining to PTS analyses, licensees should consider the effect of the reexamination of RPV data on all aspects of RPV structural integrity.

Regulatory Requirements

As required by 10 CFR 50.60(a), licensees for all light water nuclear power reactors must meet fracture toughness requirements and maintain a material surveillance program for the reactor coolant pressure boundary. These requirements are set forth in Appendices G and H to 10 CFR Part 50. 10 CFR 50.60(b) provides that proposed alternatives to the requirements of Appendices G and H to 10 CFR Part 50 may be used when an exemption is granted under 10 CFR 50.12. 10 CFR 50.61 provides fracture toughness requirements for protecting PWRs against PTS events. Licensees and permit holders have also made commitments in response to GL 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations," to use the methodology in Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," to predict the effects of irradiation as required by Paragraph V.A of Appendix G to 10 CFR Part 50.

Discussion

The staff focused its examination of the GL 92-01, Revision 1, data and other docketed

below or the appropriate NRR project manager.
/s/d by RPZimmerman

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Attachments: 1. References
2. List of Recently Issued NRC Generic Letters

(NUDOCS Accession Number 9505090312)

ATTACHMENT 1

GL 92-01, Rev. 1, Supp.
May 19, 1995

References

- [1] NUREG-1511, "Reactor Pressure Vessel Status Report," U.S. Nuclear Regulatory Commission, Washington, DC, December, 1994.
- [2] Letter from Elinor Adensam, USNRC, to Kurt Haas, Consumers Power Company forwarding, "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Evaluation of the Pressurized Thermal Shock Screening Criteria, Consumers Power Company, Palisades Plant, Docket No. 50-255", April 12, 1995.



EXHIBIT 1 K

POLICY ISSUE **(Information)**

October 28, 1994

SECY-94-267

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: STATUS OF REACTOR PRESSURE VESSEL ISSUES

PURPOSE:

To provide an update of the status of plants with regard to Appendix G, "Fracture Toughness Requirements," to Part 50 of the Code of Federal Regulations (10 CFR) and 10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events."

BACKGROUND:

In SECY-93-048, the staff of the Nuclear Regulatory Commission (NRC) stated that it was performing detailed reviews of licensee responses to Generic Letter (GL) 92-01, "Reactor Vessel Structural Integrity, 10 CFR 50.54(f)." As part of this review, the staff has assessed the upper-shelf energies (USEs), transition temperatures, and reference temperature for pressurized thermal shock RT_{pts} or adjusted reference temperatures (ARTs) for all domestic commercial nuclear power plants. Appendix G to 10 CFR Part 50 requires licensees (1) to operate their reactor vessels with pressure-temperature limits that are dependent on the amount of increase in the transition temperature resulting from neutron radiation, and (2) to maintain the Charpy USE throughout the life of the vessel of no less than 41 Joules (50 ft-lb), unless it is demonstrated that lower values of USE will provide margins of safety against fracture equivalent to those required by Appendix G of the American Society of Mechanical Engineers Boiler and Pressure Vessel Codes (ASME) Code. The analyses submitted by licensees to demonstrate margins of safety equivalent to those required by Appendix G of the ASME Code are called equivalent margins analyses. The increase in the transition temperatures affects the RT_{pts} values for pressurized water reactors (PWRs) that are calculated in accordance with 10 CFR 50.61 and the ART that is calculated in determining the pressure-temperature limits for both PWRs and boiling water reactors (BWRs).

NOTE: TO BE MADE PUBLICLY AVAILABLE
IN 10 WORKING DAYS FROM THE
DATE OF THIS PAPER

Contact:
B. Elliot, NRR/DE/EMCB
504-2709

Plant Name: Palisades

Docket Number: 50-255

NSSS Vendor: Combustion Engineering

Vessel Manufacturer: Combustion Engineering

Edition of ASME Code for Design: Winter 1965 Addenda to 1965 ASME Code

Date of Commercial Operation: December 31, 1971

Date of License Expiration: March 14, 2007

RT_{pts} for the Limiting Beltline Material:

Limiting Beltline Material: Axial welds, heat W5214

ID Fluence at EOL: $1.91E19$ n/cm²

Initial RT_{NOT}: -56°F

Method of Determining Chemistry Factor: Chemistry data per Paragraph C.1.1 of RG 1.99, Rev. 2

Increase in RT_{NOT} at EOL: 265°F

Margin: 66°F

RT_{pts} at EOL: 275°F

Date at which PTS Screening Limit will be exceeded: 2004

USE for the Limiting Beltline Material:

Limiting Beltline Material: Plate D-3804-1, heat C-1308

1/4T Fluence at EOL: $1.615E19$ n/cm²

Initial USE: 72 ft-lb

Percent Drop at EOL: 31%

USE at EOL: 50 ft-lb

Date USE Screening Limit will be Exceeded: After EOL

Bases for Accepting the USE at EOL: Chemistry data per Paragraph C.1.2 of RG 1.99, Rev. 2

REFERENCES:

July 3, 1992, letter from G. B. Slade (CPCo) to USNRC Document Control Desk, Subject: Palisades Plant--Reactor Vessel Structural Integrity--Response to Generic Letter 92-01, Revision 1

February 23, 1994, letter from D.W. Rogers (CPCo) to USNRC

August 31, 1990, letter from G.B. Slade (CPCo) to USNRC

July 12, 1994, letter from A. Hsia (NRC) to CPCo

EXHIBIT 1 L

Office of Nuclear Reactor Regulation
Items of Interest
Week Ending November 4, 1994

SECY-94-267, "Status of Reactor Pressure Vessel Issues"

In Commission Paper SECY-94-267, "Status of Reactor Pressure Vessel Issues," the staff indicated that the Palisades reactor pressure vessel would reach the pressurized thermal shock (PTS) screening criteria in the year 2004. We also indicated that the licensee was gathering additional materials properties data from its retired steam generators (the welds in the retired steam generators were fabricated using the same materials as used in the fabrication of the limiting Palisades reactor vessel beltline welds) and the results of these tests could change the date when the plant will reach the PTS screening criteria.

During telephone conversations with the licensee on November 1 and 2, 1994, the staff was informed of preliminary data from the retired steam generators that indicates the Palisades reactor pressure vessel could reach the PTS screening criteria earlier than 2004. The licensee is continuing to evaluate the new data and to gather additional materials properties from its retired steam generators. If the preliminary data are confirmed, the plant would reach the PTS screening criteria at the next outage in May 1995. A meeting between the staff and the licensee has been tentatively scheduled for November 18, 1994, to discuss the test results.

MATERIALS ISSUES IN PALISADES PTS EVALUATION

PRESENTED TO NSRRC SUBCOMMITTEE ON
MATERIALS AND ENGINEERING

January 24, 1995

Michael E. Mayfield, Chief
Electrical, Materials and Mechanical
Engineering Branch
Division of Engineering Technology, RES
U.S. Nuclear Regulatory Commission
Washington, D.C.

Ed Hackatt NRC
Core Support
PTS Evaluation

INTRODUCTION

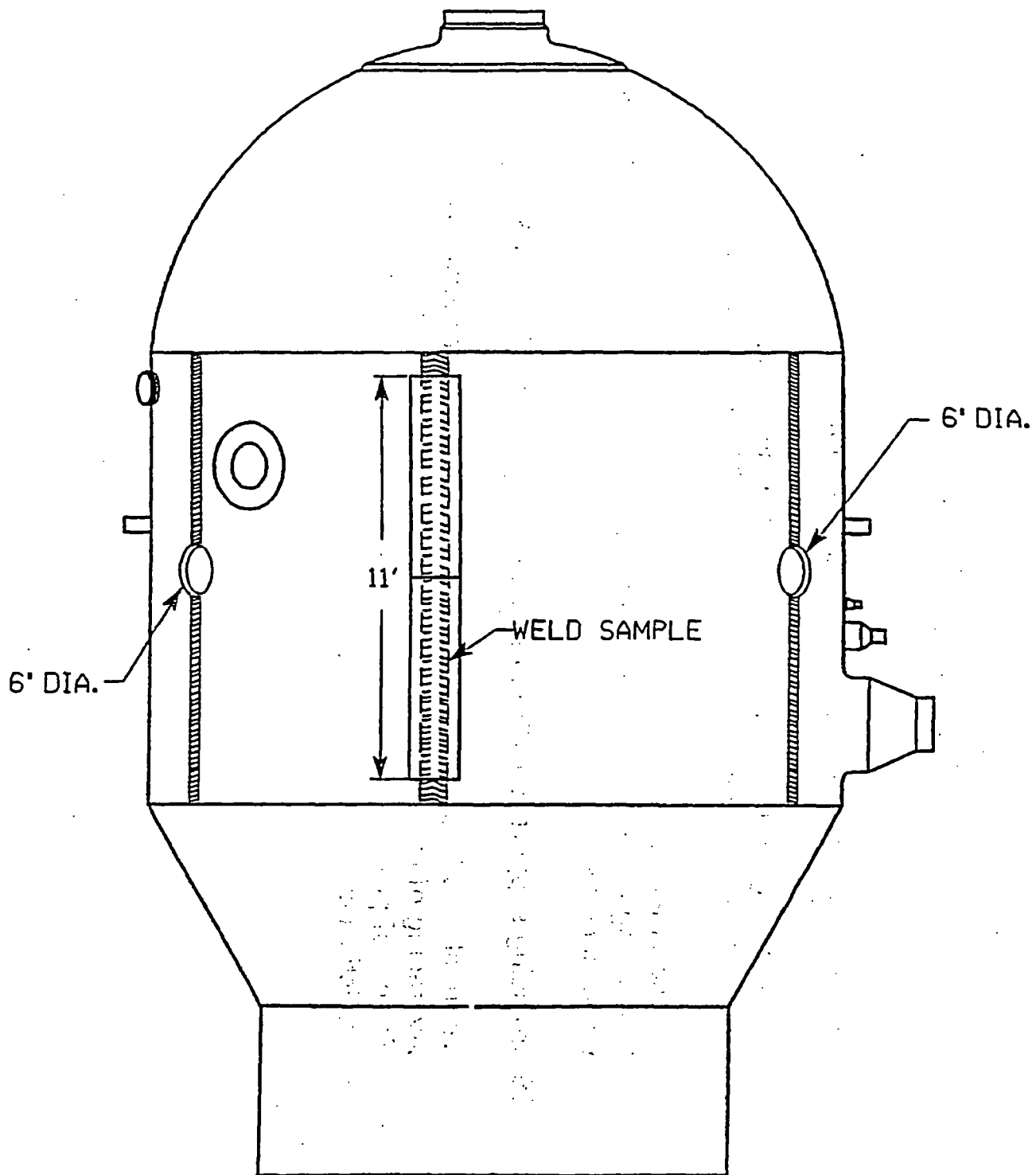
- Materials Research Program Providing Direct Support to NRR on Current Regulatory Issues, Including
 - Palisades PTS Evaluation
 - BWR Core Shroud Cracking
- Both Issues Have Generic Implications
 - Research Program Adjusted to Address Those Implications
- Presentations Will Summarize the Issues and the Research Programs

BACKGROUND -- PALISADES PTS EVALUATION

- 10 CFR 50.61 Fracture toughness requirements for protection against pressureized thermal shock events
 - Includes embrittlement screening criteria -- RT_{PTS}
 - 270°F for axial welds and plates
 - 300°F for circumferential welds
 - If criteria are to be exceeded, flux reduction and plant specific analyses may be required
 - $RT_{PTS} = I + M + \Delta RT_{PTS}$
 - I = Initial reference temperature (RT_{NDT}) of the unirradiated material
 - Measured values must be used if available
 - If plant specific values not available, generic mean must be used
 - M = Margin to cover uncertainties
 - ΔRT_{PTS} = Mean value of shift in reference temperature due to neutron irradiation
 - A function of fluence, and chemical composition (copper and nickel)

PALISADES PTS

- Palisades surveillance data not same as beltline weld material
 - Requires use of industry generic data
- Licensee took actions to provide representative data
 - Gathered additional material properties from welds in retired steam generators
 - Instituted an augmented surveillance program
 - Evaluated annealing of the reactor vessel
 - Considered instituting an "ultra low" leakage fuel strategy ** how low can you go reactor heat up*
- Staff SER dated July 12, 1994 and NUREG-1511
 - Palisades vessel projected to reach PTS screening criteria in 2004 -- prior to EOL in 2007
 - Noted that evaluation could change based on information from SG welds



PALISADES PTS

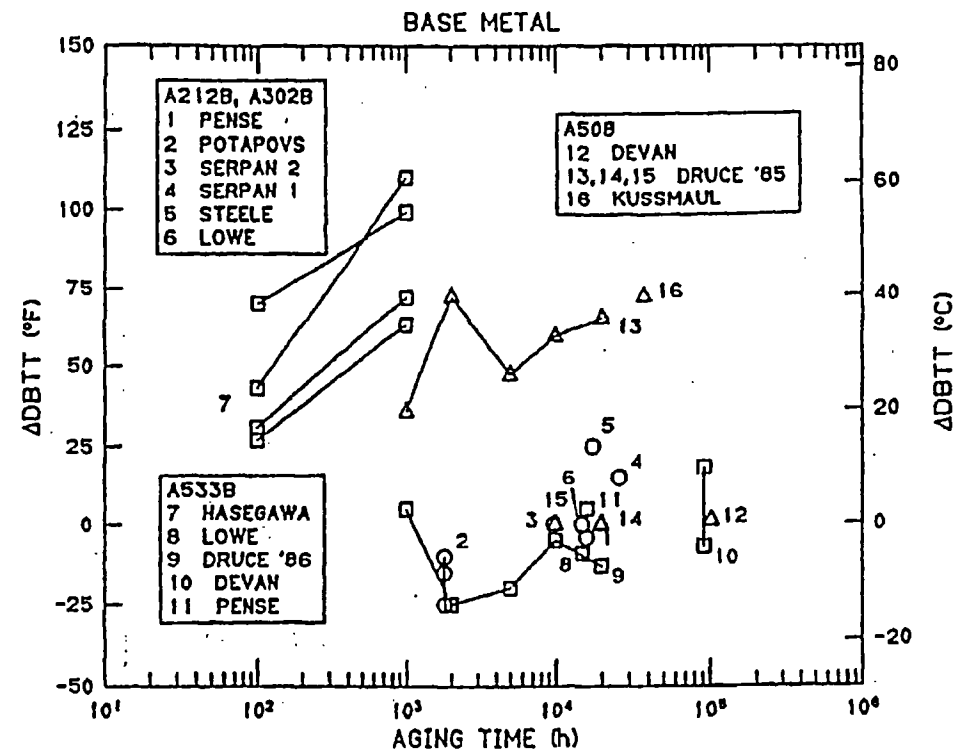
- November 1, 1994, licensee informed staff that data from SG welds
 - Indicated higher copper contents than previously assumed
 - Indicated higher initial RT_{NDT} than mean generic value
 - Licensee assessment indicated reaching PTS screening criteria in 1999
- Staff's assessment on-going
 - Depending on how the new data are evaluated, PTS screening criteria could be reached before 1999 *SER being prepared*
- RES providing support to NRR in resolving issues raised by licensee
 - Thermal embrittlement of SG welds cause of higher initial RT_{NDT}
 - Averaging of chemistry values
 - Effects of post-weld heat treatments on physical properties
 - Statistical analyses of chemistry and initial property data

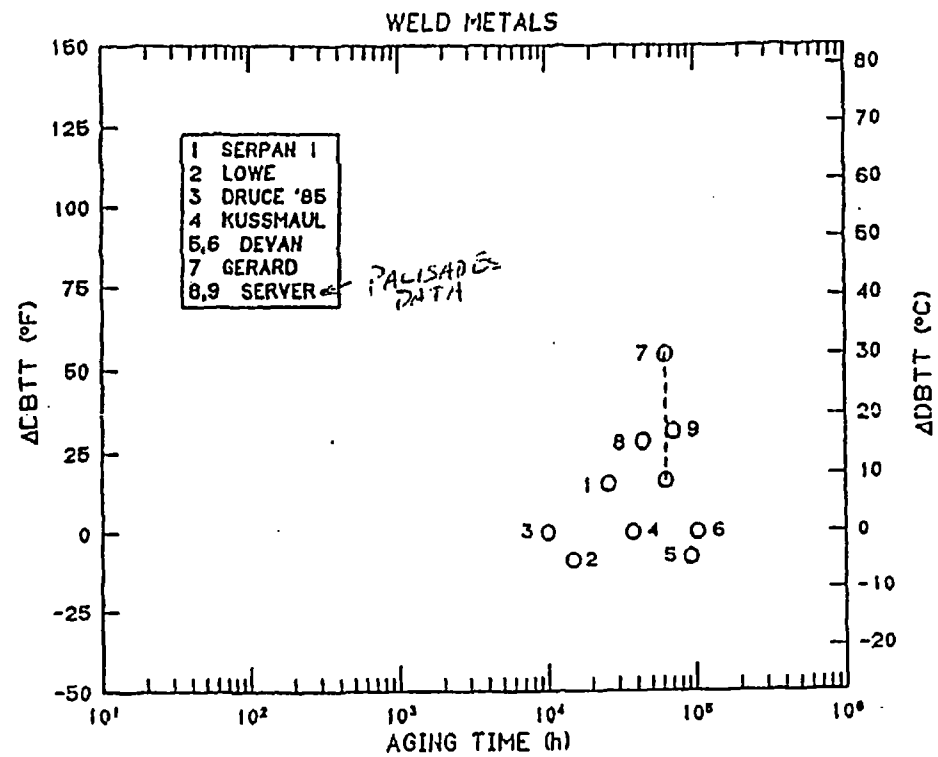
RESEARCH EFFORT ON PALISADES ISSUES

- RES staff and contractors involved in providing independent assessment of data and analysis methods
- Thermal Embrittlement
 - Literature survey
 - Evaluation of data from Power Reactor Embrittlement Data Base
 - Evaluation of mechanisms of thermal embrittlement
 - Combined effects of thermal aging and neutron flux
 - Examination of mechanical properties data related to Palisades
 - Drop-Weight Specimen fabrication techniques
- Chemical Composition
 - Analysis of generic data
 - Fabrication techniques -- single arc versus tandem arc
 - Data weighting
 - Coil-weighted averaging
 - Recommendations on data treatment

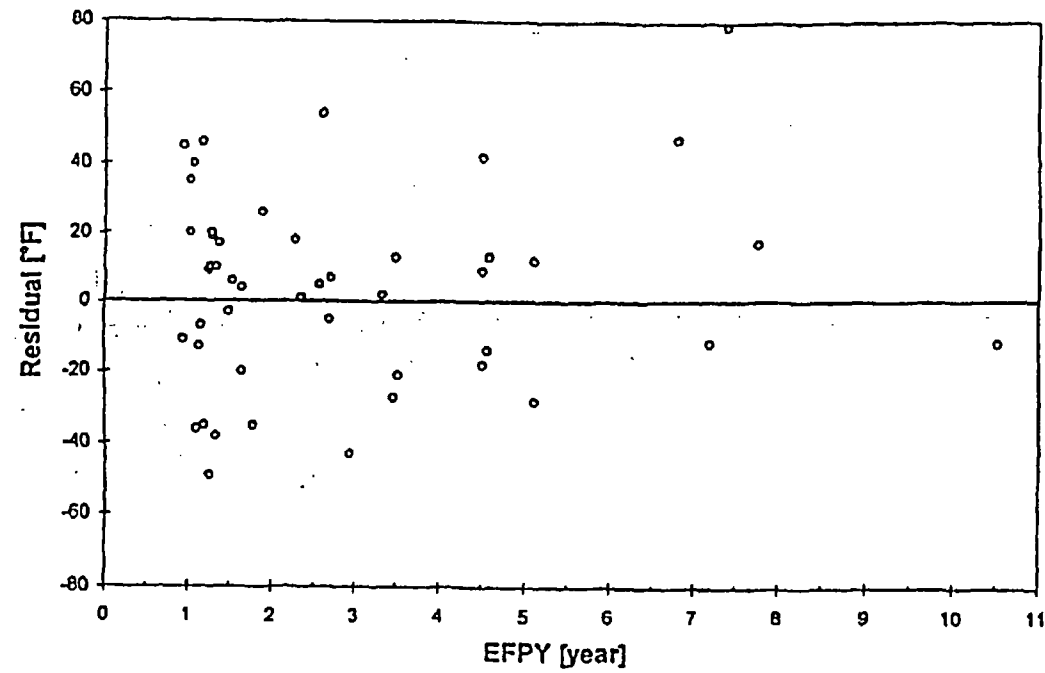
THERMAL EMBRITTLEMENT

- Palisades SG RT_{NDT} tests indicate an initial value of -20°F compared to generic mean of -56°F
 - Cited thermal embrittlement as likely cause
 - 10 EFPY at approximately 500°F
 - Presented results from Belgian paper -- suggests 70°F shifts possible
 - Inconsistent with "common wisdom"
 - RES effort to look at available data and known mechanisms
- Literature survey
- Review of PR-EDB
- Evaluation of Belgian data

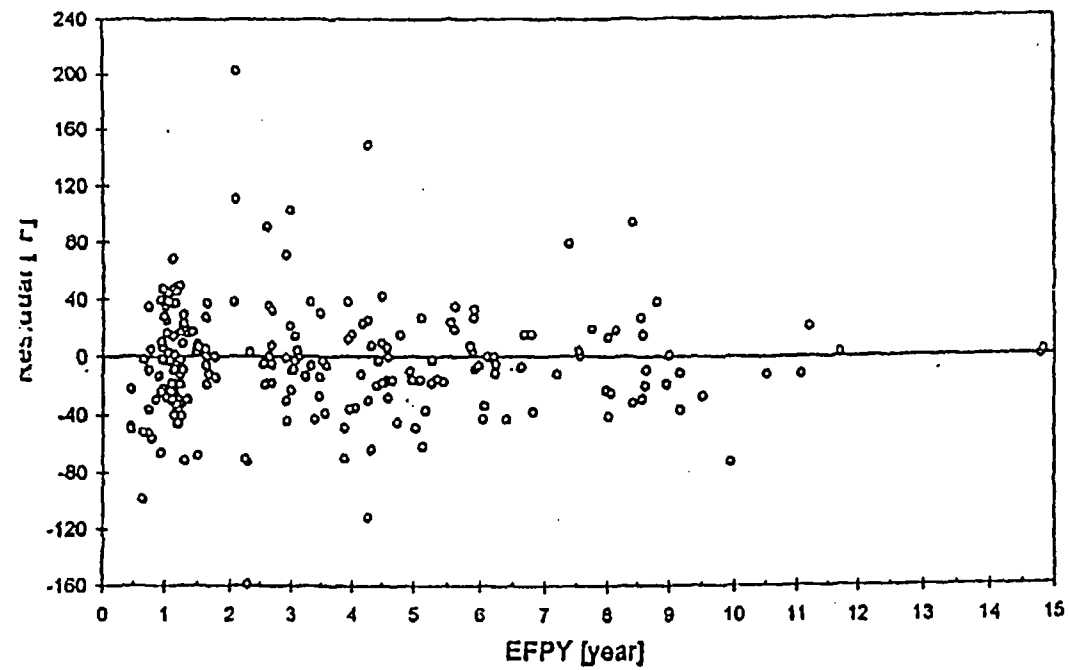


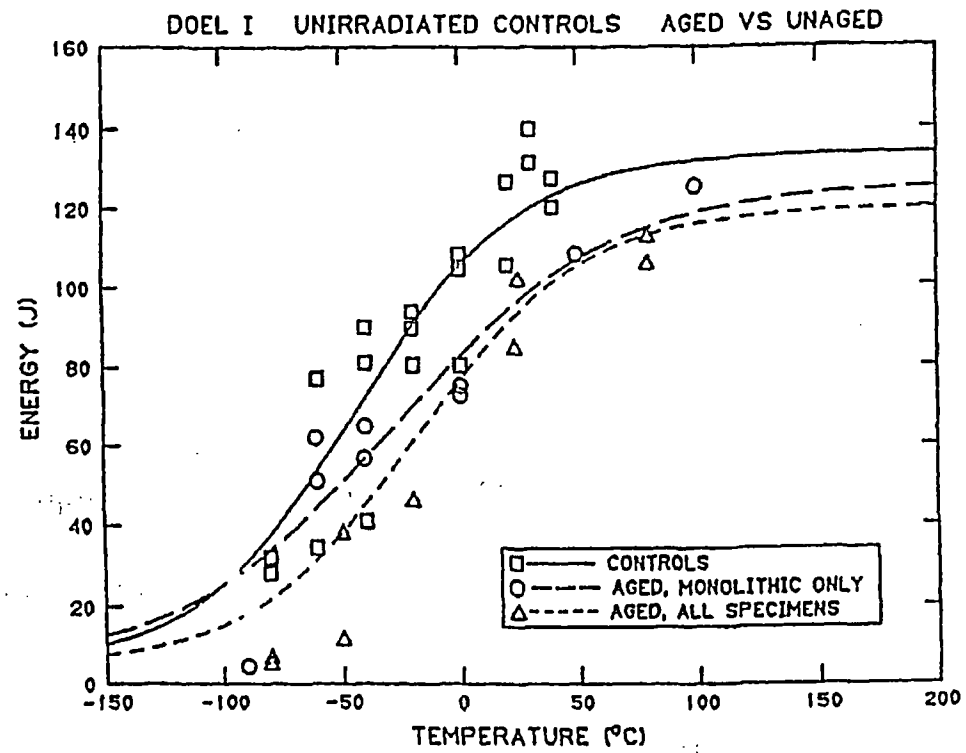


Plot of Residual vs. Effective Full Power Year
for Weld Materials per 177 Data Points



Plot of Residual vs. Effective Full Power Year
for Weld Materials per PR-EDB





CONCLUSIONS ON THERMAL EMBRITTLEMENT

- Thermal embrittlement not likely source of higher RT_{NDT}
- Statistical variability more likely
 - -20°F value is within $+2\sigma$ of generic mean

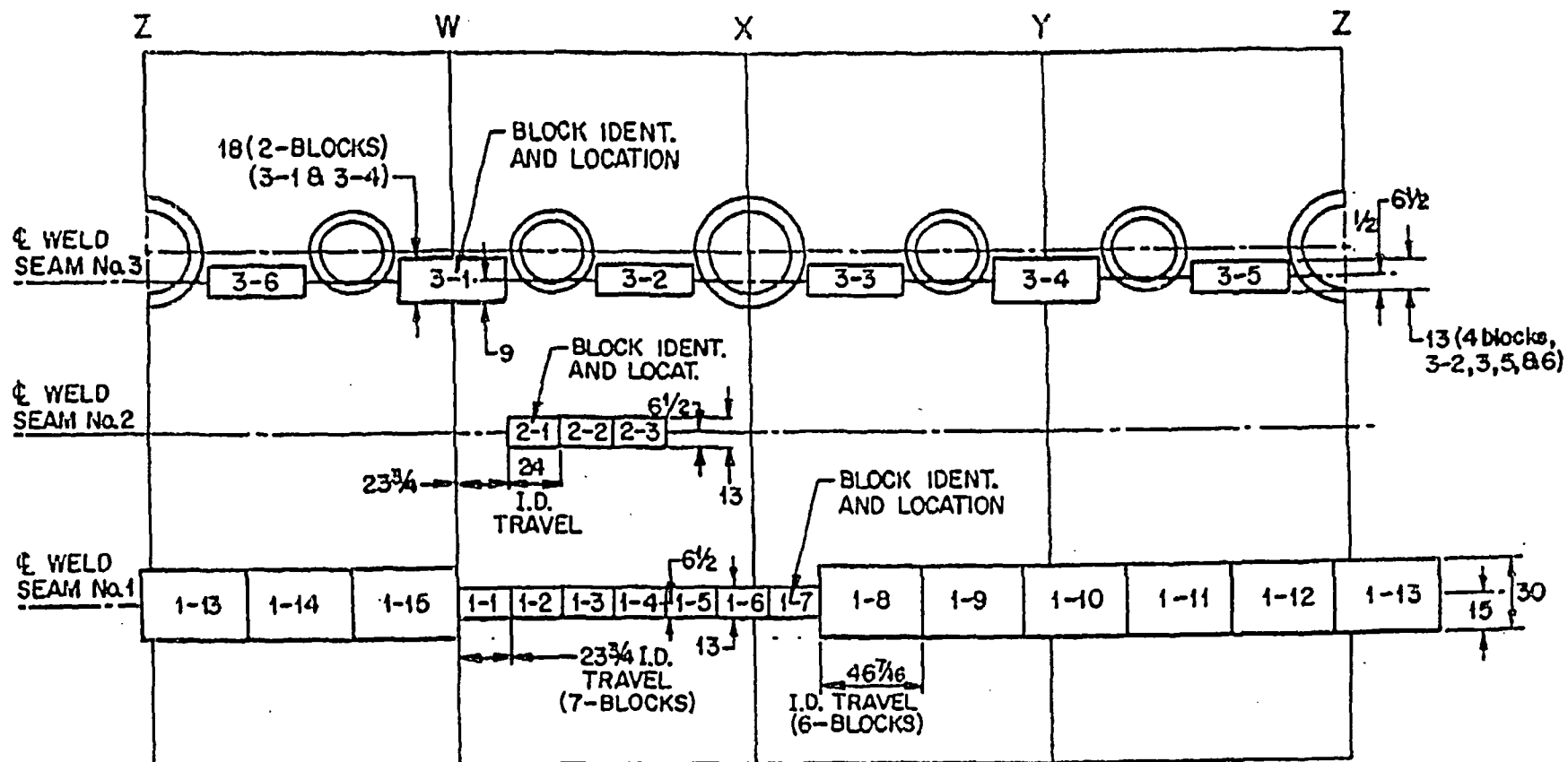
PALISADES CHEMICAL COMPOSITION ISSUE

- Key issue is how to weight new data from SG welds
- Several proposals are being considered
- Cannot provide more details until staff discussions are completed and SER issued

CHEMISTRY CONTENT ISSUES

- Palisades SG data
- Weld fabrication procedure *copper content*
- Six different coils used in fabricating welds
- How does chemical variability relate to wire coil composition
 - Statistical treatment of data

RESULTS FROM MIDLAND UNIT 1 RPV



**OVERALL COPPER CONTENT IN MIDLAND WELDS
SHOWS WIDE VARIATION**

<u>REGION</u>	<u>SECTION</u>	<u>COPPER (WT %)</u>
Beltline	9	0.22 to 0.34
	11	0.16 to 0.34
	13	0.21 to 0.32
	15	0.22 to 0.33
Nozzle	31	0.37 to 0.46
	34	0.38 to 0.42

*0.16 to .46 very wide margin / problematic
grossly sensitive to copper content*

RESEARCH PLAN TO ADDRESS THE GENERIC ISSUES

- Evaluating the effects material chemistry and radiation environment on irradiation embrittlement of RPV steels
 - Examine samples from two representative RPV welds at ORNL
 - Examine samples of thermally aged samples from retired SG shells
 - Evaluate variability in chemistry and mechanical properties both along the weld and through the thickness
 - Develop generic guidance on estimating chemistry and properties variability
- Evaluate the combined effects of thermal aging and neutron irradiation
 - Thorough assessment of technical literature
 - Review and assessment of foreign positions on thermal aging
 - Detailed metallurgical assessment of thermally aged materials
 - Evaluate thermal aging, heat treatments, and flux effects on neutron embrittlement

SCHEDULE

- **FY 1995**
 - o Determine the variability of chemistry in representative RPV welds
 - o Assessment of technical literature and foreign positions on thermal aging
 - o Initiate metallurgical assessment of thermally aged materials
 - o Continue irradiations of RPV materials
- **FY 1996**
 - o Complete report on irradiation effects on old-fabrication practice plate material
 - o Establish generic guidance for estimating material chemistry and properties variability
- **FY 1997**
 - o Complete report on irradiation effects in the Midland weld
 - o Complete determination of effects of thermal aging on RPV materials from SGs

SUMMARY

- PTS continues to be a significant issue for PWRs
- Palisades PTS evaluation highlights uncertainty in initial properties and in embrittlement estimates
- Research program addressing the key factors

EXHIBIT 2 A

NUREG/CR-2907
BNL-NUREG-51581
Vol. 14

Radioactive Materials Released from Nuclear Power Plants

Annual Report 1993

Prepared by
Fichler, K. Doty, K. Lucadamo

Savannah National Laboratory

Prepared for
U.S. Nuclear Regulatory Commission

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PDR NUREG
CR-2907 R PDR

1993 FEB -9 PM 1:46
PUBLIC RELEASE UNDER E.O. 14176

DF02 c/s

1.0 Introduction

1.1 Purpose

This report, prepared annually for the staff of the U.S. Nuclear Regulatory Commission, presents measured data on radioactive materials in effluents released from licensed commercial reactor power plants. These data were reported by licensees for plant operations during 1993. This information supplements earlier annual reports issued by the former Atomic Energy Commission and Nuclear Regulatory Commission.¹

1.2 Scope

Releases of radioactive materials are governed by 10 CFR Part 20 and 50 and by limits established in the Technical Specifications for each facility. The requirement for reporting effluent releases by nuclear power plant operators is described in 10 CFR 50.36a. Through its Office of Nuclear Reactor Regulation, the Nuclear Regulatory Commission maintains a knowledge of radioactive releases from licensed nuclear reactors to ensure that they are within regulatory requirements. This report summarizes data from the licensed nuclear power plants that were declared by the utilities to be in commercial operation as of December 31, 1993. Data are included for several licensed facilities which are permanently or indefinitely shut down (Browns Ferry 1 & 3, Brunswick 1, Dresden 1, Fort St. Vrain, Humboldt Bay, Indian Point 1, LaCrosse, Rancho Seco 1, San Onofre 1, Three Mile Island 2, Trojan 1, Yankee Rowe 1) and Shoreham which was never in commercial operation.

1.3 Source of Data

The information included in this report was obtained from data reported by the licensees. Individual licensee reports are available in the NRC Public Document Room, Gelman Building, 2120 L Street, Washington, D.C. 20555 and in local Public Document Rooms located near each licensed facility. Licensee reports varied in the format and extent of information provided.

Data from prior years used in the comparison tables were obtained from the previous annual summaries.

2.0 Tabulated Data

2.1 Airborne and Liquid Effluents

Tables 1 through 4 list for each reactor, the measured quantities of total noble gases and of I-131 and particulates (with half lives greater than 8 days) released in effluents to the atmosphere during each of the years 1974 through 1993. Tables 5 and 6 list the total measured quantities of tritium released in liquid effluents in each of the years. Tables 7 and 8 list the mixed fission and activation products not including noble gases, tritium and alpha released in liquid effluents in each of the years.

¹ Previous reports in this series are listed on page ii and iii.

Table 6

Liquid Effluent Concentration By Year

Tritium (Curie)

Pressurized Water Reactors

Facility	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Arkansas One 1	2.55E+01	4.60E+02	2.12E+02	2.45E+02	2.94E+02	1.63E+02	2.12E+02	4.42E+02	2.06E+02	1.09E+02
Arkansas One 2						5.27E+01	2.89E+02	2.44E+02	1.29E+02	2.28E+02
Beaver Valley 1&2			8.60E+00	1.02E+02	3.49E+02	9.57E+01	3.98E+01	1.40E+02	1.84E+02	4.60E+02
Braidwood 1										
Braidwood 2										
Byron 1&2										
Calhoun 1										
Calvert Cliffs 1&2		2.63E+02	2.74E+02	5.75E+02	4.56E+02	5.14E+02	4.91E+02	1.00E+03	4.35E+02	7.56E+02
Catawba 1										
Catawba 2										
Comanche Peak 1										
Donald C. Cook 1&2		5.64E+01	1.02E+02	2.86E+02	6.24E+02	1.22E+03	7.22E+02	9.15E+02	1.23E+03	8.85E+02
Crystal River 3				1.66E+02	1.54E+02	1.65E+02	1.95E+02	2.71E+02	1.82E+02	1.99E+02
Davis-Besse 1				9.01E+00	2.15E+02	2.45E+02	1.08E+02	1.57E+02	5.68E+01	1.14E+02
Diablo Canyon 1&2										
Joseph M. Farley 1					5.91E+01	9.40E+01	5.70E+02	1.65E+02	3.37E+02	4.12E+02
Joseph M. Farley 2								6.34E+02	3.59E+02	3.17E+02
Fort Calhoun 1	1.24E+02	1.11E+02	1.22E+02	1.57E+02	1.50E+02	2.52E+02	5.44E+01	2.42E+02	3.08E+02	1.53E+02
R. E. Ginna	1.95E+02	2.60E+02	2.42E+02	1.19E+02	2.42E+02	2.40E+02	1.60E+02	2.40E+02	3.08E+02	3.50E+02
Haddam Neck	2.24E+03	5.67E+03	4.85E+03	6.67E+03	3.94E+03	3.55E+03	3.29E+03	5.29E+03	4.05E+03	3.90E+03
Harris 1										
Indian Point 1&2	4.79E+01	7.94E+01	3.32E+02	3.71E+02	5.12E+02	3.75E+02	2.78E+02	2.41E+02	1.72E+02	3.43E+02
Indian Point 3			Shown With	Other Unr	2.56E+02	1.15E+02	4.27E+02	6.42E+02	1.94E+02	3.19E+01
Kewaunee	9.24E+01	2.77E+02	1.80E+02	2.95E+02	2.96E+02	2.49E+02	2.33E+02	2.51E+02	3.18E+02	2.92E+02
Maine Yankee	2.19E+02	1.77E+02	3.67E+02	1.53E+02	3.15E+02	2.02E+02	2.18E+02	2.16E+02	1.85E+02	2.87E+02
McGuire 1								6.25E+00	1.60E+02	1.49E+02
McGuire 2										1.49E+02
Millstone 2		7.60E+00	2.77E+02	2.11E+02	2.01E+02	2.54E+02	2.68E+02	3.71E+02	2.91E+02	1.21E+02
Millstone 3										
North Anna 1&2					2.82E+02	3.13E+02	4.03E+02	1.28E+03	5.71E+02	1.61E+03
Oconee 1,2 & 3	3.50E+02	3.55E+03	2.19E+03	1.92E+03	1.17E+03	8.94E+02	7.12E+02	5.07E+02	3.54E+02	1.28E+03
Palladas	8.10E+00	4.16E+01	9.63E+00	5.58E+01	1.01E+02	1.26E+02	7.47E+01	2.78E+02	1.79E+02	2.35E+02
Palo Verde 1										
Palo Verde 2										
Palo Verde 3										
Point Beach 1&2	8.23E+02	8.85E+02	6.94E+02	9.99E+02	1.29E+03	8.92E+02	7.61E+02	6.52E+02	5.03E+02	5.39E+02
Prairie Island 1&2	1.42E+02	4.54E+01	1.00E+01	1.35E+03	5.51E+02	6.25E+02	5.43E+02	5.62E+02	6.00E+02	5.20E+02
Rancho Seco 1		1.22E+02	N/D	8.55E+02	N/D	N/D	1.47E+02	8.35E+01	6.46E+01	7.43E+01
H. B. Robinson 2	4.49E+02	6.24E+02	9.80E+02	6.85E+02	4.73E+02	4.29E+02	1.89E+02	1.86E+02	9.51E+01	2.40E+02
Salem 1			4.00E+02	2.96E+02	4.46E+02	7.26E+02	N/D	4.93E+02	7.22E+02	2.08E+02
Salem 2							N/R	8.42E+02	5.25E+02	2.23E+02
San Onofre 1	3.81E+03	4.00E+03	3.39E+03	1.79E+03	2.50E+03	2.22E+03	1.03E+03	2.97E+02	5.45E+02	1.57E+01
San Onofre 2-3									8.92E+00	2.38E+02
Seabrook 1										
Sequoyah 1&2							3.23E+01	7.65E+01	9.34E+02	7.35E+02
South Texas 1										
South Texas 2										
St. Lucie 1			1.33E+01	2.42E+02	1.23E+02	1.25E+02	2.72E+02	3.25E+02	3.31E+02	3.46E+02
St. Lucie 2										3.77E+01
Summer 1									3.19E+01	2.27E+02
Surry 1&2	2.45E+02	4.42E+02	7.82E+02	4.08E+02	7.47E+02	3.57E+02	3.85E+02	5.31E+02	9.10E+02	7.17E+02
Three Mile Island 1	1.50E+02	4.83E+02	1.89E+02	1.92E+02	1.55E+02	5.55E+01	3.26E+01	7.11E+00	3.91E+00	3.09E+00
Three Mile Island 2					3.83E+01	7.81E+01	6.10E+04	5.08E+02	7.20E+02	3.75E+04
TMI 2/Epicur							N/D	N/D	N/D	N/D
Trojan			3.60E+01	3.11E+02	1.59E+02	6.80E+01	1.24E+02	1.03E+02	2.00E+02	2.34E+02

N/R = Not Reported

N/D = Not Detectable

Table 3

Liquid Effluents Compositions By Year

Facility	Turbidity (Custons)									
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Pressurized Water Reactors										
Arkansas One 1	3.05E+02	3.27E+02	2.12E+02	1.50E+02	2.50E+02	3.81E+02	2.67E+02	5.13E+02	5.06E+02	4.51E+02
Arkansas One 2	3.09E+02	2.41E+02	2.30E+02	3.52E+02	2.44E+02	4.40E+02	5.22E+02	9.40E+02	2.98E+02	3.08E+02
Beaver Valley 1&2	4.12E+02	1.50E+02	2.06E+02	5.72E+02	4.09E+02	6.21E+02	4.91E+02	4.85E+02	4.65E+02	5.52E+02
Braidwood 1				4.12E+01	2.74E+02	5.58E+02	6.50E+02	3.43E+02	9.58E+02	8.05E+02
Braidwood 2					2.44E+02	5.58E+02	6.50E+02	3.43E+02	9.58E+02	8.05E+02
Byron 1&2		2.61E+02	6.70E+01	4.10E+02	1.01E+03	1.29E+03	9.98E+02	1.43E+03	1.52E+03	2.06E+03
Callaway 1	2.90E+01	5.88E+02	4.25E+02	4.48E+02	8.92E+02	6.09E+02	1.02E+03	1.22E+03	5.92E+02	1.41E+03
Calvert Cliffs 1&2	7.87E+02	4.83E+02	7.35E+02	7.38E+02	8.24E+02	2.36E+02	7.29E+01	1.02E+03	1.77E+03	8.26E+02
Catawba 1		1.75E+02		1.18E+02	3.64E+02	3.53E+02	4.45E+02	2.97E+02	3.23E+02	4.13E+02
Catawba 2			1.18E+02	3.64E+02	3.53E+02	4.45E+02	2.97E+02	3.23E+02	3.86E+02	4.13E+02
Comanche Peak 1							1.87E+02	4.60E+02	8.11E+02	5.04E+02
Donald C. Cook 1&2	1.37E+03	1.14E+03	6.95E+02	1.97E+03	1.10E+03	8.74E+02	1.56E+03	1.55E+03	4.23E+02	6.01E+02
Crystal River 3	4.20E+02	1.76E+02	1.73E+02	3.56E+02	5.11E+02	3.44E+02	5.10E+02	4.49E+02	3.84E+02	5.89E+02
Davis-Besse 1	1.22E+02	6.74E+01	2.09E+01	2.46E+02	3.50E+01	2.39E+02	1.27E+02	3.26E+02	3.80E+02	1.81E+02
Diablo Canyon 1&2	1.07E+00	4.25E+02	6.98E+02	6.91E+02	4.29E+02	9.35E+02	9.68E+02	1.05E+03	1.22E+03	1.03E+03
Joseph M. Farley 1	4.23E+02	6.03E+02	7.14E+02	6.37E+02	5.16E+02	6.99E+02	7.25E+02	4.71E+02	8.18E+02	9.35E+02
Joseph M. Farley 2	3.56E+02	5.02E+02	6.22E+02	5.05E+02	7.53E+02	8.08E+02	6.72E+02	3.53E+02	7.90E+02	8.85E+02
Fort Calhoun 1	2.35E+02	1.87E+02	1.84E+02	2.33E+02	2.32E+02	2.28E+02	1.74E+02	1.77E+02	1.06E+02	2.39E+02
R. E. Ginna	4.59E+02	5.01E+02	3.57E+02	5.64E+02	3.47E+02	5.92E+02	3.21E+02	3.76E+02	2.13E+02	1.77E+02
Haddam Neck	3.66E+03	5.76E+03	2.58E+03	3.17E+03	1.18E+03	4.81E+03	9.89E+02	4.83E+03	8.63E+02	4.00E+03
Harris 1				2.48E+02	4.01E+02	4.58E+02	7.25E+02	2.92E+02	9.02E+02	5.55E+02
Indian Point 1&2	2.22E+02	3.51E+02	3.36E+02	5.63E+02	4.29E+02	5.60E+02	6.44E+02	5.45E+02	6.95E+02	2.89E+02
Indian Point 3	5.57E+02	3.40E+02	5.67E+02	3.40E+02	5.73E+02	3.51E+02	3.23E+02	5.38E+02	4.50E+02	2.95E+02
Kewaunee	4.40E+02	3.79E+02	2.94E+02	3.51E+02	3.32E+02	3.41E+02	3.79E+02	4.34E+02	2.90E+02	2.35E+02
Maine Yankee	1.72E+02	1.84E+02	3.50E+02	1.18E+02	2.91E+02	4.22E+02	2.43E+02	3.89E+02	2.17E+02	2.72E+02
McGuire 1	3.23E+02	4.02E+02	4.58E+02	4.92E+02	5.29E+02	4.23E+02	4.58E+02	4.39E+02	4.33E+02	3.88E+02
McGuire 2	3.23E+02	4.02E+02	4.58E+02	4.92E+02	5.29E+02	4.23E+02	4.58E+02	4.39E+02	4.33E+02	3.88E+02
Millstone 2	3.97E+02	1.66E+02	2.80E+02	2.86E+02	2.59E+02	3.66E+02	5.28E+02	2.56E+02	1.06E+02	3.29E+02
Millstone 3			5.41E+02	5.90E+02	5.47E+02	6.97E+02	7.74E+02	3.04E+02	5.96E+02	5.16E+02
North Anna 1&2	6.20E+02	1.48E+03	1.56E+03	8.36E+02	1.94E+03	1.40E+03	1.67E+03	1.16E+03	2.95E+02	6.93E+02
Oconee 1,2 & 3	1.28E+03	1.24E+03	1.34E+03	9.49E+02	7.10E+02	1.02E+03	9.92E+02	1.13E+03	9.98E+02	1.10E+03
Palisades	6.95E+01	4.29E+02	6.22E+01	1.19E+02	2.83E+02	8.06E+01	1.49E+02	5.52E+01	8.09E+01	2.10E+02
Palo Verde 1		N/D		N/D	N/D	N/D	N/D	N/D	N/D	N/D
Palo Verde 2			N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Palo Verde 3				N/D	N/D	N/D	N/D	N/D	N/D	N/D
Penn Beach 1&2	2.10E+03	8.05E+02	8.11E+02	7.09E+02	3.57E+02	5.59E+02	8.72E+02	7.87E+02	4.16E+02	4.64E+02
Prairie Island 1&2	6.41E+02	6.96E+02	6.70E+02	4.49E+02	4.05E+02	4.64E+02	3.98E+02	5.58E+02	4.72E+02	4.80E+02
Rancho Seco 1	2.97E+02	9.00E+01	8.50E+01	1.83E+01	1.01E+02	7.29E+01	1.37E+01	9.84E+01	2.42E+01	7.44E+00
H. B. Robinson 2	1.34E+01	3.09E+02	3.42E+02	2.74E+02	5.36E+02	1.64E+02	3.53E+02	1.88E+02	3.94E+02	8.45E+02
Salem 1	1.30E+02	9.23E+02	4.10E+02	3.79E+02	6.35E+02	6.09E+02	3.53E+02	6.06E+02	2.45E+02	3.93E+02
Salem 2	3.08E+02	5.77E+02	4.38E+02	6.81E+02	3.68E+02	5.11E+02	3.03E+02	4.42E+02	2.25E+02	5.08E+02
San Onofre 1	3.39E+01	2.38E+03	4.53E+02	2.27E+03	1.53E+03	9.82E+02	1.42E+03	1.25E+03	3.00E+03	4.45E+02
San Onofre 2-3	4.55E+02	4.75E+02	7.41E+02	8.20E+02	6.43E+02	1.30E+03	9.17E+02	1.08E+03	9.69E+02	9.78E+02
Seabrook 1						1.33E+03	1.13E+02	3.86E+02	5.01E+02	5.63E+02
Sequoyah 1&2	1.82E+03	8.33E+02	2.46E+02	1.19E+02	2.01E+02	1.15E+03	8.53E+02	1.65E+03	1.44E+03	5.60E+02
South Texas 1					1.99E+02	3.17E+02	3.45E+02	6.21E+02	6.19E+02	1.13E+02
South Texas 2						2.72E+02	4.70E+02	4.69E+02	7.42E+02	1.13E+02
St. Lucie 1	2.21E+02	2.86E+02	2.78E+02	3.38E+02	2.75E+02	4.05E+02	2.84E+02	4.06E+02	4.00E+02	2.58E+02
St. Lucie 2	2.21E+02	3.64E+02	2.78E+02	3.38E+02	2.75E+02	4.05E+02	2.84E+02	4.06E+02	4.00E+02	2.51E+02
Summer 1	2.25E+02	3.11E+02	3.75E+02	7.36E+02	7.55E+02	6.55E+02	4.22E+02	8.13E+02	6.08E+02	4.79E+02
Surry 1&2	8.12E+02	7.50E+02	8.73E+02	8.15E+02	4.94E+02	4.29E+02	1.11E+03	9.13E+02	9.74E+02	1.22E+03
Three Mile Island 1	1.72E+00	9.05E+00	1.69E+02	1.97E+02	3.02E+02	3.72E+02	2.10E+02	3.29E+02	5.81E+02	3.76E+02
Three Mile Island 2	1.55E+04	2.22E+03	1.60E+03	1.48E+03	5.49E+03	9.76E+04	8.30E+04	6.19E+03	3.55E+03	1.59E+02
TMI 2/Epicur	N/D									
Troyan	1.87E+02	2.65E+02	2.43E+02	1.75E+02	3.75E+02	3.18E+02	2.19E+02	1.69E+02	1.96E+02	1.22E+03

* Included with Three Mile Island 2 total

N/D = Not Detectable

Table 8

Liquid Effluents Comparison By Year

Mixed Fission and Activation Products (Curies)

Pressurized Water Reactors

Facility	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Arkansas One 1	6.50E+00	3.11E+00	1.31E+01	4.50E+00	6.05E+00	3.09E+00	3.42E+00	7.50E+00	5.80E+00	4.30E+00
Arkansas One 2						1.30E+00	4.13E+00	2.95E+00	5.90E+00	3.70E+00
Beaver Valley 1&2			1.70E-01	6.52E-01	2.63E-01	1.21E-01	1.04E-01	1.44E-01	1.47E-01	6.09E-02
Braidwood 1										
Braidwood 2										
Byron 1&2										
Callaway 1										
Calvert Cliffs 1&2		1.44E+00	1.18E+00	3.48E+00	6.13E+00	7.80E+00	4.53E+00	2.68E+00	5.26E+00	2.24E+00
Catawba 1										
Catawba 2										
Comanche Peak 1										
Donald C. Cook 1&2		2.60E-01	1.87E+00	1.52E+00	1.48E+00	2.58E+00	1.37E+00	1.86E+00	1.90E+00	6.83E-01
Crystal River 3				1.54E-02	2.96E-02	4.16E-01	1.46E-01	1.29E-01	1.07E-01	1.50E-01
Davis-Besse 1				2.60E-02	9.01E-02	4.28E-02	2.07E-01	7.92E-01	2.19E-01	5.39E-01
Diablo Canyon 1&2										
Joseph M. Farley 1					1.03E-01	5.86E-02	6.18E-02	1.31E-01	5.94E-02	5.75E-02
Joseph M. Farley 2								2.69E-02	2.90E-02	2.04E-02
Fort Calhoun 1	2.30E+00	3.60E-01	5.50E-01	3.63E-01	5.95E-01	2.45E-01	5.33E-01	1.75E-01	2.03E-01	1.44E-01
R. E. Ginna	1.00E-01	4.20E-01	6.90E-01	6.47E-02	6.07E-02	8.63E-02	1.96E-02	3.85E-02	6.17E-01	1.93E-01
Haddam Neck	2.20E+00	1.20E+00	1.30E-01	1.71E+00	9.50E-01	8.67E-01	2.76E-01	7.12E-01	6.93E-02	4.80E-01
Harris 1										
Indian Point 1&2	4.20E+00	4.93E+00	< 4.98E+00	3.02E+00	1.99E+00	1.94E+00	1.26E+00	5.67E+00	2.41E+00	4.02E+00
Indian Point 3			Shown With	Other Unit	1.03E+00	4.02E-01	2.90E+00	2.62E+00	5.46E-01	5.44E-01
Kewaunee	4.00E-01	7.20E-01	2.83E+00	1.26E+00	6.99E-01	8.94E-01	6.17E-01	8.15E-01	1.52E+00	5.43E-01
Maine Yankee	4.00E+00	3.21E+00	< 2.84E+00	4.42E-01	1.04E-01	4.63E-01	2.97E-01	4.36E-01	7.03E-01	1.99E-01
McGuire 1								3.94E-01	1.75E+00	1.87E+00
McGuire 2										1.87E+00
Millstone 2		2.00E-02	2.60E-01	1.56E+00	2.79E+00	4.87E+00	2.81E+00	4.18E+00	1.39E+01	7.81E+00
Millstone 3										
North Anna 1&2					2.68E-01	5.89E-01	1.05E+00	6.76E-01	1.32E+00	5.88E+00
Oconee 1,2 & 3	1.90E+00	5.05E+00	7.93E+00	3.62E+01	6.51E+00	9.24E-01	1.54E+00	1.75E+00	1.04E+00	1.43E+00
Palisades	5.90E+00	3.45E+00	4.40E-01	9.29E-02	9.65E-02	1.28E-01	8.73E-03	3.31E-02	1.27E-01	7.48E-02
Palo Verde 1										
Palo Verde 2										
Palo Verde 3										
Point Beach 1&2	2.00E-01	2.34E+00	3.24E+00	1.50E+00	6.86E-01	7.25E-01	6.29E-01	1.01E+00	2.95E+00	1.27E+00
Prairie Island 1&2	< 1.00E-01	4.50E-01	1.00E-01	1.33E-02	4.94E-03	9.00E-03	1.32E-02	9.12E-03	2.23E-03	3.16E-02
Rancho Seco 1		< 1.00E-02	N/D	N/D	N/D	N/D	3.78E-03	5.92E-01	2.16E-01	2.81E-01
H. B. Robinson 2	2.50E+00	4.50E-01	3.80E-01	3.29E-01	1.78E-01	2.99E-01	3.58E-01	1.84E+00	1.20E+00	8.23E-01
Salem 1			< 1.00E-02	2.88E+00	4.02E+00	3.98E+00	2.65E+00	2.80E+00	3.22E+00	2.97E+00
Salem 2							3.89E-01	1.51E+00	3.21E+00	2.85E+00
San Onofre 1	5.00E+00	1.22E+00	7.43E+00	9.84E+00	1.18E+01	1.10E+01	1.12E+01	3.64E+00	2.15E+00	1.22E+00
San Onofre 2-3									6.32E-01	2.79E+00
Seabrook 1										
Sequoyah 1&2							N/R	2.76E+00	9.82E+00	4.61E+00
South Texas 1										
South Texas 2										
St. Lucie 1			8.00E-02	5.80E+00	2.80E+00	2.67E+00	2.36E+00	2.46E+00	3.07E+00	2.99E+00
St. Lucie 2										4.37E-01
Summer 1									1.24E-04	1.47E+00
Surry 1&2	3.80E+00	9.27E+00	3.37E+01	6.55E+01	2.41E+00	2.53E+00	3.85E+00	6.11E+00	6.68E+00	1.45E+01
Three Mile Island 1	1.30E+00	7.00E-02	1.00E-01	1.94E-01	6.14E-01	4.91E-01	1.83E-01	8.69E-02	5.29E-02	8.12E-02
Three Mile Island 2					3.92E-01	3.31E-01	1.45E-05	2.22E-05	4.25E-05	9.03E-05
TMI 2/Epicor							N/D	N/D	N/D	N/D
Trojan			2.77E+00	4.19E+00	7.07E-01	5.55E-01	7.87E-01	9.94E-01	8.56E-01	3.10E-01

N/R = Not Reported

N/D = Not Detectable

Table 8

Liquid Effluents Comparison By Year

Mixed Fission and Activation Products (Curies)

Pressurized Water Reactors

Facility	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Arkansas One 1	4.10E+00	3.53E+00	5.09E+00	2.45E+00	3.73E+00	2.04E+00	2.36E+00	1.12E+00	3.59E+00	1.75E+00
Arkansas One 2	2.48E+00	4.36E+00	3.43E+00	1.85E+00	4.46E+00	2.65E+00	2.52E+01	2.73E+00	1.85E+00	4.77E-01
Beaver Valley 1&2	2.03E-01	1.13E-01	1.19E-01	6.69E-01	1.02E-01	5.45E-01	2.55E+00	3.14E-01	3.41E-01	3.96E-01
Braidwood 1				5.00E-02	8.57E+00	2.50E+00	2.13E+00	1.01E+01	5.23E-01	4.77E-01
Braidwood 2					3.04E+00	2.52E+00	2.13E+00	1.01E+01	5.23E-01	4.77E-01
Byron 1&2		1.63E-01	4.05E+00	2.48E+00	1.40E+00	6.35E-01	1.18E+00	6.70E-01	4.10E+00	1.26E+00
Callaway 1	1.07E-03	4.97E-03	3.83E-02	4.92E-01	7.74E-02	1.01E-02	3.86E-02	1.59E-02	4.54E-03	4.01E-02
Calvert Cliffs 1&2	1.64E+00	2.38E+00	1.79E+00	5.19E+00	2.64E+00	2.07E+00	1.42E+00	1.59E+00	1.44E+00	1.55E+00
Catawba 1		1.26E+00	3.82E-01	6.53E-01	5.42E-01	3.42E-01	9.78E-01	3.81E-01	4.65E-01	4.47E-01
Catawba 2			3.82E-01	6.53E-01	5.42E-01	3.42E-01	9.78E-01	3.81E-01	4.65E-01	4.47E-01
Comanche Peak 1							1.19E-02	1.57E-01	3.99E-01	4.18E-01
Donald C. Cook 1&2	1.19E+00	2.26E+00	3.34E-01	2.00E+00	4.44E-01	8.06E-01	1.61E+00	1.03E+00	1.12E+00	5.37E-01
Crystal River 3	2.34E-01	1.51E+00	8.12E-01	9.55E-01	2.31E-01	2.36E-01	6.19E-01	1.80E-01	1.63E+00	5.30E-01
Davis-Besse 1	1.89E-01	1.85E-01	6.15E-02	6.51E-02	1.68E-01	1.84E-01	1.41E-01	1.84E-01	1.10E-01	5.21E-02
Diablo Canyon 1&2	1.16E-02	3.20E+00	1.11E+01	2.86E+00	2.00E+00	1.61E+00	2.80E+00	8.47E-01	7.44E-01	9.85E-01
Joseph M. Farley 1	6.34E-02	6.72E-02	1.02E-01	5.09E-02	7.97E-02	7.31E-02	7.47E-02	2.14E-01	1.77E-01	7.60E-02
Joseph M. Farley 2	8.63E-02	3.77E-02	8.28E-02	4.63E-02	8.53E-02	7.34E-02	8.29E-02	1.90E-01	1.77E-01	1.12E-01
Fort Calhoun 1	2.91E+00	2.88E-01	8.37E-02	2.03E-01	3.08E-01	5.62E-01	8.05E-01	2.08E+00	5.90E-01	5.19E-01
R. E. Ginna	1.69E-01	5.22E-01	6.47E-02	5.88E-02	3.43E-02	8.12E-02	1.50E-01	1.52E-01	3.42E-01	1.37E-01
Haddam Neck	2.63E-01	8.44E-02	3.10E-01	4.26E-01	6.87E-01	3.90E-01	2.69E+00	7.43E-01	1.73E-01	8.36E-01
Harris 1				9.08E-01	8.04E-02	2.42E-01	7.31E-01	6.62E-01	3.14E-01	7.79E-02
Indian Point 1&2	2.67E+00	1.85E+00	3.61E+00	6.02E+00	2.84E+00	6.38E-01	1.06E+00	1.30E+00	1.53E+00	7.24E-01
Indian Point 3	1.26E+00	4.18E-01	1.95E-01	3.47E-01	3.22E-01	5.92E-01	3.09E-01	2.86E-01	2.13E-01	1.07E-01
Kewaunee	1.01E+00	1.35E+00	5.33E-01	1.29E+00	5.01E-01	1.22E+00	2.06E-01	2.35E-01	6.42E-02	1.20E-01
Maine Yankee	8.62E-02	3.11E-02	2.99E-01	8.81E-01	3.49E-01	1.83E-01	1.87E-01	4.13E-01	2.51E-01	1.62E-01
McGuire 1	1.51E+00	6.21E-01	7.73E-01	1.57E+00	2.57E+00	1.54E+00	2.00E+00	1.04E+00	3.27E-01	2.85E-01
McGuire 2	1.51E+00	6.21E-01	7.73E-01	1.57E+00	2.57E+00	1.54E+00	2.00E+00	1.04E+00	3.27E-01	2.85E-01
Millstone 2	3.55E+00	4.60E+00	4.49E+00	4.07E+00	8.89E+00	1.06E+01	8.76E+00	2.06E+00	2.14E+00	1.18E+00
Millstone 3			3.01E+00	5.40E+00	3.15E+00	5.94E+00	2.47E+00	2.99E+00	2.42E+00	2.24E+00
North Anna 1&2	4.51E+00	5.07E+00	9.41E-01	1.33E+00	4.32E-01	1.16E+00	6.75E-01	3.20E-01	4.98E-01	4.83E-01
Oconee 1,2 & 3	1.58E+00	4.16E+00	3.02E+00	2.90E+00	3.10E+00	3.82E+00	3.11E+00	1.40E+00	2.58E+00	4.70E-01
Palisades	3.68E-02	5.83E-02	1.40E-01	9.23E-02	3.43E-02	3.75E-03	7.75E-03	1.14E-02	3.88E-03	1.40E-02
Palo Verde 1		N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Palo Verde 2			N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Palo Verde 3				N/D	N/D	N/D	N/D	N/D	N/D	N/D
Point Beach 1&2	1.22E+01	1.90E+00	1.60E+01	7.55E-01	9.58E-02	5.58E-02	1.16E-02	5.89E-02	4.29E-01	2.32E-01
Prairie Island 1&2	1.91E-02	2.75E-02	6.01E-01	6.04E-02	2.55E-01	1.73E-01	1.30E-01	1.85E-01	6.66E-01	1.95E-01
Rancho Seco 1	6.33E-01	7.39E-03	1.45E-03	5.78E-04	5.79E-03	2.15E-03	2.08E-04	2.04E-04	4.83E-04	3.92E-04
H. B. Robinson 2	3.90E-01	9.41E-02	2.81E-01	7.36E-01	9.64E-01	2.82E-01	3.60E-01	2.36E-01	2.20E-01	5.47E-02
Salem 1	3.31E+00	2.88E+00	4.35E+00	3.33E+00	3.21E+00	3.11E+00	3.00E+00	3.35E+00	3.27E+00	3.21E+00
Salem 2	2.75E+00	2.80E+00	6.11E+00	4.07E+00	3.23E+00	3.56E+00	3.14E+00	2.31E+00	3.63E+00	3.65E+00
San Onofre 1	2.74E+00	7.79E+00	8.51E-01	8.42E-01	7.11E-01	6.87E-01	4.03E-01	4.22E-01	3.79E-01	1.14E+00
San Onofre 2-3	1.30E+01	1.12E+01	8.20E-01	5.37E-01	1.16E+00	9.19E-01	2.02E-01	9.94E-02	1.03E-01	2.94E-01
Seabrook 1						1.09E-04	2.21E-03	1.22E-01	1.19E-01	9.18E-02
Sequoyah 1&2	3.23E+00	1.45E+00	1.65E-01	4.66E-01	4.48E-01	3.54E-01	1.22E+00	1.48E+00	1.45E+00	1.52E+00
South Texas 1					2.24E-01	3.02E+00	7.09E+00	5.08E+00	2.12E+00	5.73E-01
South Texas 2						1.17E-02	5.72E+00	3.61E+00	1.74E+00	2.94E-01
St. Lucie 1	1.93E+00	2.72E+00	2.53E+00	5.95E-01	2.84E-01	2.56E-01	8.27E-01	3.98E-01	5.12E-01	7.55E-01
St. Lucie 2	1.93E+00	2.75E+00	2.43E+00	5.42E-01	2.59E-01	2.53E-01	7.68E-01	3.09E-01	5.12E-01	6.79E-01
Summer 1	4.54E+00	7.09E-01	3.28E-01	4.88E-01	7.55E-01	1.37E+00	3.56E-01	6.08E-01	2.23E-01	1.93E-01
Surry 1&2	9.73E+00	8.55E+00	8.77E+00	5.17E+00	2.41E+00	3.87E+00	4.60E+00	2.84E+00	8.27E-02	2.08E-02
Three Mile Island 1	3.41E-02	6.30E-03	1.41E-02	4.41E-02	4.68E-02	1.81E-02	2.36E-02	3.50E-02	2.60E-02	8.82E-02
Three Mile Island 2	6.46E-04	1.77E-04	1.87E-04	1.16E-04	1.12E-03	3.15E-04	1.77E-04	8.82E-05	1.22E-04	7.68E-04
TMI 2/Epicor	N/D	-	-	-	-	-	-	-	-	-
Trojan	3.49E-01	4.65E-01	2.64E-01	2.09E-01	2.01E-01	1.81E-01	1.44E-01	5.80E-02	8.95E-02	1.06E-01

* This number is a correction to that reported in the 1990 report

** Included with Three Mile Island 2 total

N/D = Not Detectable

Table 2

Airborne Effluents Comparison By Year

Fission and Activation Gases (Total Curies)

Pressurized Water Reactors

Facility	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Arkansas One 1	1.96E+02	1.03E+03	5.69E+03	1.39E+04	7.50E+03	8.51E+03	3.80E+04	3.73E+03	2.10E+03	9.83E+02
Arkansas One 2						4.53E+03	9.37E+03	4.35E+03	9.78E+03	1.34E+03
Beaver Valley 1&2			1.07E+00	4.73E+01	3.90E+02	1.75E+03	8.64E+01	8.06E+02	1.31E+02	1.98E+02
Braidwood 1										
Braidwood 2										
Byron 1&2										
Callaway 1										
Calvert Cliffs 1&2		7.72E+03	9.40E+03	2.23E+04	2.76E+04	1.02E+04	2.96E+03	2.18E+03	8.00E+03	9.75E+03
Catawba 1										
Catawba 2										
Comanche Peak 1										
Donald C. Cook 1&2		2.64E+00	9.75E+02	3.80E+03	4.85E+04	1.09E+04	3.76E+03	5.42E+03	3.88E+03	3.28E+02
Crystal River 3				3.35E+03	6.86E+03	7.26E+04	3.65E+04	3.96E+04	6.85E+03	3.38E+03
Davis-Besse 1				1.27E+03	2.10E+03	1.68E+03	3.35E+03	1.01E+03	5.35E+02	9.15E+02
Diablo Canyon 1&2										
Joseph M. Farley 1					3.53E+03	3.18E+03	1.92E+04	2.21E+02	3.81E+04	2.20E+04
Joseph M. Farley 2								2.60E+00	3.54E+03	8.47E+02
Fort Calhoun 1	3.03E+02	4.29E+02	1.94E+03	3.81E+03	1.36E+03	7.06E+02	2.97E+02	1.22E+03	3.46E+02	8.79E+02
R. E. Ginna	7.57E+02	1.04E+04	5.52E+03	3.20E+03	9.72E+02	7.62E+02	8.61E+02	5.46E+02	1.95E+03	7.12E+02
Haddam Neck	7.00E+00	4.80E+02	4.52E+02	3.12E+03	2.14E+03	5.53E+03	2.68E+03	1.83E+03	7.54E+02	2.76E+03
Harris 1										
Indian Point 1&2	5.58E+03	8.20E+03	1.16E+04	1.60E+04	1.41E+04	9.03E+03	9.38E+03	9.13E+03	7.27E+03	9.58E+03
Indian Point 3			Shown with	Other Unit	8.09E+02	2.47E+02	1.11E+03	6.57E+03	2.58E+03	5.60E+02
Kewaunee	3.35E+03	2.45E+03	1.40E+03	2.43E+03	4.44E+02	1.52E+02	1.22E+02	1.18E+02	1.66E+02	2.25E+02
Maine Yankee	6.36E+03	4.09E+03	1.30E+03	3.57E+03	1.55E+03	2.09E+03	4.07E+03	3.28E+02	1.53E+03	5.07E+01
McGuire 1								1.58E+01	1.65E+03	1.60E+03
McGuire 2										1.60E+03
Millstone 2			1.57E+03	2.28E+03	7.64E+02	3.59E+02	1.33E+03	2.24E+03	9.09E+03	9.06E+03
Millstone 3										
North Anna 1&2					1.51E+04	6.28E+03	3.50E+03	5.30E+03	4.34E+03	2.22E+04
Oconee 1,2 & 3	1.54E+04	1.51E+04	4.39E+04	3.56E+04	4.33E+04	4.79E+04	1.92E+04	1.63E+04	2.41E+04	2.40E+04
Palisades	< 1.00E+00	2.61E+03	2.99E+01	5.99E+01	3.23E+02	6.84E+01	1.40E+02	3.00E+03	7.38E+03	3.00E+03
Palo Verde 1										
Palo Verde 2										
Palo Verde 3										
Point Beach 1&2	9.74E+03	4.45E+04	1.91E+03	1.13E+03	5.16E+02	9.68E+02	6.41E+02	6.11E+02	9.93E+02	7.68E+02
Prairie Island 1&2	3.62E+02	2.17E+03	1.74E+03	6.73E+02	1.26E+03	6.97E+02	2.60E+02	4.65E+01	5.47E+02	2.76E+02
Rancho Seco 1		1.18E+02	1.27E+02	2.00E+03	7.10E+03	8.81E+03	1.58E+03	1.37E+03	1.48E+03	6.89E+02
H. B. Robinson 2	2.31E+03	1.17E+03	6.40E+02	4.76E+02	8.84E+02	1.52E+03	5.82E+02	5.13E+02	1.75E+02	2.93E+02
Salem 1			< 1.00E+02	1.96E+01	1.02E+01	2.49E+02	7.82E+01	1.06E+03	2.34E+02	1.25E+02
Salem 2							7.74E+00	6.09E+02	1.11E+03	7.44E+02
San Onofre 1	1.78E+03	1.11E+03	4.16E+02	1.54E+02	1.81E+03	6.37E+02	1.05E+03	4.17E+02	8.61E+01	1.06E+01
San Onofre 2-3									6.40E+00	7.43E+03
Seabrook 1										
Sequoyah 1&2							3.01E+03	9.03E+03	5.74E+03	3.92E+03
South Texas 1										
South Texas 2										
St. Lucie 1			1.72E+03	2.54E+04	2.93E+04	1.54E+04	8.97E+03	2.30E+04	2.33E+04	2.16E+04
St. Lucie 2										1.25E+03
Summer 1									1.40E+02	3.88E+02
Surry 1&2	6.86E+03	8.04E+03	1.91E+04	1.90E+04	4.36E+03	1.78E+03	6.17E+03	1.41E+04	2.11E+04	5.49E+03
Three Mile Island 1	9.16E+02	3.63E+03	2.76E+03	1.68E+04	1.57E+04	2.24E+03	4.84E+03	5.81E+02	7.56E+03	2.01E+01
Three Mile Island 2					8.73E+00	9.97E+06	4.72E+04	2.88E+02	4.89E+02	1.73E+02
TMI 2/Epicor							2.16E+00	1.84E+02	4.26E+02	3.61E+01
Trojan			7.66E+02	4.45E+03	3.26E+02	9.47E+02	4.10E+02	1.24E+03	9.02E+02	2.29E+02

* Changes to the entries for Trojan for 1976 - 1987 represent corrections which were reported and explained in the Trojan July-December 1990 Effluent and Waste Disposal Report.

* Changes to the entries for Maine Yankee for 1977 - 1988 represent corrections which were reported and explained in the Maine Yankee report "Revised Semiannual Effluent Release Report for 770131 - 901231" Docket Date 92/01/08.

Table 2

Airborne Effluents Comparison By Year

Fission and Activation Gases (Total Curies)

Pressurized Water Reactors Facility	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Arkansas One 1	2.90E+03	8.10E+03	1.71E+03	3.26E+02	1.24E+03	2.33E+03	7.00E+02	4.95E+02	8.93E+02	1.79E+01
Arkansas One 2	3.26E+03	8.91E+03	3.46E+03	2.06E+02	2.16E+03	2.76E+03	1.89E+02	1.59E+03	1.70E+03	5.21E+01
Beaver Valley 1&2	1.16E+03	3.92E+01	7.57E+01	2.25E+02	9.41E+01	1.57E+02	8.17E+01	1.49E+02	1.55E+02	5.56E+02
Bradwood 1				2.81E+01	4.19E+01	1.17E+03	1.42E+03	5.24E+03	7.71E+01	3.49E+02
Bradwood 2					3.82E+01	5.07E+02	1.02E+03	5.28E+03	1.56E+02	2.40E+03
Byron 1&2		2.79E+02	6.36E+02	1.30E+03	1.78E+03	8.16E+02	1.24E+03	1.04E+02	3.77E+02	1.22E+02
Callaway 1	2.00E+02	1.67E+03	5.19E+03	2.90E+03	6.89E+02	7.22E+02	9.02E+02	1.36E+02	4.01E+02	8.08E+02
Calvert Cliffs 1&2	3.83E+03	3.98E+03	7.65E+03	4.55E+03	5.70E+03	3.28E+03	6.72E+02	2.57E+03	5.87E+03	2.14E+02
Catawba 1		2.77E+02	1.36E+03	2.41E+03	1.56E+03	3.15E+02	5.33E+02	4.01E+02	4.28E+02	6.48E+02
Catawba 2			1.36E+03	2.41E+03	1.56E+03	3.15E+02	5.33E+02	4.01E+02	4.28E+02	6.48E+02
Comanche Peak 1							9.06E+02	5.89E+03	1.76E+03	1.92E+02
Donald C. Cook 1&2	3.50E+03	4.94E+03	3.29E+02	8.75E+02	2.58E+02	1.15E+02	1.88E+02	8.10E+01	2.04E+02	2.06E+03
Crystal River 3	1.96E+03	1.05E+03	2.76E+03	1.10E+03	3.41E+03	4.54E+03	7.31E+03	1.41E+03	7.86E+02	3.82E+01
Davis-Besse 1	5.02E+02	1.18E+02	5.09E+04	3.80E+02	1.09E+02	3.78E+02	1.09E+03	1.16E+03	3.62E+01	3.48E+02
Diablo Canyon 1&2	5.86E+02	5.72E+02	2.32E+03	7.14E+02	3.27E+02	3.35E+02	5.63E+01	4.62E+01	2.46E+00	2.14E+00
Joseph M. Farley 1	3.73E+03	1.70E+03	1.28E+03	1.30E+03	9.60E+02	9.92E+01	8.72E+01	1.09E+02	6.82E+02	1.94E+02
Joseph M. Farley 2	3.99E+03	6.63E+02	1.84E+03	7.22E+02	5.92E+02	1.60E+02	3.38E+01	3.56E+02	2.68E+01	2.61E+01
Fort Calhoun 1	1.52E+03	1.48E+03	5.68E+02	4.23E+02	7.85E+02	1.64E+02	4.59E+02	3.58E+02	1.51E+02	9.26E+00
R. E. Ginna	2.96E+02	4.06E+02	2.09E+02	1.77E+02	5.17E+01	5.11E+02	5.95E+02	5.14E+02	5.41E+02	1.40E+02
Haddam Neck	7.52E+03	2.76E+03	2.33E+03	3.58E+03	2.55E+03	1.71E+04	1.46E+03	6.11E+03	2.79E+00	2.08E+03
Harris 1				1.71E+03	2.25E+03	1.15E+03	5.96E+02	8.62E+02	1.36E+03	3.49E+02
Indian Point 1&2	3.78E+03	1.88E+03	2.05E+03	4.68E+03	2.27E+02	8.77E+01	2.23E+03	1.41E+03	5.25E+03	1.68E+03
Indian Point 3	1.88E+03	1.54E+03	1.93E+03	1.82E+03	3.10E+02	3.14E+02	6.26E+02	6.05E+01	2.15E+01	4.17E+01
Kewaunee	< 4.04E+01	< 4.97E+01	< 6.55E+01	< 3.19E+01	< 2.91E+01	6.52E+01	2.31E+00	1.81E+00	1.60E+00	3.67E+01
Maine Yankee	1.54E+02	4.41E+02	1.07E+03	8.34E+02	9.19E+01	2.02E+01	9.46E+02	1.13E+03	4.01E+02	4.50E+01
McGuire 1	2.28E+03	1.93E+03	1.05E+03	2.04E+03	1.95E+03	7.19E+02	5.18E+02	4.49E+02	4.05E+02	4.84E+02
McGuire 2	2.28E+03	1.93E+03	1.05E+03	2.04E+03	1.95E+03	7.19E+02	5.18E+02	4.49E+02	4.05E+02	4.84E+02
Millstone 2	4.19E+03	4.00E+02	1.02E+02	3.97E+02	6.34E+02	2.46E+02	2.89E+03	3.89E+02	6.36E+02	1.32E+01
Millstone 3			2.39E+01	1.05E+02	8.44E+01	2.96E+02	2.11E+02	1.25E+02	1.13E+00	3.00E+01
North Anna 1&2	1.76E+04	8.05E+03	5.71E+03	1.05E+03	4.83E+02	1.44E+03	9.52E+02	2.24E+03	1.23E+03	2.51E+02
Oconee 1,2 & 3	2.28E+04	2.35E+04	2.43E+04	1.05E+04	2.59E+04	8.97E+03	8.84E+03	3.45E+03	3.29E+03	6.58E+02
Palisades	2.84E+01	3.68E+03	1.73E+02	1.75E+03	2.43E+03	1.52E+02	1.21E+02	6.26E+01	7.46E+01	9.29E+01
Palo Verde 1		2.53E+02	1.27E+03	1.37E+03	1.84E+03	6.41E+02	7.08E+02	2.91E+03	2.22E+03	5.79E+02
Palo Verde 2			1.97E+03	5.47E+03	2.97E+03	4.29E+02	6.76E+02	5.29E+02	2.01E+02	2.62E+02
Palo Verde 3				2.52E+02	1.36E+02	8.34E+02	1.20E+03	4.38E+02	4.35E+01	1.97E+02
Point Beach 1&2	9.30E+01	1.16E+02	2.78E+01	4.82E+01	8.08E+01	1.50E+01	8.03E+00	2.00E+01	5.06E+01	1.01E+01
Prairie Island 1&2	7.58E+01	4.59E+01	3.03E+01	8.77E+01	1.42E+01	1.73E+02	8.28E+01	5.60E+01	2.54E+01	3.68E+01
Rancho Seco 1	3.83E+03	4.67E+03	9.30E+01	2.16E+02	1.52E+03	2.00E+03	2.20E+01	N/D	6.93E+02	N/D
H. B. Robinson 2	4.90E+01	2.14E+03	6.59E+02	7.70E+02	1.04E+03	2.79E+01	7.20E+00	2.26E+00	7.59E+00	3.99E+02
Salem 1	1.95E+02	1.68E+03	1.39E+03	3.64E+03	5.29E+02	1.39E+03	3.13E+02	3.66E+02	6.75E+02	1.12E+03
Salem 2	1.81E+03	1.15E+03	8.56E+02	1.06E+03	1.18E+03	7.30E+01	1.49E+02	1.92E+02	2.68E+02	3.42E+02
San Onofre 1	8.62E+01	3.83E+03	4.11E+02	9.81E+02	2.99E+03	9.05E+02	1.80E+03	2.49E+03	4.12E+03	4.20E+02
San Onofre 2-3	4.00E+04	2.53E+04	8.25E+03	2.18E+04	5.12E+03	2.46E+03	1.16E+03	1.30E+03	1.41E+03	1.54E+03
Seabrook 1						N/D	1.07E+02	2.92E+01	9.13E+01	1.09E+01
Sequoyah 1&2	6.68E+03	4.57E+03	1.21E+00	N/D	2.25E+02	3.85E+03	6.07E+03	1.42E+03	2.07E+02	7.71E+01
South Texas 1					8.64E+02	4.45E+02	1.72E+02	8.55E+01	2.89E+02	2.42E+01
South Texas 2						1.16E+02	1.09E+02	4.67E+01	6.23E+02	1.79E+01
St. Lucie 1	3.53E+04	5.08E+04	3.33E+04	6.21E+03	1.42E+03	4.53E+03	8.19E+02	2.05E+03	3.30E+02	2.61E+02
St. Lucie 2	7.68E+03	9.55E+03	9.98E+03	8.60E+03	9.18E+03	2.22E+03	5.34E+02	4.90E+02	6.59E+02	8.62E+01
Summer 1	1.64E+01	1.40E+02	1.39E+01	6.34E+02	3.32E+02	1.82E+03	7.51E+02	4.34E+02	3.38E+02	2.43E+02
Surry 1&2	6.95E+03	2.07E+03	1.99E+03	3.08E+02	3.66E+02	1.37E+02	4.51E+02	3.54E+01	1.61E+01	4.15E+01
Three Mile Island 1	3.62E+01	1.08E+02	3.80E+03	7.89E+02	1.87E+03	2.10E+03	6.66E+02	1.22E+02	5.73E+02	2.40E+03
Three Mile Island 2	2.07E+02	N/D	2.80E+01	N/D	4.40E+01	N/D	N/D	4.18E+05	5.81E+05	4.41E+02
TMI 2/Epicor	3.99E+01	+	+	+	+	+	+	+	+	+
Trojan	8.98E+02	1.10E+03	9.42E+02	2.55E+02	4.25E+02	5.94E+02	2.06E+02	1.66E+02	2.07E+02	5.34E+01

* Changes to the entries for Trojan for 1976-1987 are corrections which were reported and explained in the Trojan July-December 1990 Effluent and Waste Disposal Report.

— Changes to the entries for Maine Yankee for 1977 - 1988 are corrections which were reported and explained in the Main Yankee report "Revised Semiannual Effluent and Release Reports for 770131 - 901231" Docket Date 92/01/03.

+ Included with Three Mile Island 2 total

N/D = Not Detectable

EXHIBIT 2 B

ATTACHMENT 2

**NUCLEAR MANAGEMENT COMPANY, LLC
PALISADES NUCLEAR PLANT**

**RADIOACTIVE EFFLUENT RELEASE REPORT
GASEOUS EFFLUENTS - SUMMATION OF RELEASES**

January - December 2001

3 pages follow

TABLE HP 10.5-2
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT

GASEOUS EFFLUENTS - SUMMATION OF RELEASES

January 1, 2001 to December 31, 2001

A. FISSION AND ACTIVATION GASES	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Est Total Error %
1. Total release	Ci	3.01E+00	2.92E+00	2.21E-02	0.00	5.6
2. Average release rate for period	μCi/sec	3.88E-01	3.72E-01	2.78E-03	0.00	
3. Percent of annual avg EC	%	1.67E-04	1.84E-04	1.16E-06	0.00	
B. IODINES						
1. Total Iodine *	Ci	5.52E-04	3.85E-04	5.69E-05	0.00	10.3
2. Average release rate for period	μCi/sec	7.09E-05	4.90E-05	7.16E-06	0.00	
3. Percent of annual avg EC	%	3.93E-05	3.52E-05	7.62E-06	0.00	
C. PARTICULATES						
1. Particulates with half-life > 8 days	Ci	2.80E-06	2.36E-05	7.72E-06	7.09E-06	18.0
2. Average release rate for period	μCi/sec	3.59E-07	3.01E-06	9.71E-07	8.92E-07	
3. Percent of annual avg EC	%	8.47E-06	1.92E-05	2.38E-05	2.12E-05	
4. Gross alpha radioactivity	Ci	5.17E-07	2.01E-06	3.72E-06	2.07E-06	
D. TRITIUM						
1. Total Release	Ci	4.81E+00	1.53E+01	5.27E+00	4.93E+00	
2. Average release rate for period	μCi/sec	6.18E-01	1.95E+00	6.63E-01	6.20E-01	
3. Percent of annual avg EC	%	1.31E-03	4.15E-03	1.41E-03	1.32E-03	
E.						
1. Beta Airdose at Site Boundary Due to Noble Gases (ODCM App A III.C)	mrads	2.13E-04	2.14E-04	1.56E-06	0.00	
2. Percent limit	%	2.13E-03	2.14E-03	1.56E-05	0.00	
3. Gamma Airdose at Site Boundary Due to Noble Gases (ODCM App A III.C)	mrads	7.25E-05	7.82E-05	5.26E-07	0.00	
4. Percent limit	%	1.45E-03	1.56E-03	1.05E-05	0.00	
F.						
1. Maximum Organ Dose to Public Based on Critical Receptors (ODCM App A III.D)	mrem	5.64E-03	1.62E-02	5.47E-03	4.98E-03	
2. Percent of limit	%	7.52E-02	2.16E-01	7.29E-02	6.64E-02	

*NOTE: Data is reported for I-131 and I-133 only.

TABLE HP 10.5-2
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT
GASEOUS EFFLUENTS
January 1, 2001 to December 31, 2001

1. FISSION GASES	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Argon-41	Ci	7.33E-04	<LLD	<LLD	<LLD
Krypton-85	Ci	<LLD	<LLD	<LLD	<LLD
Krypton-85m	Ci	<LLD	<LLD	<LLD	<LLD
Krypton-87	Ci	2.31E-04	<LLD	<LLD	<LLD
Krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
Xenon-131m	Ci	4.29E-03	6.11E-03	<LLD	<LLD
Xenon-133	Ci	3.00E+00	2.83E+00	2.21E-02	<LLD
Xenon-133m	Ci	<LLD	<LLD	<LLD	<LLD
Xenon-135	Ci	2.21E-03	8.53E-02	<LLD	<LLD
Xenon-135m	Ci	4.44E-03	9.41E-04	<LLD	<LLD
Xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	3.01E+00	2.92E+00	2.21E-02	<LLD

2. IODINES					
Iodine-131	Ci	2.22E-04	2.28E-04	5.69E-05	<LLD
Iodine-132	Ci	<LLD	1.00E-03	<LLD	<LLD
Iodine-133	Ci	3.30E-04	1.57E-04	<LLD	<LLD
Iodine-134	Ci	<LLD	<LLD	<LLD	<LLD
Iodine-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	5.52E-04	1.39E-03	5.69E-05	<LLD

TABLE HP 10.5-2
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT

3. PARTICULATES*	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Chromium-51	Ci	<LLD	1.80E-06	<LLD	<LLD
Cobalt-58	Ci	<LLD	1.47E-05	<LLD	<LLD
Iron-59	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-60	Ci	<LLD	4.16E-07	<LLD	1.82E-06
Zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-89	Ci	9.75E-07	8.25E-07	9.95E-07	7.95E-07
Strontium-90	Ci	4.80E-07	5.15E-07	4.95E-07	4.65E-07
Niobium-95	Ci	<LLD	3.92E-07	<LLD	<LLD
Zirconium-95	Ci	<LLD	5.57E-07	<LLD	<LLD
Ruthenium-103	Ci	<LLD	1.29E-07	<LLD	<LLD
Cesium-137	Ci	<LLD	7.92E-07	1.51E-06	<LLD
Cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
Net unidentified beta	Ci	1.34E-06	3.51E-06	4.72E-06	4.01E-06
Total		2.80E-06	2.36E-05	7.72E-06	7.09E-06

*Particulates with half-lives > 8 days.

ATTACHMENT 3

**NUCLEAR MANAGEMENT COMPANY, LLC
PALISADES NUCLEAR PLANT**

**RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID EFFLUENTS - SUMMATION OF RELEASES**

January - December 2001

2 pages follow

TABLE HP 10.5-3
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
January 1, 2001 to December 31, 2001

A. FISSION AND ACTIVATION PRODUCTS	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Est Total Error %
1. Total release (not including tritium, gases, alpha)	Ci	2.81E-06	2.45E-04	0.000	3.68E-05	26.0
2. Average release rate for period	$\mu\text{Ci}/\text{ml}$	7.35E-14	9.68E-12	N/A	3.79E-12	
3. Percent of EC	%	1.29E-05	6.02E-04	N/A	3.91E-04	
B. TRITIUM						
1. Total Release	Ci	2.73E+01	9.87E+01	6.80E-03	3.70E+01	4.01
2. Average diluted concentration during period	$\mu\text{Ci}/\text{ml}$	7.15E-07	3.90E-06	6.36E-10	3.82E-06	
3. Percent of EC	%	7.15E-02	3.90E-01	6.36E-05	3.82E-01	
C. DISSOLVED AND ENTRAINED GASES						
1. Total Release	Ci	0.000	0.000	0.000	0.000	N/A
2. Average diluted concentration during period	$\mu\text{Ci}/\text{ml}$	N/A	N/A	N/A	N/A	
3. Percent of EC	%	N/A	N/A	N/A	N/A	
D. GROSS ALPHA RADIOACTIVITY (Total Release)	Ci	7.45E-08	2.13E-06	0.000	1.65E-07	
E. VOLUME OF WASTE RELEASED (Prior to Dilution)	Liters	1.02E+05	3.78E+05	0.000	1.70E+05	
F. VOLUME OF DILUTION WATER USED DURING PERIOD	Liters	3.82E+10	2.53E+10	1.07E+10	9.68E+09	
G. MAXIMUM DOSE COMMITMENT - WHOLEBODY	mrem	3.81E-05	2.55E-04	3.35E-08	3.89E-04	
Percent of ODCM App A III.H limit	%	2.54E-03	1.70E-02	2.23E-06	2.59E-02	
H. MAXIMUM DOSE COMMITMENT - ORGAN	mrem	3.70E-05	2.15E-04	3.35E-08	4.80E-04	
Percent of ODCM App A III.H limit	%	7.40E-04	4.30E-03	6.70E-07	9.60E-03	

TABLE HP 10.5-3
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT

LIQUID EFFLUENTS
January 1, 2001 to December 31, 2001

1. NUCLIDES RELEASED	Units	Ist Qtr	2nd Qtr	3rd Qtr	4th Qtr
Manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-58	Ci	<LLD	2.23E-05	<LLD	<LLD
Iron-59	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-60	Ci	<LLD	3.44E-05	<LLD	<LLD
Zirconium-95	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-89	Ci	3.57E-07	1.02E-06	<LLD	5.44E-07
Strontium-90	Ci	2.45E-06	1.97E-06	<LLD	1.62E-06
Silver-110m	Ci	<LLD	1.28E-04	<LLD	<LLD
Iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-137	Ci	<LLD	<LLD	<LLD	3.46E-05
Niobium-95	Ci	<LLD	<LLD	<LLD	<LLD
Silver-110m	Ci	<LLD	<LLD	<LLD	<LLD
Antimony-125	Ci	<LLD	<LLD	<LLD	<LLD
Net unidentified beta	Ci	<LLD	5.72E-05	<LLD	<LLD
Fission & Activation Product Total	Ci	2.81E-06	2.45E-04	0.00	3.68E-05
Tritium	Ci	2.73E+01	9.87E+01	6.80E-03	3.70E+01
Grand Total	Ci	2.73E+01	9.87E+01	6.80E-03	3.70E+01

EXHIBIT 2 D

ATTACHMENT 2

**Nuclear Management Company, LLC
Palisades Plant
Docket 50-255**

**RADIOACTIVE EFFLUENT RELEASE REPORT
GASEOUS EFFLUENTS - SUMMATION OF RELEASES**

January - December 2002

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TABLE HP 10.5-2
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT

GASEOUS EFFLUENTS - SUMMATION OF RELEASES
January 1, 2002 to December 31, 2002

A. FISSION & ACTIVATION GASES	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Est Total Error %
1. TOTAL RELEASE	Ci	5.01E-01	3.20E+00	1.65E+00	3.26E+01	8.41
2. Average release rate for Period	uCi/sec	6.44E-02	4.07E-01	2.08E-01	4.10E+00	
3. Percent of annual ave EC	%	2.90E-05	1.71E-04	8.49E-05	1.71E-03	
B. IODINES						9.88
1. Total Iodine *	Ci	2.61E-04	4.55E-04	6.81E-04	1.20E-03	
2. Average release rate for Period	uCi/sec	3.35E-05	5.79E-05	8.57E-05	1.50E-04	
3. Percent of annual ave EC	%	1.60E-05	2.98E-05	4.31E-05	1.31E-04	15.97
C. PARTICULATES						
1. Particulates with half-life > than 8 days	Ci	1.94E-04	4.88E-06	2.82E-06	8.32E-07	
2. Average release rate for Period	uCi/sec	2.50E-05	6.21E-07	3.55E-07	1.05E-07	
3. Percent of annual ave EC	%	6.00E-05	2.22E-05	1.27E-05	3.75E-06	
4. Gross Alpha radioactivity	Ci	8.23E-07	1.75E-06	1.42E-06	7.17E-07	
D. TRITIUM						
1. Total release	Ci	4.87E+00	4.73E+00	4.79E+00	5.23E+00	
2. Average release rate for Period	uCi/sec	6.26E-01	6.02E-01	6.03E-01	6.58E-01	
3. Percent of annual ave EC	%	1.33E-03	1.28E-03	1.28E-03	1.40E-03	
E. SITE BOUNDARY DOSE						
1. Beta Airdose at Site Boundary Due to Noble Gases (ODCM App A III.C)	mrads	3.55E-05	2.32E-04	1.38E-04	2.33E-03	
2. Percent limit	%	3.55E-04	2.32E-03	1.38E-03	2.33E-02	
3. Gamma Airdose at Site Boundary Due to Noble Gases (ODCM App A III.C)	mrads	1.22E-05	7.45E-05	3.17E-05	7.68E-04	
4. Percent limit	%	3.10E-04	1.49E-03	6.34E-04	1.54E-02	
F. ORGAN DOSE						
1. Maximum Organ Dose to Public Based on Critical Receptors (ODCM App A III.D)	mrem	5.70E-03	5.36E-03	5.66E-03	1.94E-02	
2. Percent limit	%	7.60E-02	7.15E-02	7.55E-02	2.59E-01	

* NOTE: Data is reported for I-131 and I-133 only.

TABLE HP 10.5-2

**PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT**

GASEOUS EFFLUENTS

January 1, 2002 to December 31, 2002

1. FISSION GASES	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Argon-41	Ci	<LLD	<LLD	<LLD	8.68E-04
Krypton-85	Ci	<LLD	9.20E-02	3.56E-01	3.93E-01
Krypton-85m	Ci	<LLD	<LLD	9.85E-05	2.72E-04
Xenon-131m	Ci	<LLD	1.27E-03	6.54E-03	5.08E-03
Xenon-133	Ci	4.97E-01	3.10E+00	1.28E+00	3.22E+01
Xenon-135	Ci	1.46E-03	2.19E-03	2.55E-03	2.65E-03
Xenon-135m	Ci	2.72E-03	3.72E-03	4.65E-03	5.36E-03
Total for Period	Ci	5.01E-01	3.20E+00	1.65E+00	3.26E+01

2. IODINES	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Iodine-131	Ci	8.11E-05	1.61E-04	2.32E-04	9.30E-04
Iodine-132	Ci	<LLD	<LLD	<LLD	<LLD
Iodine-133	Ci	1.80E-04	2.94E-04	4.49E-04	2.65E-04
Iodine-134	Ci	<LLD	<LLD	<LLD	<LLD
Iodine-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	2.61E-04	4.55E-04	6.81E-04	1.20E-03

TABLE HP 10.5-2

**PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT**

GASEOUS EFFLUENTS

January 1, 2002 to December 31, 2002

*PARTICULATES	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Chromium-51	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-58	Ci	1.06E-04	<LLD	<LLD	<LLD
Cobalt-60	Ci	8.35E-05	<LLD	<LLD	<LLD
Cobalt-57	Ci	6.53E-07	<LLD	<LLD	<LLD
Zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-137	Ci	<LLD	<LLD	<LLD	<LLD
Net unidentified beta	Ci	2.45E-06	4.88E-06	2.82E-06	8.32E-07
Total for Period	Ci	1.94E-04	4.88E-06	2.82E-06	8.32E-07

* Particulates with half-lives > 8 days

ATTACHMENT 3

**Nuclear Management Company, LLC
Palisades Plant
Docket 50-255**

**RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID EFFLUENTS - SUMMATION OF RELEASES**

January - December 2002

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TABLE HP 10.5-3

**PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT**

LIQUID EFFLUENTS - SUMMATION OF RELEASES

January 1, 2002 to December 31, 2002

A. FISSION & ACTIVATION PRODUCTS	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Est Total Error %
1. Total release (not including tritium, gases, alpha)	Ci	9.59E-05	0.000	1.83E-04	7.48E-07	17.31
2. Average release rate for Period	uCi/ml	2.45E-12	N/A	4.93E-12	1.89E-14	
3. Percent of EC	%	3.13E-04	N/A	2.90E-04	3.78E-06	
B. TRITIUM						4.01
1. Total Release	Ci	4.17E+01	4.09E-02	4.90E+01	7.27E+01	
2. Average diluted concentration during period	uCi/ml	1.06E-06	1.03E-09	1.32E-06	1.84E-06	
3. Percent of EC	%	1.06E-01	1.03E-04	1.32E-01	1.84E-01	
C. DISSOLVED & ENTRAINED GASES						N/A
1. Total Release	Ci	0.000	0.000	0.000	0.000	
2. Average diluted concentration during period	uCi/ml	N/A	N/A	N/A	N/A	
3. Percent of EC	%	N/A	N/A	N/A	N/A	
D. GROSS ALPHA RADIOACTIVITY (Total Release)	Ci	3.09E-08	0.000	2.74E-06	3.74E-07	
E. VOLUME OF WASTE RELEASED (Prior to Dillution)	Liters	1.93E+05	0.000	2.10E+05	2.20E+05	
F. VOLUME OF DILLUTION WATER USED DURING PERIOD	Liters	3.92E+10	3.97E+10	3.71E+10	3.95E+10	
G. MAXIMUM DOSE COMMITMENT - WHOLE BODY	mrem	8.47E-05	5.36E-08	1.73E-04	9.72E-05	
Percent of ODCM App A III. H limit	%	5.65E-03	3.57E-06	1.15E-02	6.48E-03	
H. MAXIMUM DOSE COMMITMENT - ORGAN	mrem	1.13E-04	5.36E-08	2.55E-04	9.69E-05	
Percent of ODCM App A III. H limit	%	2.26E-03	1.07E-06	5.10E-03	1.94E-03	

TABLE HP 10.5-3

**PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT**

LIQUID EFFLUENTS

January 1, 2002 to December 31, 2002

NUCLIDES RELEASED	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-60	Ci	4.15E-05	<LLD	1.12E-04	<LLD
Zirconium-95	Ci	<LLD	<LLD	<LLD	<LLD
Silver-110m	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-90	Ci	6.95E-07	<LLD	7.35E-07	7.48E-07
Cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-137	Ci	<LLD	<LLD	6.87E-05	<LLD
Iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
Antimony-125	Ci	<LLD	<LLD	<LLD	<LLD
Net unidentified beta	Ci	5.37E-05	<LLD	<LLD	<LLD
Fission & Activation Products Total	Ci	9.59E-05	0.00	1.83E-04	7.48E-07
Tritium	Ci	4.17E+01	4.09E-02	4.90E+01	7.27E+01
Grand Total	Ci	4.17E+01	4.09E-02	4.90E+01	7.27E+01

ATTACHMENT 2

**RADIOACTIVE EFFLUENT RELEASE REPORT
GASEOUS EFFLUENTS – SUMMATION OF RELEASES**

JANUARY – DECEMBER 2003

3 Pages Follow

TABLE HP 10.5-2
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT

GASEOUS EFFLUENTS - SUMMATION OF RELEASES
January 1, 2003 to December 31, 2003

A. FISSION & ACTIVATION GASES	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Est Total Error %
1. Total Release	Ci	6.07E+01	3.05E+00	4.96E-01	7.42E-01	5.57
2. Average release rate for Period	uCi/sec	7.81E+00	3.88E-01	6.23E-02	9.33E-02	
3. Percent of annual ave EC	%	3.27E-03	1.48E-04	2.82E-05	4.15E-05	
B. IODINES						8.46
1. Total Iodine *	Ci	1.86E-03	8.78E-04	4.00E-04	3.53E-04	
2. Average release rate for Period	uCi/sec	2.39E-04	1.12E-04	5.04E-05	4.44E-05	
3. Percent of annual ave EC	%	2.15E-04	1.02E-04	2.18E-05	1.90E-05	7.89
C. PARTICULATES						
1. Particulates with half-life > than 8 days	Ci	8.28E-04	1.32E-04	1.42E-06	4.38E-07	
2. Average release rate for Period	uCi/sec	1.06E-04	1.68E-05	1.79E-07	5.51E-08	
3. Percent of annual ave EC	%	5.28E-05	2.03E-05	6.34E-06	1.97E-06	
4. Gross ALPHA Radioactivity	Ci	4.20E-07	6.16E-07	5.86E-07	4.56E-07	
D. TRITIUM						
1. Total release	Ci	5.39E+00	6.43E+00	5.25E+00	5.16E+00	
2. Average release rate for Period	uCi/sec	6.93E-01	8.18E-01	6.60E-01	6.49E-01	
3. Percent of annual ave EC	%	1.47E-03	1.74E-03	1.40E-03	1.38E-03	
E. SITE BOUNDARY DOSE						
1. Beta Airdose at Site Boundary Due to Noble Gases (ODCM App A III.C)	mrads	4.36E-03	2.64E-04	3.78E-05	5.32E-05	
2. Percent limit	%	4.36E-02	2.64E-03	3.78E-04	5.32E-04	
3. Gamma Airdose at Site Boundary Due to Noble Gases (ODCM App A III.C)	mrads	1.44E-03	5.41E-05	1.12E-05	1.78E-05	
4. Percent limit	%	2.88E-02	1.08E-03	2.24E-04	3.56E-04	
F. ORGAN DOSE						
1. Maximum Organ Dose to Public Based on Critical Receptors (ODCM App A III.D)	mrem	3.09E-02	1.55E-02	5.66E-03	5.52E-03	
2. Percent limit	%	4.12E-01	2.07E-01	7.55E-02	7.36E-02	

* **NOTE:** Data is reported for I-131 and I-133 only.

TABLE HP 10.5-2
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT

GASEOUS EFFLUENTS

January 1, 2003 to December 31, 2003

1. FISSION GASES	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Krypton-85	Ci	8.33E-01	7.75E-01	4.34E-02	1.26E-02
Krypton-87	Ci	<LLD	<LLD	2.50E-04	<LLD
Krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
Xenon-131m	Ci	1.14E-02	9.13E-02	<LLD	<LLD
Xenon-133	Ci	5.98E+01	2.18E+00	4.47E-01	7.24E-01
Xenon-133m	Ci	<LLD	5.84E-04	<LLD	<LLD
Xenon-135	Ci	9.55E-02	1.81E-03	1.54E-03	1.65E-03
Xenon-135m	Ci	2.94E-03	2.24E-03	3.32E-03	3.63E-03
Xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	6.07E+01	3.05E+00	4.96E-01	7.42E-01

2. IODINES	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Iodine-131	Ci	1.51E-03	7.23E-04	1.03E-04	8.95E-05
Iodine-132	Ci	1.06E-05	1.34E-04	<LLD	<LLD
Iodine-133	Ci	3.46E-04	1.55E-04	2.97E-04	2.63E-04
Iodine-135	Ci	4.65E-06	<LLD	<LLD	<LLD
Total for Period	Ci	1.87E-03	1.01E-03	4.00E-04	3.53E-04

TABLE HP 10.5-2

**PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT**

GASEOUS EFFLUENTS

January 1, 2003 to December 31, 2003

3. PARTICULATES*	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Chromium-51	Ci	2.86E-04	<LLD	<LLD	<LLD
Manganese-54	Ci	1.88E-05	<LLD	<LLD	<LLD
Cobalt-58	Ci	3.62E-04	1.17E-04	<LLD	<LLD
Cobalt-60	Ci	4.14E-05	9.38E-06	<LLD	<LLD
Niobium-95	Ci	5.47E-05	1.80E-06	<LLD	<LLD
Ruthenium-103	Ci	8.88E-06	<LLD	<LLD	<LLD
Strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-90	Ci	<LLD	2.40E-07	6.70E-07	3.75E-07
Cesium-134	Ci	8.49E-08	<LLD	<LLD	<LLD
Cesium-137	Ci	9.57E-07	<LLD	<LLD	<LLD
Zirconium-95	Ci	5.17E-05	1.11E-06	<LLD	<LLD
Cobalt-57	Ci	<LLD	1.46E-07	<LLD	<LLD
Net unidentified beta	Ci	3.33E-06	2.42E-06	7.50E-07	6.30E-08
Total for Period	Ci	8.28E-04	1.32E-04	1.42E-06	4.38E-07

* Particulates with half-lives > 8 days

ATTACHMENT 3

**RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID EFFLUENTS – SUMMATION OF RELEASES**

JANUARY – DECEMBER 2003

2 Pages Follow

TABLE HP 10.5-3
PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT

LIQUID EFFLUENTS - SUMMATION OF RELEASES
January 1, 2003 to December 31, 2003

A. FISSION & ACTIVATION PRODUCTS	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Est Total Error %
1. Total release (not including tritium, gases, alpha)	Ci	2.09E-04	5.40E-04	0.000	1.45E-03	14.16
2. Average release rate for Period	uCi/ml	8.25E-12	1.60E-11	N/A	3.75E-11	
3. Percent of EC	%	7.37E-04	8.89E-04	N/A	2.42E-03	
B. TRITIUM						4.01
1. Total Release	Ci	5.87E+01	9.21E+01	5.57E-02	4.67E+01	
2. Average diluted concentration during period	uCi/ml	2.32E-06	2.72E-06	1.39E-09	1.21E-06	
3. Percent of EC	%	2.32E-01	2.72E-01	1.39E-04	1.21E-01	
C. DISSOLVED & ENTRAINED GASES						N/A
1. Total Release	Ci	0.000	0.000	0.000	0.000	
2. Average diluted concentration during period	uCi/ml	N/A	N/A	N/A	N/A	
3. Percent of EC	%	N/A	N/A	N/A	N/A	
D. GROSS ALPHA RADIOACTIVITY (Total Release)	Ci	<LLD	8.30E-07	0.000	<LLD	
E. VOLUME OF WASTE RELEASED (Prior to Dillution)	Liters	1.79E+05	3.49E+05	0.000	1.79E+05	
F. VOLUME OF DILLUTION WATER USED DURING PERIOD	Liters	2.53E+10	3.38E+10	4.01E+10	3.86E+10	
G. MAXIMUM DOSE COMMITMENT - WHOLE BODY	mrem	2.49E-04	3.92E-04	7.31E-08	6.49E-04	
Percent of ODCM App A III. H limit	%	1.66E-02	2.61E-02	4.87E-06	4.33E-02	
H. MAXIMUM DOSE COMMITMENT - ORGAN	mrem	3.05E-04	5.02E-04	7.31E-08	1.04E-03	
Percent of ODCM App A III. H limit	%	6.10E-03	1.00E-02	1.46E-06	2.08E-02	

TABLE HP 10.5-3

**PALISADES PLANT RADIOACTIVE
EFFLUENT REPORT**

LIQUID EFFLUENTS
January 1, 2003 to December 31, 2003

NUCLIDES RELEASED	Units	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr
Manganese-54	Ci	<LLD	2.35E-05	<LLD	<LLD
Cobalt-58	Ci	<LLD	1.20E-04	<LLD	3.31E-04
Cobalt-60	Ci	1.16E-04	1.03E-04	<LLD	6.38E-04
Zirconium-95	Ci	<LLD	<LLD	<LLD	<LLD
Silver-110m	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-90	Ci	2.86E-06	1.03E-05	<LLD	2.86E-05
Cesium-134	Ci	<LLD	<LLD	<LLD	7.51E-05
Cesium-137	Ci	3.76E-05	1.37E-04	<LLD	1.84E-04
Iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
Antimony-125	Ci	<LLD	9.76E-05	<LLD	<LLD
Net unidentified beta	Ci	5.22E-05	4.91E-05	<LLD	1.91E-04
Fission & Activation Products Total	Ci	2.09E-04	5.40E-04	0.0	1.45E-03
Tritium	Ci	5.87E+01	9.21E+01	5.57E-02	4.67E+01
Grand Total	Ci	5.87E+01	9.21E+01	5.57E-02	4.67E+01

Inventory of Radionuclides for the Great Lakes

Nuclear
Task
Force

International
Joint
Commission

December 1997



International Joint Commission
United States and Canada

United States Government Code of Federal Regulations (CFR)

10 CFR 835 (1995) *Occupational Radiation Protection*

40 CFR 51 (1993) *Requirements for Preparation, Adoption and Submittal of Implementation Plans*, as amended

UNSCEAR (1977)

Sources, Effects and Risks of Radioactivity; Report to the UN General Assembly with Appendices; United Nations, New York.

UNSCEAR (1982)

Sources, Effects and Risks of Ionizing Radiation; Report to the UN General Assembly with Appendices; United Nations, New York.

UNSCEAR (1988)

Sources, Effects and Risks of Ionizing Radiation; Report to the UN General Assembly with Appendices; United Nations, New York.

UNSCEAR (1993)

Sources, Effects and Risks of Ionizing Radiation; Report to the UN General Assembly with Appendices; United Nations, New York.

Wahlgren, M.A., Robbins, J.A., and Edgington, D.N. (1980)

Plutonium in the Great Lakes. In: *Transuranic Elements in the Environment*, W.C. Hanson (ed.); United States Department of Energy, Washington, D.C. pp. 659-683.

Yan, N.D., Mackie, G.L., and Boomer, D. (1989)

Chemical and biological effects correlates of metal levels in crustacean zooplankton from Canadian Shield Lakes: a multivariate analysis; *Sci. Total Environ.* 87/88: 419-458.

This generic letter supplement only requires information from the addressees under the provisions of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f). Therefore, the staff has not performed a backfit analysis. The information required will enable the NRC staff to determine whether licensees are complying with the requirements of

10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50 and any associated license conditions, and licensee commitments related to GL 88-11 and GL 92-01, Revision 1. The staff is not establishing a new position for such compliance in this generic letter supplement. Therefore, this generic letter supplement does not constitute a backfit and no documented evaluation or backfit analysis need be prepared.

Federal Register Notification

A notice of opportunity for public comment was not published in the *Federal Register* because the NRC needs to receive the responses to the generic letter in an expeditious manner. However, comments on the technical issue(s) addressed by this generic letter may be sent to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555.

Paperwork Reduction Act Statement

The information collections contained in this request are covered by the Office of Management and Budget clearance number 3150-0011, which expires July 31, 1997. The public reporting burden for this collection of information is estimated to average 600 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needs, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, D.C., 20555-0001, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0011), Office of Management and Budget, Washington, D.C. 20503.

Compliance with the following request for information is voluntary. The information would assist the NRC in evaluating the cost of complying with this GL supplement.

- (1) the licensee staff time and costs to perform requested record reviews and developing plans for inspections;
- (2) the licensee staff time and costs to prepare the requested reports and documentation;
- (3) the additional short-term costs incurred as a result of the inspection findings such as the cost of the corrective actions or the costs of down time; and
- (4) an estimate of the additional long-term costs that will be incurred as a result of implementing commitments such as the estimated costs of conducting future inspections and repairs.

If you have any questions about this matter, please contact the technical contacts listed

relevant data;

(3) a determination of the need for use of the ratio procedure in accordance with the established Position 2.1 of Regulatory Guide 1.99, Revision 2, for those licensees that use surveillance data to provide a basis for the RPV integrity evaluation; and

(4) a written report providing any newly acquired data as specified above and (1) the results of any necessary revisions to the evaluation of RPV integrity in accordance with the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, and any potential impact on the LTOP or P-T limits in the technical specifications or (2) a certification that previously submitted evaluations remain valid. Revised evaluations and certifications should include consideration of Position 2.1 of Regulatory Guide 1.99, Revision 2, as applicable, and any new data.

Required Response

All addressees are required to submit the following written responses providing the information described above:

(1) within 90 days from the date of this generic letter, a written response to part (1) of the information requirement specified above; and

(2) within 6 months from the date of this generic letter, a written response to parts (2), (3), and (4) of the information requirement above.

Address the required written reports to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, under oath or affirmation under the provisions of Section 182a, Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f). In addition, submit a copy to the appropriate regional administrator.

The NRC recognizes the potential difficulties (number and types of sources, age of records, proprietary data, etc.) that licensees may encounter while ascertaining whether they have all of the data pertinent to the evaluation of their RPVs. For this reason, 90 days is allowed for the initial response.

The information obtained from the licensees as a result of Revision 1 to GL 92-01 has been entered into a computerized reactor vessel integrity database (RVID), which will be made publicly available in the third quarter of 1995. The NRC intends to hold a public meeting on this GL supplement within 30 days of its issuance and a public workshop on RPV integrity, addressing the RVID and other RPV integrity issues, in the third quarter of 1995.

Related Generic Communications

(1) NRC Generic Letter 92-01, Revision 1, "Reactor Vessel Structural Integrity," March 6, 1992.

(2) NRC Generic Letter 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations," July 12, 1988.

Backfit Discussion

NRC Staff Generic Evaluation of RPV Structural Integrity Data for PTS Events

The staff is assessing the generic implications of chemical composition variability with regard to the current methodology for ensuring protection against PTS events for PWRs. The staff considers that the larger variability observed in recent reviews could be applicable to other reactor vessels and may, therefore, reduce the margins of safety provided by the PTS screening criteria. The staff will evaluate this concern as part of its review of plant-specific evaluations and longer-term reassessment of the PTS rule.

To provide assurance that all PWRs will maintain adequate protection against PTS events while the PTS rule is being reassessed, the staff has assessed all of the PWR RPVs using generic values of chemistry and increased margin terms to account for potentially larger chemical composition variability. It should be noted that such analyses are considered conservative evaluations, that were performed to determine whether an immediate safety concern exists for this issue and whether there is adequate time to perform a more rigorous assessment of the issue. As stated in the previous section, based upon currently available information, the staff believes that the Palisades vessel will exceed the PTS screening criteria before any other PWR. However, because of the importance of RPV integrity and the potential impact of additional, unreviewed data on RPV evaluations, the staff believes that this issue needs to be resolved on an expedited basis.

Consideration of All Data Relevant to Reactor Pressure Vessel Integrity

As described previously, another result of recent reviews was that the staff became concerned that licensees might not necessarily have all of the data pertinent to the evaluation of the structural integrity of their RPVs. This is particularly true where the RPV fabricator holds, or has held, the applicable data to be proprietary in nature. Such data include, but are not limited to: chemical composition, heat treatment, plate and forging manufacturing process records, RPV fabrication records, all mechanical property data (tensile, impact, fracture toughness), and surveillance data. Sources of data that licensees should reexamine include material test reports from the steel producer, weld wire manufacturer, RPV fabricator, independent testing laboratories, and nuclear steam supply system (NSSS) vendor. Licensees are encouraged to work closely with their respective vessel owners groups and NSSS vendor groups to ensure that all sources of information pertinent to the analysis of the structural integrity of their RPVs have been considered. The information submitted in response to this generic letter should be considered to be public information.

Required Information

Addressees are required to provide the following information:

- (1) a description of those actions taken or planned to locate all data relevant to the determination of RPV integrity, or an explanation of why the existing data base is considered complete as previously submitted;
- (2) an assessment of any change in best-estimate chemistry based on consideration of all

information on the two key aspects of RPV structural integrity of primary concern to the NRC: PTS and USE. With respect to USE, licensees of all plants were able to demonstrate compliance with the Appendix G requirements either through consideration of applicable data or through equivalent margins analyses. With regard to PTS, only two plants (Beaver Valley 1 and Palisades) were projected to exceed the PTS screening criteria of 10 CFR 50.61 before the end of operating life (EOL). As stated previously, based on data and analyses submitted for GL 92-01, Revision 1, and other recent reviews (e.g., Ref. 2), the staff has determined that not all licensees were aware of all the information pertinent to the analysis of the structural integrity of their RPVs. In addition, recent reviews have indicated larger-than-expected variabilities in weld chemical composition, which have, in turn, highlighted the extreme sensitivity of RPV embrittlement estimates to small changes in the chemical composition of beltline materials.

Recent NRC Staff Evaluations of RPV Structural Integrity Data for PTS Events

The staff issued a safety evaluation report to the licensee for Palisades on the variability of reactor vessel weld properties for the Palisades reactor vessel on April 12, 1995 [Ref. 2]. The staff agreed with the licensee's best-estimate analysis of the chemical composition of the reactor vessel welds and concluded that continued operation through Cycle 14 (late 1999) was acceptable. As discussed previously, while performing the evaluation, the staff noted larger variability in the chemical composition of the welds compared to that assumed for the development of the PTS rule. The staff evaluated the implications of this larger variability on the PTS rule generic margins for the Palisades vessel using the same analytic methods as those used in formulating the rule. The staff has reviewed the other PWR vessels and, based upon currently available information, believes that the Palisades vessel will reach the PTS screening criteria by late 1999, before any other PWR.

On March 27 and 28, 1995, the staff reviewed the Asea Brown Boveri-Combustion Engineering proprietary RPV data-base. The most significant information reviewed concerned the Kewaunee RPV. The particular concern was the impact of data generated subsequent to the response to GL 92-01, Revision 1, on the plant's PTS evaluation. The staff met with the licensee for Kewaunee (April 13, 1995) to discuss issues related to consideration of all appropriate chemical composition data in addition to the applicable surveillance program data. In that meeting, the licensee presented its plant-specific surveillance program results and some new information related to the chemical composition variability in the RPV welds. Based upon this information, the licensee believes that the Kewaunee vessel will not exceed the PTS screening criteria before EOL. The staff has not completed its review of the new information on the Kewaunee vessel. However, based on the new vessel specific surveillance data, chemical composition data and the greater margin to the PTS screening criteria (300°F for the limiting Kewaunee circumferential weld compared to 270°F for the limiting Palisades axial weld), the staff believes that the Kewaunee vessel will not exceed the PTS screening criteria before the Palisades vessel. A key aspect of the Kewaunee review is the determination of the need for use of the ratio procedure in accordance with the established Position 2.1 of Regulatory Guide 1.99, Revision 2, by licensees using surveillance data.

2/17/94

EXHIBIT 3 A

Dear Dr. Selin,

I'm glad the Palisades resident got your ear about my concern over the lack of seismic requirements for the spent fuel dry cask storage pad and more importantly, the foundation material. I discovered this while I was investigating an allegation from Mary Sinclair on Palisades. I've discussed this issue with Fritz Sturz, one of the authors of Part 72 the licensing requirements for the casks. Initially, it was ok as is until I requested it in writing. Enclosed is their response to this issue. It's still not addressing the generic issue of lack of seismic requirements in the regulations. It seems that Subpart E, of Part 72, covers this point quite well for storage casks that are not pre-approved.

However, if you use NRC-approved casks under Subpart K, the regulations are silent about the foundation material or the pad. Actually, it's the consequences that might occur from an earthquake that I'm concerned about. The casks can either fall into Lake Michigan or be buried in the loose sand because of liquefaction. This event might be in the public's mind in view of what just happened in Southern California. It is apparent to me that NMSS doesn't realize the catastrophic consequences of their continued reliance on their current ideology:

(emphasis added-MPS)

Please call.

Dr. Ross Landman

Rtll 708-829-9609

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE SECRETARY

In the Matter of
Nuclear Management Company, LLC Docket No. 50-255
Palisades Nuclear Power Station
Regarding Renewal of Facility Operating
License No. DPR-20 for an Additional 20
Year Period

**DECLARATION OF Dr. Ross Landsman,
Retired U.S. Nuclear Regulatory Commission
Nuclear Safety Engineer and Palisades Dry Cask Storage Inspector**

Under the penalty of perjury, I, Ross Landsman, declare that the following statements are true and correct to the best of my knowledge and belief:

1. My name is Ross Landsman. I am a retired U.S. Nuclear Regulatory Commission Region III Nuclear Safety Engineer and Palisades Dry Cask Storage Inspector. I live at 9234 North Lowell, Skokie, Illinois.
2. NRC Region III, where I formerly worked before recently retiring, has requested assistance from NRC Headquarters division of Nuclear Reactor Regulation (NRR), in coordination with the division of Nuclear Materials Safety and Safeguards (NMSS) Spent (sic) Fuel Project Office (SFPO), in order to resolve questions involving the licensing basis for the Palisades Nuclear Power Plant and the appropriateness of the licensing basis to the seismic design of the Palisades ISFSI.
3. On August 4, 2004, on behalf of the NRC, I completed an inspection of design and operational activities associated with the newly constructed Palisades ISFSI pad. The results of this inspection were documented in NRC Inspection Report No. 07200007/2004-002 (DNMS). As a result, I identified two issues, characterized as violations by me in the draft report but changed to unresolved items (URI) by my boss in the final report to allow Palisades to go ahead and load fuel instead of stopping them even though it was not safe. These two issues were associated with the licensee's translation of the safe shutdown earthquake (SSE) from the reactor site to the ISFSI pad (URI 0720007/2004-002-1) and its assessment of the sub-surface bearing stability beneath the ISFSI pad (URI 0720007/2004-002-2). After the final report was issued, I wrote a Differing Professional Opinion (DPO) on this issue but the agency (the NRC) would not accept it based on the fact that there was no issue to disagree about since the NRC has not made a decision on my issues yet because they changed them from violations to

unresolved items. I informed them that they did make a decision and let Palisades load casks over my objections. They turned me down again because I was retiring and officially couldn't bother them any more, but the point is, the pad is not safe to hold any loaded casks.

4. During an inspection of the 2004 ISFSI installation, I reviewed the licensee's seismic calculations associated with the ISFSI pad and the irradiated fuel canisters. I determined that the licensee performed the ISFSI pad SSE calculations assuming a seismic horizontal acceleration of 0.2g in the free-field and at the ISFSI pad ground surface elevation of 623 feet. The licensee stated its understanding that the seismic horizontal acceleration value of 0.2g was approved by the NRC at the time of initial reactor plant licensing. The licensee further stated its understanding that the 0.2g horizontal acceleration value was applicable for SSE seismic calculations associated with any location and at any elevation on the plant site. I noted that the licensee performed a soil-structure interaction, seismic assessment for the ISFSI pad using the SSE seismic horizontal acceleration of 0.2g. The soil-structure interaction assessment results indicated that the irradiated fuel canisters would experience 0.25g horizontal acceleration during an SSE. The irradiated fuel canister seismic horizontal acceleration design limit is 0.25g.

5. While reviewing the licensee's calculations, I noted significant differences between the elevation and subsurface soil composition of the reactor plant and the 2004 ISFSI pad. Specifically, the reactor containment building was constructed, following the removal of the soil/sands overburden, at a ground surface elevation of 590 feet on compacted glacial till. The 2004 ISFSI pad was constructed, without the removal of the soils/sands overburden, at a ground surface elevation of 625 feet on sands that the licensee mechanically compacted. The licensee estimated that the compacted glacial till soil layer, at the location of the 2004 ISFSI pad, was at an elevation of 560 to 570 feet.

6. Based upon the subsurface soil composition and elevation differences between the reactor plant site and the 2004 ISFSI site, I determined that the licensee's application of the 0.2g horizontal acceleration value that the ISFSI site was non-conservative. Specifically, the inspectors noted that the calculated SSE seismic horizontal acceleration would likely be larger at the ISFSI compared to the reactor plant site due to the increased site elevation and the approximately 50 to 60 feet of mechanically compacted sands present on top of the compacted glacial till material at the ISFSI site. In addition, I concluded that the soil-structure interaction calculation results were non-conservative, which if revised to incorporate a larger horizontal acceleration value based on the increased ISFSI pad elevation and the soil profile differences, would likely result in a seismic horizontal acceleration value in excess of the irradiated fuel canister design limit.

7. Additionally, correspondence between the NRC and the licensee, dated December 1966, telephone call between R. Maccary (Atomic Energy Commission, AEC) and H. Wahl (Bechtel for the licensee), indicates that the NRC considered SSE to be defined as having a horizontal acceleration, at the bedrock, of 0.15g with an amplification factor of 1.25, producing a 0.2g ground acceleration. This demonstrates the NRC's understanding

13. Revision 0 of the Final Safety Analysis Report indicated that a 0.2g surface acceleration was used for the SSE. Licensee calculations of the seismic adequacy of those structures housing safety-related components were all performed at the grade elevation of 590 feet. This was also the ground surface elevation since the overburden of sand dunes was removed prior to construction.

14. NRR and NMSS have been requested by NRC Region III to respond to each of the following questions:

- a. During initial licensing of the Palisades Nuclear Power Plant, did the NRC anchor the horizontal acceleration for seismic evaluations at the "ground surface" of the reactor building, elevation 590 feet and on top of the compacted glacial till, or the "ground surface" of the general plant site, any elevation and with any combination of soil structures intervening between the "ground surface" and the underlying bedrock?
- b. During Initial licensing of the Palisades Nuclear Power Plant, did the NRC consider that the seismic horizontal acceleration would be amplified from its value at the bedrock to the value used at the "ground" surface due to the type and thickness of the intervening soil between the bedrock and the "ground surface"?
- c. Does the NRC expect, based upon the regulations in 10CFR72.212(b)(2)(i)(B) and 10CFR72.212(b)(3), a licensee to incorporate new information and technology into its assessment of the continued appropriateness and re-application of the previous reactor plant seismic siting and design criteria for the design and construction of an ISFSI pad?
- d. Irrespective of the previous answers, should the NRC require the licensee to demonstrate that the irradiated fuel canister seismic design is appropriate, using ISFSI pad-specific seismic data, given that the calculated ISFSI horizontal acceleration is at the canister design limit without consideration of the increases expected due to the site-specific soil profile and elevation?

15. Regarding intra-NRC coordination on these questions, NRC Region III staff spoke with NRR staff and others on April 29, 2005. NRR agreed to accept this issue as a Task Interface Agreement and to respond to this request 30 days after receipt, but at least prior to the next dry cask loading campaign, because the pad is not safe to hold the irradiated fuel. The Task Force Agreement Number is 2005-06.

16. Upon request, I would be happy to identify the more than one dozen references referred to in the preparation of this declaration.

/s/ Dr. Ross Landsman
[Signature]

Date: 9-15-2005

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY**

In the Matter of)	
	)	Docket No. 50-255
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING)	
STATION)	
)	
Regarding the Renewal of)	
Facility Operating License No.	)	August 8, 2005
DPR-20 for a 20-Year Period)	

**REQUEST FOR HEARING
AND
PETITION TO INTERVENE**

Now come the Nuclear Information and Resource Service (hereinafter "NIRS"), West Michigan Environmental Action Council (hereinafter "WMEAC"), Don't Waste Michigan (hereinafter "DWM"), the Green Party of Van Buren County (hereinafter "Green Party"), the Michigan Land Trustees (all collectively known as Petitioners-Intervenors), and Ann Aliotta, Katherine Beck, Lee Burdick, Bruce Cutean, W. Ronald Elmore, Jane Gardner, Barbara Geisler, Karen Heavrin, Janine Heisel, Mary Lou Hession, Alice Hirt, Lauretta Holmes, Chuck Jordan, Judy Kamps, Gary Karch, Maynard Kaufman, Nelly Kurzmann, Nan Lewis, Michael Martin, Maria Ochs, Elizabeth Paxson, Ken Richards, Margaret Roche, Pamela S. Rups, James O. Schlobohm, Sally P. Schlobohm, Catherine Sugas, Elizabeth M. Sugas, Robin Tinholt, Barbara Trumbull, and Sally Zigmond (collectively known as Member-Intervenors) and hereby make their REQUEST FOR A HEARING and PETITION TO INTERVENE in the captioned matter, pursuant to the

Federal Register Notice of June 08, 2005 [Volume 70, Number 109, Page 33533-33535] and in accordance with the provisions of 10 CFR § 2.714 and § 2.309.

In support of their Request and Petition, said Intervenors further state as follows:

1. Nuclear Information and Resource Service is a nonprofit corporation with over 6000 members, a number of whom live in the Great Lakes Region of the United States, including over 100 in Michigan and 50 of whom make their residences within fifty (50) miles of the Palisades Nuclear Generating Station (hereinafter "Palisades"). The central office of NIRS is located at 1424 16th Street NW, Suite 404, Washington, DC 20036.

2. Western Michigan Environmental Action Council is a nonprofit, tax-exempt environmental organization started in the mid-1960's. It has 1500 members, most of whom live in Michigan, and an estimated 400 to 500 live within 50 miles of the Palisades nuclear plant.

3. Don't Waste Michigan is a nonprofit organization begun in the 1980's with about 25 members, nearly all of whom live in Michigan, and of which an estimated 5 currently live within 50 miles of the Palisades nuclear plant.

4. The Green Party of Van Buren County is a political party and association of persons which came into being around environmental issues. It has a membership of approximately 15 members, all of whom are residents of Van Buren County, Michigan, and all of whom reside within 50 miles of the Palisades nuclear plant.

5. Michigan Land Trustees (website www.michiganlandtrust.org) was founded in 1976. It is an association of 60 to 70 individuals and

families dedicated to preserving and protecting farm land in Michigan. Most of its members reside in southwest Michigan, at least 15 of whom live within the 50-mile zone around the Palisades nuclear reactor.

6. Members of these organizations who live or have property and family within the 50-mile Emergency Planning Zone (EPZ) including the immediate area around the Palisades Nuclear Generating Station which is sited in Covert, Michigan have requested Nuclear Information and Resource Service, West Michigan Environmental Action Council, Don't Waste Michigan, the Green Party of Van Buren County and the Michigan Land Trustees (hereinafter "Petitioners") to represent them and their respective interests in this proceeding.

6. The Declarations of individuals Ann Aliotta, Katherine Beck, Lee Burdick, Bruce Cutean, W. Ronald Elmore, Jane Gardner, Barbara Geisler, Karen Heavrin, Janine Heisel, Mary Lou Hession, Lauretta Holmes, Chuck Jordan, Judy Kamps, Gary Karch, Maynard Kaufman, Nelly Kurzmann, Nan Lewis, Michael Martin, Maria Ochs, Elizabeth Paxson, Ken Richards, Margaret Roche, Pamela S. Rups, James O. Schlobohm, Sally P. Schlobohm, Catherine Sugas, Elizabeth M. Sugas, Robin Tinholt, Barbara Trumbull, and Sally Zigmond are annexed to this Request and Petition, with each individual declarant identifying his or her affiliation with the petitioning organizations.

7. Petitioners-Intervenors, as organizational intervenors, believe that their members' interests will not be adequately represented without this action to intervene, and without the opportunity to participate as full parties in this proceeding. If

the Palisades Nuclear Generating Station license is renewed without resolving the Petitioners'-Intervenors' safety concerns and environmental issues, this nuclear generating station may operate unsafely and pose an unacceptable risk to the environment, thereby jeopardizing the health and welfare of the respective Petitioners'-Intervenors' members who live, recreate and have businesses within the vicinity of the nuclear power reactor.

PETITIONERS' CONTENTIONS

TECHNICAL/HEALTH/SAFETY ANALYSIS CONTENTIONS

1. The license renewal application is untimely and incomplete for failure to address the continuing crisis of embrittlement.

The Petitioners allege that the Palisades license renewal application is fundamentally deficient because it does not adequately address technical and safety issues arising out of the embrittlement of the reactor pressure vessel and unresolved Pressure Thermal Shock ("PTS") concerns that might reasonably result in the failure of the reactor pressure vessel ("RPV"). The Palisades nuclear power station is identified as prone to early embrittlement of the reactor pressure vessel, which is a vital safety component. As noted in the opinion of Petitioners' expert on embrittlement, Mr. Demetrios Basdekas, retired from the Nuclear Regulatory Commission, the longer Palisades operates, the more embrittled its RPV becomes, with decreasing safety margins in the event of the initiation of emergency operation procedures. Therefore, a hearing on the public health and safety effects of a prospective additional twenty years of operation, given the present and prospective embrittlement trend of the RPV is imperative to protecting the interests of those members of the petitioning organization who are affected by this proceeding.

2. Excessive radioactive and toxic chemical contamination in local drinking water due to emissions from Palisades nuclear power plant as part of its daily, "routine" operations.

The radioactive and toxic chemical emissions from the Palisades nuclear power plant into the waters of Lake Michigan contaminate the recently-installed drinking water supply intake for the City of South Haven, built just offshore from Van Buren State Park and just downstream from the Palisades reactor, due to the direction of the flow of Lake Michigan's waters and the very close proximity of the Palisades reactor to the South Haven drinking water supply intake. U.S. National Oceanographic and Atmospheric Administration models confirm the direction of water flow in Lake Michigan toward the

intake. Petitioners-Intervenors hope to produce public records of toxics and radiation testing of the water source to evidence this public health problem.

ENVIRONMENTAL CONTENTIONS

3. The Palisades reactor has no place to store its overflowing irradiated nuclear fuel inventory within NRC regulations.

The indoor irradiated fuel storage pool reached capacity in 1993. But the outdoor dry cask storage pads at Palisades, both the older one nearer Lake Michigan and the newer one further inland, are in violation of NRC earthquake regulations. 10 CFR § 72.212(b)(2)(i)(B) requires that:

Cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, and soil liquefaction potential or other soil instability due to vibratory ground motion. . . .

According to Petitioners' anticipated expert, Dr. Ross Landsman, former U.S. Nuclear Regulatory Commission Region III dry cask storage inspector, the older pad violates the liquefaction portion of this regulation, and the new pad violates the amplification portion of the regulation. Petitioners contend that neither the older nor new dry cask storage pads at the Palisades plant were designed in consideration of the factors contained in the cited regulation.

4. The unloadable, unmovable dry storage cask #4 at Palisades.

In 1993, Consumers Power (now Consumers Energy) assured a federal district judge that if it encountered problems with loaded dry casks at Palisades, it would simply reverse the loading procedure and return the high-level radioactive waste to the storage pools. But the fourth cask loaded at Palisades, in June 1994, was shortly thereafter admitted by Consumers Power to be defective, having faulty welds. However, eleven years on, Consumers has yet to unload the defective cask, because it cannot. Petitioners state that Consumers perpetrated a fraud upon the court and the public, with the complicit support by the NRC, and has critically undermined its credibility as to any pledges about the safety of dry cask storage.

The significance of this problem with cask #4 is considerable. For example, the configuration of the 18 to 19 dry casks currently stored on the older pad nearer Lake Michigan is such that the casks furthest back cannot be moved or unloaded until all other casks in front of them have been moved out of the way first. This configuration increases the risks, making it very difficult to address emergencies involving certain casks in the configuration in a timely manner.

5. There is no permanent repository for the nuclear waste which would be generated at Palisades after 2010.

Any waste generated at Palisades after 2010 would be excess to the capacity of the proposed national dump at Yucca Mountain, Nevada according to U.S. Department of Energy projections in its Yucca Mountain Final Environmental Impact Statement (Feb. 2002), as revealed in Tables A-7 and A-8 on pages A-15 and A-16 of Appendix A. In fact, the waste generated at Palisades from 1971 to 2010 may also be excess to Yucca, in that the proposed dump may never open. The State of Nevada maintains that NRC's "Nuclear Waste Confidence Decision" is erroneous, in that it biases NRC to favor the Yucca Mountain dump license lest it be proven wrong in its assurance to the public that a high-level radioactive waste geologic repository will open in the U.S. by 2025. Because so much uncertainty surrounds the Yucca Mountain dump proposal, as well as other high-level radioactive waste proposals, Petitioners-Intervenors contend that waste generated at Palisades during the 20 year license extension could very well be stored at Palisades indefinitely, a scenario inadequately addressed by the applicant and NRC.

6. Intensifying sand erosion and avalanche risk around dry cask storage pads.

The more casks loaded on the storage pads at Palisades, the more risk of erosion to the sand supporting the pads, given the large weight of the casks themselves (well over 100 tons each), weather related erosion of the sand dunes, as well as the erosion that will occur due to more severe weather impacts from the global climate crisis and climate de-stabilization. Arresting erosion at both pads is important to safety and radiation containment over the long haul, given the proximity of the waters of Lake Michigan. The State of Michigan and the U.S. Army Corps of Engineers have designated the sand dunes upon which the older pad is located - so close to the waters of Lake Michigan - as a high-risk erosion zone.

The Lake Michigan dunes are subject to "blow outs" where entire dunes are blown out during wind storms and lightning strikes. See F. Nori, P. Sholtz, and M. Bretz (Department of Physics, The University of Michigan), "Sound-Producing Sand Avalanches," Scientific American Vol. 277, No. 3 (September 1997). At Warren Dunes, some 35 miles south of Palisades, sand blowouts have been estimated to travel as much as a one-quarter mile per day, exposing 5,000-year-old trees that have long since turned to charcoal. "Some chilling facts about Dunes history,"

<http://www.nwitimes.com/articles/2005/07/25/news/region/0256d4c429632b30862570460062843b.txt>

The Palisades dunes could, in a wind storm or lightning strike, shift, blow and cover the dry cask storage area. As weather patterns intensify (as anticipated) this potential for erosion will increase. Additionally, the dunes and shore line are geologically prone to sand avalanche. A sand avalanche coupled with a seismic event could compromise the integrity of one or more casks at Palisades.

7. *Non-radiological persistent toxic burdens to area water sources.*

The impact of 20 additional years of pollution by toxics disclosed but not adequately controlled under requirements of the National Pollutant Discharge Elimination System will directly affect water quality of nearby sources, including Lake Michigan. In 2000, for example, Palisades was found to be in "continuing noncompliance" for its apparent multiple misuses of Betz Clam-Trol in Lake Michigan for the dispersion of mussels and clams affecting the water intakes. See <http://www.epa.gov/region5/water/weca/reports/mi4qtr01.txt>

NPDES violations also contradicts the spirit, intention and explicit recommendation of The International Joint Commission. In its "Ninth Biennial Report on Great Lakes Water Quality," the Commission's Recommendation #16 (at p. 42) urges that "[g]overnments monitor toxic chemicals used in large quantities at nuclear power plants, identify radioactive forms of the toxic chemicals and analyze their impact on the Great Lakes ecosystem."

MISCELLANEOUS CONTENTIONS

8. *Increased embrittlement of re-used fuel rods as buffers to reduce embrittlement of RPV walls.*

To mitigate the prospect of increased embrittlement of the reactor pressure vessel (RPV), the Palisades operator uses previously-irradiated fuel to create a buffer next to the RPV wall.

The second-use of irradiated fuel assemblies in the reactor core tends to weaken and damage the cladding on the fuel rods, making future waste handling, storage, and ultimate disposal - whether on-site at Palisades, in transport, and at future storage or dump sites - problematic. It poses an elevated risk for the safety of Palisades workers and the general public. Moreover, the U.S. Department of Energy ("DOE") depends on the integrity of the fuel cladding as a means of preventing or minimizing the chances of unanticipated fissioning in storage casks or other units - in effect, as a means of delaying radiation releases into the groundwater at the Private Fuel Storage (Utah) and Yucca Mountain (Nevada) sites.

8. *Environmental justice denied by the continuing operations of Palisades.*

Palisades nuclear generating station is a the source of environmental justice violations. Located within a predominantly African-American and low-income township, Palisades provides woefully inadequate tax revenues to the host community, considering the large adverse impacts and risks the reactor inflicts. Palisades' African-American employees have traditionally been stuck in the dirtiest and most dangerous jobs at the reactor, with little to no prospects for promotion. Some of Palisades' African American employees have also experienced death threats at the work place, including nooses hung in their lockers or in public places to symbolize lynching, an attempt

to silence their public statements for workplace justice.

Palisades' license extension application also has inadequately addressed the adverse impacts that 20 additional years of operations and waste generation would have on the traditional land uses, spiritual, cultural, and religious practices, and treaty rights of various federally-recognized tribes in the vicinity of the plant and beyond, as well as effects upon non-federally recognized tribes governed by international law. Only three tribes were contacted by the NRC by August 8th, 2005, and invited to participate in the license extension proceedings, which effectively excluded a number of tribes within the 50-mile zone around the reactor. For this reason alone, the August 8, 2005 deadline for requesting a hearing to intervene against the Palisades license extension should be extended, until all tribes within the 50-mile zone and beyond, which have ties to the power plant site and its environs, are contacted.

Also, Palisades' license extension application inadequately addresses the adverse socio-economic impacts of a catastrophic radiation release due to reactor core embrittlement leading to core rupture, as they would be found among the low-income Latin American agricultural workforce of the Palisades area. Too, possible synergistic effects of such catastrophic radiation releases combined with the toxic chemical exposures these low income Latin-American agricultural workers already suffer on the job have not been evaluated.

Finally, there is an unacceptable lack of Spanish language emergency evacuation instructions and notifications to serve the Spanish speaking Latino population within 50 miles of the Palisades reactor, especially migrant agricultural workers.

9. Chronic emergency unpreparedness within EPZ.

Emergency responders in the 50 mile zone around the Palisades nuclear reactor are inadequately trained and inadequately equipped to respond to a major radioactivity release during an accident or attack at the plant.

Even with its shiny new fire trucks, Covert, Michigan does not have the staffing, equipment, training nor preparedness for a major radiological emergency. Covert's best, good as it is, is still no match for a chernobyl style fire. The remainder of the emergency planning zone is occupied by rural, volunteer fire departments, which have even less equipment and resources with which to work. Radiation monitors and radiation-protective gear are in short supply or unheard of. Isolation wards for radioactively contaminated victims (so they don't harm the doctors and nurses and other patients) are very rare or non-existent at most, probably all, hospitals within 50 miles.

10. Economic damage in Palisades region in event of accident or attack on the power plant causing severe radiation release.

Given that a severe radiation release from Palisades due to accident or attack would significantly damage the economic base of western Michigan, not only within the 50 mile zone around the

reactor, but even beyond it, due to crops and products that would have to be destroyed, as well as the lingering stigma attached to western Michigan agricultural products after such a release, a Severe Accident Mitigation Analysis must be performed, publicized and circulated for public review and comment as a precondition to considering whether or not to grant a license extension.

11. Threats of terrorist attack and sabotage against the Palisades nuclear power plant.

Located on the shoreline of Lake Michigan, the source of drinking water, fish, recreation, and other economic value to tens of millions of people downstream, Palisades represents a target for potentially catastrophic terrorist attack or sabotage intended to release large amounts of radioactivity into the Great Lakes basin. Palisades represents a radioactive bull's eye on the shore of 20% of the planet's surface fresh water, the Great Lakes. The operating reactor (containing many billions of curies of radioactivity) and high-level waste storage pool (containing tens to hundreds of millions of curies) are vulnerable to such attack, as are the outdoor dry storage casks, so highly visible stored in plain sight.

12.

Respectfully submitted for the Petitioners,

/s/ Terry J. Lodge
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Co-Counsel for all Petitioners-Intervenors and Member-Intervenors

CERTIFICATION OF SERVICE/TRANSMISSION

I hereby certify that the foregoing Request for Hearing and Petition to Intervene, along with five (5) Notices of Appearance, was sent this 8th day of August, 2005 via email only to the following:

Office of the Secretary
United States Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention: Rulemaking and Adjudications Staff
Email to Office of the Secretary : HEARINGDOCKET@nrc.gov

Office of General Counsel
United States Nuclear Regulatory Commission
Washington, DC 20555-0001
Email: OGCMailcenter@nrc.gov

And that the same was sent via first-class mail on the 9th of August, 2005 to:

Jonathan Rogoff, Esq.
Vice President Counsel & Secretary
Nuclear Management Company LLC
700 First Street
Hudson, WI 54016

/s/ Terry J. Lodge
Terry J. Lodge

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY**

In the Matter of)	
	)	Docket No. 50-255
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING)	
STATION)	
)	
Regarding the Renewal of)	
Facility Operating License No.	)	August 8, 2005
DPR-20 for a 20-Year Period)	
)	

NOTICE OF APPEARANCE OF PAUL GUNTER

Pursuant to 10 CFR 2.713(b), Paul Gunter hereby enters an appearance on behalf of Nuclear Information and Resource Service (NIRS) and provides the following information:

1. I am Director of the Reactor Watchdog Project for Nuclear Information and Resource Service at 1424 16th Street NW, Suite 404, Washington, DC 20036, Tel. 202 328 0002 and my email address is <pgunter@nirs.org>.

2. I have been appointed by NIRS to jointly represent the organization and its members in this proceeding.

<u>/s/ Paul Gunter</u>
Paul Gunter
 <u>8/8/2005</u>
Date

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY**

In the Matter of)	
	)	Docket No. 50-255
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING)	
STATION)	
)	
Regarding the Renewal of)	
Facility Operating License No.	)	August 8, 2005
DPR-20 for a 20-Year Period)	
)	

**NOTICE OF APPEARANCE OF MICHAEL KEEGAN
FOR DON'T WASTE MICHIGAN**

Pursuant to 10 CFR 2.713(b), Michael Keegan hereby enters an appearance on behalf of Don't Waste Michigan (DWM), and provides the following information:

1. I am Co-Chair of the board of Don't Waste Michigan at 2213 Riverside Drive, NE, Grand Rapids, MI 49505, phone (734) 735-6373 and my email address is <mkeeganj@comcast.net>.

2. I have been appointed by DWM to jointly represent the organization and its members in this proceeding.

/s/ Michael Keegan
Michael Keegan

8/8/2005
Date

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY**

In the Matter of)	
	)	Docket No. 50-255
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING)	
STATION)	
)	
Regarding the Renewal of)	
Facility Operating License No.	)	August 8, 2005
DPR-20 for a 20-Year Period)	
)	

NOTICE OF APPEARANCE OF ALICE HIRT
FOR WESTERN MICHIGAN ENVIRONMENTAL ACTION COUNCIL

Pursuant to 10 CFR 2.713(b), Alice Hirt hereby enters an appearance on behalf of the Western Michigan Environmental Action Council (WMEAC), and provides the following information:

1. I am a member of WMEAC, the office of which is located at 1415 Wealthy Street, SE, Suite 280, Grand Rapids, MI 49506, phone (616) 335-3405 and my email address is <alicehirt@charter.net>.
2. I have been appointed by WMEAC to jointly represent the organization and its members in this proceeding.

/s/ Alice Hirt
Alice Hirt

8/8/2005
Date

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY**

In the Matter of)	
	)	Docket No. 50-255
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING)	
STATION)	
)	
Regarding the Renewal of)	
Facility Operating License No.	)	August 8, 2005
DPR-20 for a 20-Year Period)	
)	

**NOTICE OF APPEARANCE OF CHUCK JORDAN
FOR GREEN PARTY OF VAN BUREN COUNTY, MICHIGAN**

Pursuant to 10 CFR 2.713(b), Chuck Jordan hereby enters an appearance on behalf of the Green Party of Van Buren County, Michigan, and provides the following information:

1. I am the Chairman of the Green Party of Van Buren County, the office of which is located at 50521 34th Avenue Bangor, MI 49013, phone (home) 269.427.8339 (cell) 269.271.2038, email <jordanc@btc-bci.com>.

2. I have been appointed by the Green party to jointly represent the organization and its members in this proceeding.

/s/ Chuck Jordan
Chuck Jordan

8/8/2005
Date

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY**

In the Matter of)	
	)	Docket No. 50-255
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING)	
STATION)	
)	
Regarding the Renewal of)	
Facility Operating License No.	)	August 8, 2005
DPR-20 for a 20-Year Period)	
)	

**NOTICE OF APPEARANCE OF MAYNARD KAUFMAN
FOR MICHIGAN LAND TRUSTEES**

Pursuant to 10 CFR 2.713(b), Maynard Kaufman hereby enters an appearance on behalf of the Michigan Land Trustees and provides the following information:

I am a member of the Michigan Land Trustees. My office is located at my home, 25485 County Road 681, Bangor, MI 49013.

2. I have been appointed by the Michigan Land Trustees to jointly represent the organization and its members in this proceeding.

/s/ Maynard Kaufman
Maynard Kaufman

8/8/2005
Date

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

In the Matter of)	
	)	Docket No. 50-255-LR
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING	)	ASLBP No. 05-842-03-LR
STATION)	
)	
Regarding the Renewal of Facility Operating)	
License No. DPR-20 for a 20-Year Period	)	September 16, 2005
)	

**PETITIONERS' COMBINED REPLY TO NRC STAFF
AND NUCLEAR MANAGEMENT COMPANY ANSWERS**

Now come the Nuclear Information and Resource Service, *et al.*, Petitioners-Intervenors herein (and hereinafter referred to as "Petitioners"), by and through counsel, and respond to the "NRC Staff Answer Opposing Petition to Intervene and Request for Hearing" (hereinafter referred to "Staff Answer"), and to the "Nuclear Management Company's Answer to the August 8, 2005 Request for Hearing and Petition to Intervene" (hereinafter referred to as "NMC Answer"). Petitioner respond in opposition to those portions of the respective Answers which deny the admissibility of Petitioners' proffered contentions.

ARGUMENT

Preliminary Note As To Standing Issues

Nuclear Management Company raises no objections to the standing of the sundry Intervenors. NMC Answer p. 2. The Staff quibbles, not about the standing of the Intervenors, but only that the Organizational Intervenors have failed to demonstrate that they have

organizational standing. Staff Answer pp. 7-8. Because they are assured that some combination of their numbers has standing to raise the pending contentions, the Petitioners/Intervenors will make no further arguments on the standing issue, but instead will defer to the Board to render a final determination.

Response as to Contention No. 1 (*The license renewal application is untimely and incomplete for failure to address the continuing crisis of embrittlement*)

NMC and NRC staff have argued that Contention 1 regarding the Application's proposed management of the embrittlement of the Palisades reactor pressure vessel is inadmissible because the Contention (i) fails to challenge the Application and demonstrate the existence of a genuine dispute on a material issue of fact or law; (ii) fails to provide a factual basis to support any dispute with the application, and; (iii) improperly challenges Commission regulation. These assertions are incorrect.

1) The embrittlement contention is within the scope of the proceeding

The extended operation of the Palisades nuclear steam supply system falls squarely under 10 CFR § 54.21 and § 54.29(a) which focuses on the management of aging of certain systems, structures, and components and the review of time-limited aging evaluations.

A genuine dispute exists within the Application that is germane to the health and safety of the petitioners who live, work and recreate out to 50 miles from the Palisades nuclear power station in Covert, Michigan.

The Palisades Reactor Pressure Vessel is the subject component. There is no safety redundancy to this single largest component in the Palisades nuclear steam supply system. Palisades is arguably one of the most embrittled reactor pressure vessels, if not *the* most embrittled vessel, in the United States. The nuclear steam supply system for Palisades was the first of the Combustion Engineering line licensed for construction. Documentation as early as 1970 identifies

Surveillance specimens in the vessel will be used to monitor the radiation damage during the life of the plant. If these specimens reveal changes that affect the safety of the plant, the reactor vessel will be annealed to reduce radiation damage effects. The results of annealing will be confirmed by tests on additional surveillance specimens provide for this purpose. Prior to the accumulation of a peak fluence of 10 E 19 nvt (>1 Mev) on the reactor vessel wall, the Regulatory Staff should reevaluate the continued suitability of the currently proposed startup, cool down, and operating conditions.¹

Exhibit 1-A. All exhibits are found in "Petitioners' Appendix of Evidence in Support of Contentions" (Pet. App.), a copy of which is provided with this response in hard copy to the ASLB and the parties.

The Petitioners have been able to establish that the licensee could not provide surveillance materials for critical weld material in the Palisades vessel beltline welds in 1994.² See Exhibit 1-B.

A commitment was made for the Palisades plant as early as 1970 to make actual physical efforts by annealing the vessel to restore ductility should any "radiation damage" affecting plant safety be discovered. In fact, calculations later recognized by NRC staff concluded that the Palisades vessel could have surpassed its Pressure Thermal Shock ("PTS") limits as early as 1995. Repeated Palisades re-analyses have produced a widening range of resulting estimates for exceeding vessel embrittlement limits with a very broad range of uncertainty (as much as $\pm 25\%$) with as many PTS values for the severely-embrittled reactor vessel. Palisades has neared the maximum-embrittlement goalposts time and again over the years,³ but each time they have been moved back following rejiggering of the assumptions and

¹Report on Palisades Plant, Letter from Joseph Hendrie (ACRS) to Glen Seaborg, Chair AEC, January 27, 1970.

² Palisades Thermal Shock, NRC Staff Presentation to the ACRS, Viewgraphs, December 09, 1994, p. 3.

³For example that is sort of a summary of the regulatory framework that applies to annealing. With regard to Palisades, we completed an evaluation in April of 1995 in which we concluded that they would reach the screening criteria. At least they were okay until 1999. That evaluation was consistent with the 50.61, the Pressurized Thermal Shock Rule. The current license for Palisades expires in 2007 so they would fall somewhat short of the current operating license with regard to the life of the vessel."

calculations. In 1995, for example, the NRC staff noted that the "Palisades RPV . . . is predicted to reach the PTS screening criteria by late 1999, before any other plant." NRC Generic Letter 92-01, Revision 1, Supplement 1: Reactor Vessel Structural Integrity (May 19, 1995) (Exhibit 1-J). The most recently-recognized estimates project that the current PTS criteria will be exceeded in 2014, which is early in the proposed 20-year license extension period.

The Applicant asserts that NRC approved methodology was used to perform neutron fluence calculations consistent with Regulatory Guide § 1.190 and described in WCAP-15353, "Palisades Reactor Pressure Vessel Fluence Evaluation." The Applicant argues that "at the appropriate time, prior to exceeding the PTS screening criteria, Palisades will select the optimum alternative to manage PTS in accordance with NRC regulations, and will make the applicable submittals to obtain NRC review and approval."⁴ The Applicant argues that with respect to addressing technical issues relating to neutron irradiation embrittlement of the reactor pressure vessel that the Applicant adopts the third measure set forth in 10 CFR § 54.21(c)(1) to disposition the issue - *i.e.*, adequate management of the effects of neutron irradiation embrittlement - for the period of extended operation.

The content of technical information of an application is set forth in 10 CFR § 54.21 to include a review of systems, structures and components subject to an aging management review to include the reactor vessel, the core shroud and component supports. 10 CFR § 54.21(c)(1) stipulates an evaluation of time-limited aging analyses where the applicant must demonstrate (i) the analyses remain valid for the period of extended operation; (ii) the analyses

"Briefing on Annealing Demonstration Project," NRC Public Meeting, August 27, 1996.

⁴"Application for Renewed Operating License for Palisades Nuclear Generating Station," Nuclear Management Company, March 22, 2005, ADAMS Accession Number ML050940446, p. 4-15.

have been projected to the end of the period of extended operation; (iii) the effects of aging on the intended function(s) will be adequately managed for the period of operation.

Under the current rule (10 CFR § 50.61), three courses of action can be taken to manage aging of the reactor vessel: 1) The operator shall implement flux reduction programs that are reasonably practicable to avoid exceeding the PTS screening criteria;

2) For those plants where no “reasonable flux reduction program will prevent RTpts from exceeding the PTS screening criterion” the operator can take a look at plant-specific evaluation of plant systems, thermal hydraulics, reactor vessel design, etc. This analysis must be submitted at least three years before RTpts is projected to exceed the PTS screening criteria; or;

3) Anneal the pressure vessel as provided under 10 CFR § 50.66, or the annealing rule and Regulatory Guide § 1.162, which provides guidance on how to implement the annealing rule.

There is a requirement that a licensee that desires to anneal the reactor vessel must submit a thermal annealing report 3 years before actually performing the annealing. This thermal report has four major sections in it. One is an operating plan basically identifying how annealing is to be performed.

The Petitioners do not agree that the current rule necessarily affords an either/or choice to be made by the company, as with choosing from a Whitman’s Sampler box of candy, but rather, that it contemplates a combination of efforts in concert to achieve the largest margins of safety. The Petitioners further suggest that the operative words in 10 CFR § 50.61(b)(4) [where there is “no reasonably practicable flux reduction program” to prevent exceeding the PTS criteria] require, not only consideration of the financial interests of the utility, but that the

regulation is heavily weighted in the direction of considering public safety. Hence the

Petitioners dispute licensee's assertion in the Application (page 4-10) that:

The flux to the reactor vessel would have to be reduced by an additional factor of 3 in order to reach March 24, 2031. Some additional flux reduction could conceivably be achieved by installation of additional shield assemblies and/or flux suppression devices (e.g. hafnium inserts). Flux reduction of the magnitude required at Palisades would require far more extraordinary measures, such as the installation of neutron shields on the exterior of the core support barrel. *It is unlikely that a plant modification of this magnitude would be cost-effective.* (Emphasis added)

It is highly likely that NMC would pursue alternative solutions rather than rely on flux reduction to extend the reactor vessel life. Other alternatives that would be considered would include completion of the safety analysis as specified in 10 CFR § 50.61 (b)(4), and thermal annealing treatment as specified in 10 CFR § 50.61(b)(7). Any alternative that NMC may propose in the future to extend the life of the Palisades reactor vessel would, of necessity, be discussed thoroughly with the NRC and would be subject to formal NRC review and approval before it could be implemented. The ultimate method used to manage PTS for extended plant operation would be governed by NRC regulations independently from the license renewal process.”⁵

The Petitioners also dispute that part of the Application where the licensee states (p. 4-15) in its Analysis that “The current pressure/temperature analyses are valid beyond the current operating license period, but not to the end of the period of extended operation. These analyses are estimated to expire in 2014.”⁶ The licensee admits in its Application that it seeks to limit an aging management strategy as required in 10 CFR § 54.21(c)(1)(iii) and adopt a subset of the established management strategies as established by 10 CFR § 50.61 for fracture toughness requirements to protect against pressurized thermal shock events based on

⁵ *Id.*, p. 4-10.

⁶ *Id.*, p. 4-15.

economic considerations to the licensee. It does so, however, without adequately demonstrating that the proposed alternatives can confidently address and mitigate advancing embrittlement and the associated higher Pressure Thermal Shock values any better than the licensee's admitted inability to reduce, cost-effectively, an increasing safety-significant risk to the public through flux reduction programs. Petitioners argue that all of these management strategies are in place to provide reasonable assurance that the public health and safety will be protected, first and foremost, and that they are not mere options to be predicated on consideration of the company's financial bottom line.

Petitioners submit that an effective and reliable management plan for a twenty-year extension must begin with the incorporation of all NRC management strategies as outlined under 10 CFR § 50.61, including fluence reduction efforts, not just the company's perceived cost-effective ones. This is particularly germane to Palisades, as the NRC staff has recognized through a broad set of calculations and associated uncertainties in determining the actual severity of the embrittlement that the vessel might have exceeded the PTS criterion as early as 1995 or might, according to later questionable estimations, exceed as late as 2014. That would be three (3) years into the 20-year license extension period sought by NMC.

The Applicant has already abandoned a previous commitment to anneal the severely embrittled Palisades pressure vessel, discussed *infra*. Petitioners are unsure whether the Applicant abandoned its previous commitment to anneal the Palisades reactor pressure vessel because of economic considerations, or because of operational issues and risks associated with re-embrittlement of annealed beltline welds. NMC instead now relies on a complex re-analysis to assure safety margins in the physically-deteriorating reactor pressure vessel. The requisite labyrinth of computer models that has resulted has been subjected to much healthy skepticism from the NRC's own Advisory Committee on Reactor Safeguards.

In light of these problems, petitioners suggest that it is unreasonable for the Applicant to forego Flux Reduction programs for the extension period which might reasonably reduce the risk to public health and safety from a Pressure Thermal Shock accident potentially occurring during the same license extension period without demonstrating with a high degree of confidence that alternative approaches, *including* the option of annealing the vessel, can adequately preserve required public safety margins in the extension period.

Instead, the Application seeks less costly and undemonstrated efforts for the extension period by vaguely proposing to alternately;

1) incorporate another embrittlement and PTS re-analysis which is recognized by significant uncertainties that potentially seek to merely pencil whip a worsening safety issue with narrowing safety margins for the proposed extension period or;

2) resort to a yet-to-be demonstrated effective annealing of the reactor pressure vessel, a process which the same operator had already previously committed to in 1995 and abandoned in 1997.

The applicant's statement that it can abandon actual physical and operational measures to reduce the neutron fluence affecting embrittlement of the pressure vessel raises an undue public risk from a Pressure Thermal Shock event.

Therefore, the Petitioners suggest that under current established management strategy Palisades may have already exceeded the current PTS criteria or if not, will exceed the criteria early in the proposed license renewal period (*viz.*, 2014). It is therefore unreasonable and unacceptable for the Application to foreclose options within its established management strategy for economic reasons without first being required to demonstrate with confidence that the proposed alternatives adequately provide for the public's protection from this significant ongoing and potentially worsening age-associated safety issue.

Petitioners are particularly concerned that safety focused measures such as Flux Reduction Programs at Palisades fall victim to the economic imperative to keep the reactor operating even at unacceptably reduced margins of safety rather than make much-needed investments.

This controversy is an historical problem at Palisades. The New York Times reported April 12, 1992 on a comment by then-NRC Chairman Ivan Selin on the vulnerability of Palisades to early closure because of embrittlement:

Mr. Selin said it was unlikely that any utility would decide to close a plant that was running smoothly and was not in immediate need of any big investment. But if a plant required a large investment, he said, 'that could push it over the brink.' In that category he put the Consumers Power Company's Palisades plant, near South Haven, Mich., which opened in 1971, where the reactor pressure vessel may now be brittle, the same weakness that was suspected at Yankee Rowe. . . .⁷

Exhibit 1-C.

There is a grave issue of law here: whether the economically-dictated priorities of Palisades, or the health and safety concerns of the Petitioners, conform to NRC regulations. A Licensing Board should not address the merits of a contention when determining its admissibility. *Carolina Power and Light Co. and North Carolina Eastern Municipal Power Agency* (Shearon Harris Nuclear Power Plant), ALAB-837, 23 NRC 525, 541 (1986); *Texas Utilities Electric Co.* (Comanche Peak Steam Electric Station, Unit 1), ALAB-868, 25 NRC 912, 933 (1987); What is required is that an intervenor state the reasons for its concern. *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980).

The Petitioners have stated reasons for their concern. The Board should conclude that the Application is deficient and should be rejected.

⁷ "Cheap and Abundant Power May Shutter Some Reactors," Matt Wald, New York Times, April 14, 1992.

2) There are many factual disputes affecting public health and safety

Palisades Nuclear Power Station is a Combustion Engineering Pressurized Water Reactor identified as one of the earlier reactor vessels of greater concern whose current 40-year license expires in 2011 after being granted a four-year recapture period.

As NIRS has pointed out in its earlier publication, "The Aging of Nuclear Power Plants, A Citizen's Guide to Causes and Effects":

Irradiation embrittlement of the reactor pressure vessel (RPV) may be the single most important factor in determining the operating life of a Pressurized Water Reactor. The design of pressure vessels is generally the same for all PWRs generally constructed from 8 inch thick steel plates, formed and welded to create the vessel structure.

The major age-related mechanism associated with this component is embrittlement. Embrittlement is the loss of ductility, i.e, the ability of the pressure vessel metals to withstand stress without cracking. It is caused by neutron bombardment of the vessel metal and is contingent upon the amount of copper and nickel in the metal and the extent of neutron exposure or fluence. As the metal in the reactor pressure vessel is bombarded with radiation, high-energy atomic particles pass through the steel wall. In doing so, these atoms collide with atoms in the metal and knock them out of position. Over time this results in the loss of ductility.

In an unirradiated vessel the metal loses its ductility at about 40 degrees Fahrenheit. As the vessel becomes embrittled, the temperature at which it loses its ductility rises. This change in the mechanical properties of the metal from ductile to brittle is characterized as the 'reference temperature for nil ductility transition' or RTndt. Thus as the reactor ages and the pressure vessel is exposed to more radiation, the RTndt can shift from its original 40 degree F to as much as 280-290 degrees F or more in extreme cases.⁸

From Exhibit 1-D.

The embrittlement of the all-important reactor pressure vessel, which has no redundant safety feature in a nuclear power station, is of even greater concern to those plants constructed prior to 1972. Palisades was issued its construction license in 1967. According to thermal shock experts within Electric Power Research Institute (EPRI), there is an

⁸ The Aging of Nuclear Power Plants: A Citizen's Guide to Causes and Effects, Nuclear Information and Resource Service, 1988, Chapter IV, "Embrittlement of Reactor Pressure Vessels and Reactor Pressure Vessel Supports in Pressurized Water Reactors," p. 19.

indeterminate amount of susceptible copper in the metal walls of these older vessels and in the weld material used to join the vessel plates.

The significance of embrittlement of the vessel component and the shift in RT_{ndt} is the increased susceptibility to pressurized thermal shock (PTS). Pressurized thermal shock occurs when the reactor pressure vessel is severely overcooled. RPV technical specifications generally limit the cool down to a rate of 100° F per hour. During an overcooling event (*i.e.*, pipe break) the vessel may experience a drop in temperature of several hundred degrees per hour. This extreme drop in temperature can send a thermal shock through the vessel wall. As the vessel is overcooled there is a drop in the pressure of the primary coolant loop. This rapid decrease in the pressure of primary coolant cause the high pressure injection pumps in the Emergency Core Cooling System to automatically inject coolant into the primary loop. As the injection of coolant repressurizes the RPV, the vessel is subject to pressure stresses. The stresses placed on the RPV by overcooling and repressurization cause the Pressure Thermal Shock.

Pressure Thermal Shock can be initiated by numerous accidents, including: control system malfunctions, small, medium and large break loss of coolant accidents including main steam line break, feed water pipe break, and steam generator tube ruptures. Any of these events can initiate a PTS event, but as long as the fracture resistance of the reactor pressure vessel material and welds remains high, *i.e.*, RT_{ndt} values remain low, such transients are considered unlikely to cause vessel failure. However, the reduction of fracture resistance within the RPV wall and weld materials, severe overcooling accompanied by repressurization can cause pre-existing flaws in the inner surface of the RPV to propagate into cracks which can go through the vessel wall resulting in the associated uncontrollable loss of coolant water over the reactor core.

For failure of the RPV to occur a number of factors must be present:

- 1) the vessel must have a flaw of sufficient size to propagate and a typical vessel can have thousands of varied-sized flaws;
- 2) the vessel material must be susceptible to irradiation embrittlement due to copper and nickel content;
- 3) the vessel must be sufficiently irradiated to cause a decrease in ductility , represented by an increase in the RTndt value;
- 4) an event must initiate a severe overcooling transient with repressurization;
- 5) the resulting crack must be of such size and location that the RPV's ability to maintain core cooling is affected.

Petitioners believe it more likely than not that some or all of these factors are present at Palisades, as they articulate below. Petitioners believe they have provided quite sufficient information to establish the existence of a genuine dispute with the applicant on a material issue of law or fact, as required by 10 CFR § 2.309(f)(1)(v) (formerly § 2.714(b)(2)(iii)). See Georgia Power Co. (Vogtle Electric Generating Plant, Units 1 and 2), LBP-9121, 33 NRC 419, 422-24 (1991), appeal dismissed, CLI-92-3, 35 NRC 63 (1992); Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2 and 3), CLI-91-12, 34 NRC 149, 155-56 (1991); Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), LBP-02-4, 55 NRC 49, 64-68 (2002).

A. Significant flaws are likely to exist on the surface of the Palisades reactor pressure vessel wall and considerable uncertainty exists to dispute assumptions with regard to the extent that these flaws can contribute to making PTS events increasingly risk-significant.

The Petitioners have significant safety-related concerns with regard to the uncertainty that exists with the analyzed flaw distribution in the Palisades reactor pressure vessel. As documented in transcripts as recent as 2004, the NRC's Advisory Committee on Reactor

Safeguards shares in those concerns and disputed flow distribution assumptions:

Dr. Wallis [ACRS]: This flow distribution is based on rather skimpy evidence. This is one of the areas where---I mean, heat transfer Dittus-Boelter if you believe that. It's based on data points. But the flow [sic "flow"] distribution in these walls is based on a few examinations. Isn't it?

Mr Ericksonkirk [NRC RES]: A few examinations but infinitely more than we had the first time.

Dr. Wallis: It's much better than you had the first time.

Mr. Ericksonkirk: Much better than we had the first time. I think as a laboratory geek at heart I have to admit I would really like to have more data on this and I don't think there's anybody in the technical community that would disagree with this. But I think that it's also important to recognize that the flow distribution doesn't rest on experimental evidence alone. Certainly we started with --- excuse me. We start with experimental evidence both from destructive and nondestructive evaluations but that's then also bolstered by --

Dr. Wallis: But those are individual reactors' vessels.

Mr. Ericksonkirk: That's right.

Dr. Wallis: But there are a hundred reactor vessels. I don't know how convincing it is that the flow distribution that you might measure in a couple of vessels which were taken apart is typical of all other vessels.

Mr. Ericksonkirk: No. I think it would be unfair to say that a single experimental distribution derived from two vessels could be just looked at and thought to be representative of the other vessels.⁹

Excerpted from Exhibit 1-E.

B. The Petitioners urge that Palisades reactor pressure vessel is susceptible to irradiation embrittlement due at least to its copper/nickel/phosphorus content and dispute assumptions that regard the viability of reactor vessel sampling of susceptible materials and the associated RTndt /RTpts assumptions specific to Palisades reactor pressure vessel.

Palisades does not have representative samples of susceptible materials for surveillance requirements of its reactor pressure vessel, including the weld material in the

⁹ Official Transcript of NRC Proceeding, ACRS Joint Subcommittees: Materials and Metallurgy Thermal Hydraulic Phenomenon Reliability and Probabilistic Risk Assessment Meeting, December 01, 2004, p. 15 line 17 – p. 16, line 25.

vulnerable beltline welds. Palisades' assumptions on the material contaminants in the vessel and weld materials are based on questionable extrapolations of generic industry data and materials taken from weld material in Palisades' discarded steam generator which arguably did not experience the same level of adverse operational conditions as those degrading the reactor vessel beltline welds.

Further, adequate analysis of the Palisades beltline welds has been problematic due to uncertainties in determining the copper, nickel and phosphorous content of the susceptible materials. In 1994, NRC staff at one point clashed with ABB Combustion Engineering staff who had refused to divulge data on reactor vessel weld integrity that the vendor on proprietary grounds that the company wanted to keep confidential. NRC said that it might need to compel CE to release the data.¹⁰ Exhibit 1-F.

C. Petitioners dispute the viability of NMC assumptions regarding the degree to which Palisades pressure vessel materials have been degraded due to radiation-induced embrittlement and suggest that significant uncertainty exists with regard to the degraded state of the vessel, represented by an increase in its RTndt and RTpts values, for them to be accurately used as a reference point for an additional twenty-year extension.

The Applicant has over the years set forth many re-evaluations of the Palisades Rtn dt and RTpts values with a wide range of findings and uncertainty as to bring into question the viability of the degree of embrittlement of the Palisades reactor pressure vessel in its current condition to withstand a PTS event. The petitioners dispute the Applicants' claim that "The current pressure/temperature analyses are valid beyond the current operating license period, but not to the end of the period of extended operation. These analyses are estimated to expire in 2014."¹¹

¹⁰ Palisades Could Reach Its PTS Screening Limit Earlier Than Expected," Inside NRC, December 12, 1994, p. 13.

¹¹ Palisades Application, p. 4-15

Petitioners are aware of NRC communications which raise **this** dispute with regard to the NMC assertions that they do not exceed PTS screening criteria until 2014:

*From: Stephanie Coffin
To: Hoffman, Stephen
Date: 11/24/04 3:05PM
Subject: Palisades phone call*

We had a phone call with them Monday.

They no longer plan on submitting an exemption to apply "Master Curve" at their facility. Instead, they will be managing it in accordance with the May 27, 2004 guidance from Reyes to the Commissioners. They are following Point Beach and Beaver Valley closely.

I gave them feedback especially about the flux reduction requirements of the current rule and suggested they review the Point Beach submittal and our associated SER with Open Items, and to check for applicability to their plant.

FYI for Matt and Barry and Neil:

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Stephanie

CC: Duvigneaud, Dylanne; Elliot, Barry; Mitchell, Matthew; Ray, Nihar; Stang, John¹²

Exhibit 1-G. Petitioners contend that at best, whether or not Palisades has exceeded its RTpts remains inconclusive and at worst RTpts were exceeded as early as 1995 or 2001. As such, the petitioners dispute that the licensee has established an accurate and reliable reference temperature point for Palisades pressure vessel RTndt and RTpts values as a basis for extending Palisades operations for an additional 20-year period.

D. The petitioners contend that a significant dispute exists with regard to NMC assumptions on the low probability of an event to initiate a severe overcooling transient with repressurization such that the resulting crack will be of such size and location as to make the probability of a significant Palisades vessel fracture acceptably small

¹²Notes from NRC Telephone Call, "Palisades phone call," 11/24/2004, ML043340206.

NMC relies heavily upon assumptions that the probability of an initiating event is acceptably small, as do other pressurized water reactor operators. Given the associated uncertainty with the actual degradation of the Palisades reactor pressure vessel, the Petitioners submit that to take any comfort that the "big one" is not going to occur is uncomfortably reminiscent of the lack of an effective governmental response to the inadequate levees around New Orleans based on the improbability of conditions leading to the Gulf Coast city encountering a hurricane greater than Category III.

This type of accident is beyond the design basis of Palisades Nuclear Power Station, namely its safety systems, including the emergency core cooling system and the containment, which are not designed to withstand cracks in the pressure vessel resulting in the inability to sufficiently cool the reactor core and reactor core damage.

3) The petitioners dispute the Applicant's assertion that it can optionally anneal the embrittled vessel, given the lack of a demonstrated effective annealing process for any irradiated commercial reactor pressure vessels and the applicant's abandonment of a prior commitment for annealing the Palisades reactor pressure vessel that make the abandonment of Flux Reduction efforts for economic considerations unreasonable

Annealing, while a routine process in metallurgy, is acknowledged to be complicated by reactor pressure vessel radioactivity. For Palisades it would involve heating the beltline weld and perhaps the axial welds or some vessel plates to about 850° F for approximately a week or more. Even then, early estimates as to how long an annealing repair will last is a matter of debate and depend on a number of factors. Alan Hiser, U.S. Nuclear Regulatory Commission was attributed to say "If the material is a weld, rather than a plate, the annealing repair will be less effective and the re-embrittlement faster. The chemistry of the material is crucial, as well --

steels or welds containing nickel or copper are more subject to embrittlement and re-embrittlement."¹³ Exhibit 1-H.

Palisades has previously announced plans to anneal the reactor pressure vessel but has taken no action. On January 5, 1995, Consumers Power Company informed its employees that the Palisades reactor would reach its PTS screening criteria limit as early as 1996. Consumers Power then announced plans to anneal the Palisades vessel by the year 2000.¹⁴

Palisades operators met with the NRC Commission Chairman on May 11, 1995 regarding its planned annealing operation.¹⁵

While the Applicant refers to annealing of the pressure vessel to mitigate the severely embrittled component as an option it can take up at the "appropriate time," in fact, the Applicant withdrew its original request for further NRC staff review of its Preliminary Thermal Annealing Report as the company disclosed that it no longer had plans to anneal the embrittled vessel in 1998.¹⁶

NRC and the nuclear industry had an opportunity to test the annealing process on the irradiated decommissioned Yankee Rowe nuclear reactor pressure vessel but took no such action, instead Yankee Atomic Corporation used the badly embrittled vessel as a nuclear waste container for burial in Barnwell, South Carolina. While the NRC and industry have referred to the Yankee Atomic vessel as atypical of other commercial vessels, a valuable opportunity to test the annealing process on an irradiated specimen was a lost opportunity for

¹³ Outlook for Life Extension, Special Report to the Readers of Nucleonics Week, Inside NRC and NuclearFuel," April 11, 1991 p. 10.

¹⁴ "Consumers May Anneal Palisades' Vessel-A U.S. First," Nucleonics Week, January 12, 1995, p. 1.

¹⁵ Meeting Summary between the Chairman and Consumers Power Co., US NRC, Microfiche Address 84015:231- 84015:231.

¹⁶ Consumers Energy Co. (formerly Consumers Power Co.) Withdraws Request for Further Staff Review of Preliminary Thermal Annealing Report, April 24, 1997, US NRC PDR, Microform Addresses: 92745:358-92745:359.

the entire industry. As a result, there is no experience with annealing severely-embrittled commercial power reactors in the United States which, coupled with the Applicant's abandonment of Flux Reduction Programs and the unreliability of the Applicant's past safety analysis, renders the Application deficient and deserving of rejection.

4) The Petitioners argue that Contention 1 on the Palisades embrittlement and PTS issue is not an improperly challenge to Commission rulings

The Petitioners have valid and proper concerns regarding consistent, thorough and viable analysis and documentation of Pressure Thermal Shock values calculated by both the industry and the NRC for Palisades, which is arguably one of the most embrittled reactors in the United States. Since 1981, the Palisades pressure vessel has been at the forefront of the embrittlement controversy and associated safety concerns for a Pressure Thermal Shock accident.

The Palisades nuclear power station pressure vessel has been analyzed and re-analyzed by NRC and projected to exceed its Pressure Thermal Shock Screening Criteria in numerous time frames:

> April 03, 1989, Consumers Power provided a revised report on reactor vessel fluence for operational cycles 1 through 8 in association with its vessel fluence reduction report. "It concludes that the PTS screening criteria will be exceeded at the axial welds in September 2001 as opposed to the previously reported exceed date of March 2002."¹⁷ Exhibit 1-I. Consumers Power Company (Now CMS) acknowledges a calculational uncertainty of + / - 25% in estimating the calculated vessel wall fluence, this is said to be typical of current neutron transport methodology uncertainties. Consumers reported:

¹⁷ Compliance with Pressurized Thermal Shock Regulation 10CFR50.61 and Regulatory Guide 1.99 Revision 2 (TAC No. 59970), Consumers Power, May 17, 1990, p. 1.

A number of factors contribute to the uncertainty in the projected peak fast fluence at the reactor vessel wall. These factors are due to the conversion of measured activity data to fluxes, uncertainties in material composition, neutron cross sections, power distributions, as-built core/vessel dimensions and cycle-by-cycle variation in the fast flux lead factors.¹⁸

> In the October 28, 1994 revision of NRC's "Status of Reactor Pressure Vessel Issues" (SECY 94-267) reports the staff indicated that the Palisades Pressure Vessel would reach the pressurized thermal shock (PTS) screening criteria in the year 2004.¹⁹

> In a revision in November 1994, NRC staff reported that:

[T]he staff was informed of preliminary data from the retired steam generators that indicates the Palisades reactor pressure vessel could reach the PTS screening criteria earlier than 2004. The licensee is continuing to evaluate the new data and to gather additional materials properties from its retired steam generators. If the preliminary data are confirmed, the plant would reach the PTS screen criteria at the next outage in May 1995.²⁰

> On January 24, 1995 in a NRC meeting on "Materials Issues in Palisades PTS Evaluation," the Palisades PTS criteria is again referenced and revised in staff view graphs stating: *"November 1, 1994, licensee informed staff that data from SG [steam generators] welds - Indicated higher copper contents than previously assumed - Indicated higher RTndt than mean generic value- Licensee assessment indicated reaching PTS screening criteria in 1999."*²¹

> On November 24, 2004, a documented NRC telephone conversation further enlightens the ongoing uncertainty and inconsistency of estimating a still elusive timetable for exceeding the public safety-related criteria:

From: Stephanie Coffin

¹⁸ *Id.*, p. 33.

¹⁹ "Status of Reactor Pressure Vessel Issues," SECY-94-267, US NRC, October 28, 1994 (Exhibit 1-K).

²⁰ "Items of Interest," Office of Nuclear Reactor Regulation, Week Ending November 04, 1994 (Exhibit 1-L)..

²¹ "Materials Issues in Palisades PTS Evaluation," Presented to NSRRC Subcommittee on Materials and Engineering, US NRC, January 24, 1995 (Exhibit 1-M).

*To: Hoffman, Stephen
Date: 11/24/04 3:05PM
Subject: Palisades phone call*

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Stephanie

CC: Duvigneaud, Dylanne; Elliot, Barry; Mitchell, Matthew; Ray, Nihar; Stang, John"²²

[The petitioners note that the referenced May 27, 2004 communication from Reyes to the Commissioners regarding Palisades management plan is not available to the public through NRC ADAMS.]

Palisades values for exceeding the PTS criteria have been extremely fluid, back and forth, with significant disparity in the year that the criteria is exceeded. The lack of consistent reliable analyses of the rate and level of embrittlement, complicated by the lack of viable Palisades-specific in-vessel sampling materials, together with dependence on generic industry data, demonstrate the unreliability of data used to establish Palisades' compliance with the screening criteria and subsequent effective mitigation actions for the license extension period.

²² Notes from NRC Telephone Call, "Palisades phone call," 11/24/2004, ML043340206, Exhibit 1-G.

This contention arises from evidence contained within the NRC's Staff contacts with the affected utility. The bases for a contention need not originate with the petitioner. Petitioners here properly may base their contention on NRC Staff letters to an applicant, so long as there is an adequate explanation of how alleged deficiencies support its contention and that there is additional information in support. *Louisiana Energy Services L.P.* (Claiborne Enrichment Center), LBP-91-41, 34 NRC 332, 338-339 (1991). See *Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), LBP-92-23, 36 NRC 120, 136 (1992), appeal granted in part and remanded, CLI-93-3, 37 NRC 135 (1993).

5) The significant uncertainty represents a dispute of fact that undermines confidence in Palisades treatment of PTS values for the License Renewal Process

The Palisades nuclear power station one of four U.S. reactor sites participating in the development of models for developing the technical basis for the revision of the PTS Rule. A review of transcripts of the Advisory Committee on Reactor Safeguards Joint Subcommittees Materials and Metallurgy and Thermal Hydraulic Phenomena and Reliability and Probabilistic Risk Assessment reveals substantial and significant uncertainties with regard to capturing and bounding public safety risk associated with ongoing operations further complicated by the twenty year license extension in three major technical areas: probabilistic fracture mechanics, thermal hydraulics and probabilistic risk assessment.

NRC staff went to the ACRS in November 2004, seeking a letter of endorsement of the staff effort to revise the current PTS rule. The revised PTS screening criteria is incomplete and fraught with uncertainty. According to the NRC Advisory Committee on Reactor Safeguards, in

its Conclusions and Recommendations on NUREG-1809 "Thermal-Hydraulic Evaluation of Pressure Thermal Shock "should be substantially revised."²³

There are numerous citations in the ACRS transcripts that underscore the uncertainty that prompted the ACRS' call for the substantial revision of the technical basis for on Thermal-Hydraulic Evaluation of Pressure Thermal Shock.

5) There is a lack of transparency and an incomplete record of NRC processes and documents which potentially affect the Palisades License Renewal Process with regard to how the Revision of the PTS Rule may affect the outcome of the Application

The NRC has not provided sufficient transparency and completeness of the public record germane to the processes with potential implications for the Palisades license extension. The Petitioners are not able to thoroughly review current NRC efforts to revise its Pressure Thermal Shock Rule. NRC has not made all of its germane safety documentation, albeit draft documents, available for public review. Two key examples are:

1) "Technical Basis for Revision of Pressurized Thermal Shock (PTS) Screening Limit in the PTS Rule (10 CFR 50.61): Summary Report," NUREG-1806, Draft for Peer Review Panel and ACRS Review, November 2, 2004; and

2) "Thermal Hydraulic Evaluation of Pressurized Thermal Shock," NUREG- 1809, Draft, February, 2005.

Whether or not a basis for contentions has been established must be decided by considering the contentions in the context of the entire record of the case up to the time the contentions are filed. Thus, when an application for a license amendment is itself incomplete,

²³ Pressure Thermal Shock (PTS) Evaluation Project: Technical Basis for Revision of the PTS Screening Criterion in the PTS Rule," March 11, 2005, Graham Wallis, Chairman, Advisory Committee on Reactor Safeguards, US NRC, p. 1., NRC ADAMS ML 050730177.

the standard for the admission of contentions is lowered, because it is easier for petitioners to have reasons for believing that the application has not demonstrated the safety of the proposed procedures for which an amendment is sought. *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Units 1 and 2), LBP-81-45, 14 NRC 853 (1981). Petitioners urge that this contention should be deemed admissible at a lower standard precisely because there is undisclosed information which can be explored adequately for its relevance to the Application at a hearing.

With respect to their Contention No. 1, Petitioners have demonstrated many factual conundrums which must be resolved by means of a merit hearing. All that is required for a contention to be acceptable for litigation is that it be specific and have a basis. Whether or not the contention is true is left to litigation on the merits in the licensing proceeding. *Washington Public Power Supply System* (WPPSS Nuclear Project No. 2), ALAB-722, 17 NRC 546, 551 n.5 (1983), citing *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980); *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-806, 21 NRC 1183, 1193 n.39 (1985); *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 NRC 681, 694 (1985). The factual support necessary to show that a genuine dispute exists need not be in formal evidentiary form, nor be as strong as that necessary to withstand a summary disposition motion. What is required is "a minimal showing that material facts are in dispute, thereby demonstrating that an 'inquiry in depth' is appropriate." *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-10, 40 NRC 43, 51 (1994) (citing Final Rule, Rules of Practice for Domestic Licensing Proceedings -- Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,171 (Aug. 11, 1989), quoting *Connecticut Bankers Association v. Board of Governors*, 627 F.2d 245 (D.C. Cir. 1980).

Response as to Contention No. 2 (Excessive radioactive and toxic chemical contamination in local drinking water due to emissions from Palisades nuclear power plant as part of its daily, "routine" operations)

NMC states (Answer p. 14) that this contention "is inadmissible because (i) the substance of the assertions (alleged radioactive and chemical emissions from the plant) are outside the scope of this proceeding, and (ii) the assertions are vague and unsupported by factual basis." The Staff likewise challenges (Staff Answer p. 14) this contention as "...vague and lacking in the required supporting information. . . ." The NRC goes on to state (Answer p. 14) that Petitioners failed "to provide the specific factual information necessary to provide a valid basis for any safety claim. . . ." Petitioners provide considerable information below, but it should be noted that the NRC has had in its possession these very documents for years, even decades. NRC staff also challenges this contention as being "generalized and unsupported arguments," but the information supplied below turns away that assertion. The NRC staff's failures to address these concerns is a violation of the agency's own mandate and mission to protect public health and safety and the environment.

NMC says (Answer p. 15) that "radioactive and chemical emissions from the plant are not issues related to the management of aging or time-limited aging analyses." On the contrary, such emissions are age-related, in that deteriorating and degrading reactor systems, including the Palisades reactor's fuel rods, pipes, tanks, and valves, will increase the amounts of toxic chemicals and radioactivity released into the Lake Michigan ecosystem over time due to increased leaks and malfunctions. Not only do "routine" releases thus increase, but so does the risk of more severe incidents and accidents as the reactor ages.

NMC (Answer p. 15) seeks to dismiss the validity of this contention by stating "[r]adiation exposure to the public during the renewal term is a Category 1 issue determined to

be small, based on a generic finding that radiation doses to the public will continue at current levels associated with normal operations.” However, as stated above, releases of toxic chemicals and radioactivity over time can be expected to increase due to more leakage and malfunctioning of age-deteriorated and degraded equipment and systems. In addition, the recent report published by the National Academies of Science (NAS) Committee on the Biological Effects of Ionizing Radiation (BEIR VII, published June 2005 and entitled “Health Effects from Exposure to Low Levels of Ionizing Radiation”) found that exposure to even low levels of ionizing radiation has a negative impact on human health. See <http://www.nap.edu/books/030909156X/html>. The significance of the NAS BEIR VII Report’s findings and relevance to ascertaining the implications of 20 more years of radioactivity emissions from Palisades is unmistakable. The NRC’s previous conclusion that the impact to public health is minimal or trivial must be re-evaluated in light of the recently published NAS BEIR VII report.

NMC urges that the contention is “inadmissible because it is vague and unsupported by any factual basis, ” that it “fails to identify what toxic and radioactive substances allegedly are released during the plant’s ‘routine’ operations, and in what respect any such emissions are allegedly ‘excessive.’ “ Specifically, the radioactive releases from the Palisades nuclear power plant into the environment of the Great Lakes Basin that are of most concern include radioactive hydrogen (tritium), radioactive noble gases (such as xenon and krypton, which relatively quickly transform into biologically active radioactive substances such as cesium and strontium), as well as fission products, activation products, and transuranics that find their way into the environment after escaping the reactor or the irradiated fuel.

Documentation recording such releases at Palisades includes the “Radioactive Materials Released from Nuclear Power Plants,” NUREG/CR-2907, BNL-NUREG-51581, Vol.

14, Annual Report 1993, prepared by J. Tichler, K. Doty, and K. Lucadamo, Brookhaven National Laboratory, prepared for the U.S. Nuclear Regulatory Commission, covering the years 1974 to 1993, and documenting reported annual emissions of such liquid and airborne effluents from Palisades as tritium, mixed fission and activation products. See Exhibit 2-A.

The following figures were reported for emissions from the Palisades Nuclear Power Plant:

From Table 2, pages 8 to 10

Airborne Effluents Comparison By Year/Fission and Activation Gases (Total Curies)

1974: <1.00E+00

1975: 2.61E+03

1976: 2.99E+01

1977: 5.99E+01

1978: 3.23E+02

1979: 6.84E+01

1980: 1.40E+02

1981: 3.00E+03

1982: 7.38E+03

1983: 3.00E+03

1984: 2.84E+01

1985: 3.68E+03

1986: 1.73E+02

1987: 1.75E+03

1988: 2.43E+03

1989: 1.52E+02

1990: 1.21E+02

1991: 6.26E+01

1992: 7.46E+01

1993: 9.29E+01

From Table 6, pages 20 to 22

Liquid Effluents, Comparison By Year/Tritium (Curies)

1974: 8.10E+00
1975: 4.16E+01
1976: 9.63E+00
1977: 5.58E+01
1978: 1.01E+02
1979: 1.26E+02
1980: 7.47E+01
1981: 2.78E+02
1982: 1.79E+02
1983: 2.35E+02
1984: 6.95E+01
1985: 4.29E+02
1986: 6.32E+01
1987: 1.19E+02
1988: 2.83E+02
1989: 8.06E+01
1990: 1.49E+02
1991: 5.52E+01
1992: 8.09E+01
1993: 2.10E+02

From Table 8, pages 26 to 28

Liquid Effluents, Comparison By Year/Mixed Fission and Activation Products (Curies)

1974: 5.90E+00
1975: 3.45E+00
1976: 4.40E-01
1977: 9.29E-02
1978: 9.65E-02
1979: 1.28E-01
1980: 8.73E-03
1981: 3.31E-02

1982: 1.27E-01
1983: 7.48E-02
1984: 3.68E-02
1985: 5.83E-02
1986: 1.40E-01
1987: 9.23E-02
1988: 3.43E-02
1989: 3.75E-03
1990: 7.75E-03
1991: 1.14E-02
1992: 3.88E-03
1993: 1.40E-02

Similarly, the Palisades effluent release reports for 1994 to 2000 could be similarly examined in detail. The following reports for 2001 to 2003 clearly show that emissions have continued. In fact, annual reports for 2004 to the present day would show that emissions continue still. Radioactivity emissions into the air, water, and soil are inevitable at Palisades nuclear power plant, and would continue from 2011 to 2031 if allowed.

Palisades' "RADIOACTIVE EFFLUENT RELEASE REPORT: GASEOUS EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2001" ATTACHMENT 2 reports the following:

FISSION & ACTIVATION GASES, Total Release:

1st Qtr: 3.01E+00 Ci
2nd Qtr: 2.92E+00 Ci
3rd Qtr: 2.21E-02 Ci
4th Qtr: 0.00

Specific radionuclides are listed individually. See Exhibit 2-B.

In ATTACHMENT 3, "RADIOACTIVE EFFLUENT RELEASE REPORT: LIQUID EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2001" the total release of fission and activation products (not including tritium, gases, and alpha emitters) was reported as:

1st Qtr: 2.81E-06 Ci
2nd Qtr: 2.45E-04 Ci
3rd Qtr: 0.000 Ci
4th Qtr: 3.68E-05 Ci

Again, individual nuclides released are identified there. See Exhibit 2-C.

Palisades' "RADIOACTIVE EFFLUENT RELEASE REPORT: GASEOUS EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2002" ATTACHMENT 2 reports the following:

FISSION & ACTIVATION GASES, Total Release:

1st Qtr: 5.01E-01 Ci
2nd Qtr: 3.20E+00 Ci
3rd Qtr: 1.65E+00 Ci
4th Qtr: 3.26E+01

Specific radionuclides are listed individually. See Exhibit 2-D.

In ATTACHMENT 3, "RADIOACTIVE EFFLUENT RELEASE REPORT: LIQUID EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2002" the total release of fission and activation products (not including tritium, gases, and alpha emitters) was reported as:

1st Qtr: 9.59E-05 Ci
2nd Qtr: 0.000 Ci
3rd Qtr: 1.83E-04 Ci

4th Qtr: 7.48E-07 Ci

Again, individual nuclides released are identified there. See Exhibit 2-E.

Similarly, Palisades' "RADIOACTIVE EFFLUENT RELEASE REPORT: GASEOUS EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2003" ATTACHMENT 2 reports the following:

FISSION & ACTIVATION GASES, Total Release:

1st Qtr: 6.07E+01 Ci

2nd Qtr: 3.p5E+00 Ci

3rd Qtr: 4.96E-01 Ci

4th Qtr: 7.42E-01

Individual fission gases identified as being released in various amounts from Palisades include: krypton-85, 87, and 88; Xenon-131m, 133, 135m, 138; individual Iodines identified as being released in various amounts from Palisades include: Iodine 131, 132, 133, 135; Particulates with half-lives greater than 8 days include: Chromium-51; Manganese-54; Cobalt-58; Cobalt-60; Niobium-95; Ruthenium-103; Strontium-89; Strontium-90; Cesium-134; Cesium-137; Zirconium-95; Cobalt-57; as well as net identified beta emitters. See Exhibit 2-F.

In ATTACHMENT 3, "RADIOACTIVE EFFLUENT RELEASE REPORT: LIQUID EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2003" the total release of fission and activation products (not including tritium, gases, and alpha emitters) was reported as:

1st Qtr: 2.09E-04 Ci

2nd Qtr: 5.40E-04 Ci

3rd Qtr: 0.000 Ci

4th Qtr: 1.45E-03 Ci

Again, individual nuclides released are identified there. See Exhibit 2G.

As the NAS BEIR VII Report found, even so-called "low" level radiation exposure has a negative, adverse impact on human health.

Petitioners challenge the methodology upon which all of these annual reports are based. On September 13, 2005 Kevin Kamps of NIRS spoke by phone with a worker at the City of South Haven, Michigan's Water Filtration Plant. The City of South Haven's Water Filtration Plant supplies drinking water to customers in the City and townships of Casco, Covert and South Haven. This plant supplies water to nearly 3,400 customers located in these areas. The water comes from Lake Michigan, a surface water source, through an intake pipe located about a mile offshore from South Beach in the City of South Haven, just several miles north and downstream (given the prevailing direction of flow in Lake Michigan) from the Palisades nuclear power plant, which emits radioactivity into the waters of Lake Michigan daily. The lake water is treated, settled, filtered and disinfected as it goes through the Water Filtration Plant, but radioactivity is not removed by any of these processes.

The worker at the Water Filtration Plant explained that while he does collect samples of Lake Michigan water on a daily and monthly basis to test for radiation, he turns those samples over to the Palisades nuclear power plant, which then performs the testing itself (and/or through subcontractors). This fox-guarding-the-henhouse transfer of the water samples back into the hands of the Palisades nuclear power plant represents an unacceptable methodology, given its vulnerability to falsification by Palisades personnel, which would be in the interest of Palisades, to under-report radioactivity levels in the source of drinking water for nearby communities. Genuinely independent radiation monitoring must be performed, without the risk

of falsification by the very company that stands to benefit from low reports of radiation in the water

NMC states (NMC Answer p. 16) that "...Petitioners. . .failed to provide any 'alleged facts' or 'expert opinion that supports the contention.' " To the contrary, Petitioners have consulted with Dr. John Robbins, a Great Lakes limnologist recently retired from the U.S. Chamber of Commerce, National Oceanographic and Atmospheric Administration (NOAA), Great Lakes Environmental Research Laboratory (GLERL) in Ann Arbor, Michigan (where, among other things, he specialized in analyzing radioactivity in the Great Lakes, being referenced in such publications as the International Joint Commission's Nuclear Task Force's December 1997 "Inventory of Radionuclides for the Great Lakes," namely, the report he co-authored in 1980 entitled "Plutonium in the Great Lakes," which appeared in "Transuranic Elements in the Environment," edited by W.C. Hanson, published by the U.S. Dept. of Energy, see specifically pages 659 to 683 of that report, referenced on page 98 of the IJC report). See Exhibit 2-H. Dr. Robbins has established that the predominant current flow is from south to north in Lake Michigan near the Palisades nuclear reactor. Therefore, not only the new intake built just offshore from Palisades, but the old intake at South Beach in South Haven are directly in line for radioactive and toxic chemical contamination. Dr. Robbins believes that it is not implausible, on average, for those water intakes to serve as radioactivity receptors from the emissions into Lake Michigan at Palisades. Thus, the drinking water for South Haven, Casco, and Covert could very well be contaminated with radioactivity from Palisades, which, even at so-called low levels, would have an adverse impact on human health, as found by the NAS BEIR VII Report.

To confirm the direction of Lake Michigan water flow in the vicinity of Palisades, Dr. Robbins referred us to Dr. Dave Schwab, who still works at NOAA's GLERL. Dr. Schwab is

one of the top experts on the direction of flow of Lake Michigan's waters. Dr. Schwab confirms that the prevailing direction of Lake Michigan water flow is from south to north, the very direction of flow that would carry radioactivity and toxic chemicals released by Palisades into the drinking water intakes for South Haven, Casco, and Covert. Dr. Schwab pointed to the following field data to support this finding:

Gerald Miller, Michael McCormick, James Saylor
Great Lakes Environmental Research Lab
2205 Commonwealth Blvd.
Ann Arbor, MI 48105
Phone: 734/741-2119, 734/741-2277, 734/741-2118
FAX: 734/741-2055
Email: michael.mccormick@noaa.gov

GLERL Vector Averaging Current Meter (VACM) Moorings 10/1999-06/2000

Manufacturer: EG&G

Header Line: N Lat (dec. deg), W. Lon (dec. deg), VACM Depth (m), Inst. No.,
Year Deployed, Mooring Name

Explanation of Columns in the Data Set

YEAR	Year (UT)
DOY	Day of year (UT)
TIME	Universal time (UT - Hours and minutes HHMM)
E	Eastward component of mean horizontal current (cm/s)
N	Northward component of mean horizontal current (cm/s)
WT	Water Temperature (deg C)

Data Sources:

			Inst	Depth				
File Name	Mooring	Lat (N)	Lon (W)	No.	Dates	VACM/Water	Op #	
V01-1999-12M.txt	V01-99	41 48.89'	86 40.80'	556	No Data	12/20m	S1999294.01	
V01-1999-19M.txt	V01-99	41 48.89'	86 40.80'	265	10/20/99-06/15/00	19/20m	S1999294.01	
V03-1999-14M.txt	V03-99	41 58.17'	86 57.34'	569	10/20/99-06/15/00	14/62m	S1999293.03	
V03-1999-61M.txt	V03-99	41 58.17'	86 57.34'	348	10/20/99-06/15/00	61/62m	S1999293.03	

V04-1999-10M.txt V04-99 41 54.85' 86 40.74' 347 10/20/99-06/15/00 10/18m S1999294.02
 (A)
 V04-1999-17M.txt V04-99 41 54.85' 86 40.74' 354 10/20/99-06/15/00 17/18m S1999294.02
 (A)
 V05-1999-12M.txt V05-99 41 57.95' 86 44.82' 572 10/20/99-06/15/00 12/40m S1999293.05
 V05-1999-39M.txt V05-99 41 57.95' 86 44.82' 551 10/20/99-06/15/00 39/40m S1999293.05
 V06-1999-13M.txt V06-99 42 00.53' 86 47.90' 274 10/20/99-06/14/00 13/61m S1999293.04
 V06-1999-60M.txt V06-99 42 00.53' 86 47.90' 311 10/20/99-06/14/00 60/61m S1999293.04
 V07-1999-11M.txt V07-99 42 07.41' 86 41.19' 574 No Data 11/59m S1999299.01
 V07-1999-58M.txt V07-99 42 07.41' 86 41.19' 319 10/26/99-06/14/00 58/59m S1999299.01
 (B)
 V08-1999-09M.txt V08-99 42 15.18' 86 39.87' 279 10/26/99-06/13/00 09/57m S1999299.02
 V08-1999-56M.txt V08-99 42 15.18' 86 39.87' 568 10/26/99-06/13/00 56/57m S1999299.02
 V09-1999-11M.txt V09-99 42 14.51' 86 25.19' 573 10/27/99-06/14/00 11/19m S1999300.05
 V09-1999-18M.txt V09-99 42 14.51' 86 25.19' 352 10/27/99-06/14/00 18/19m S1999300.05
 V10-1999-10M.txt V10-99 42 15.83' 86 27.90' 553 10/27/99-06/14/00 10/28m S1999300.04
 V10-1999-27M.txt V10-99 42 15.83' 86 27.90' 277 10/27/99-06/14/00 27/28m S1999300.04
 V11-1999-10M.txt V11-99 42 17.20' 86 31.35' 555 10/27/99-06/14/00 10/38m S1999300.03
 V11-1999-37M.txt V11-99 42 17.20' 86 31.35' 280 10/27/99-06/13/00 37/38m S1999300.03
 V12-1999-11M.txt V12-99 42 20.27' 86 38.08' 583 10/27/99-06/13/00 11/59m S1999300.02
 V12-1999-58M.txt V12-99 42 20.27' 86 38.09' 349 10/27/99-06/13/00 58/59m S1999300.02
 V13-1999-13M.txt V13-99 42 20.04' 86 21.65' 577 10/19/99-04/25/00 13/21m S1999292.01
 V13-1999-20M.txt V13-99 42 20.04' 86 21.65' 576 10/19/99-04/25/00 20/21m S1999292.01

(A) Water temperature only

(B) Current velocity data ends 10/26/99, water temperature to end.

Missing data denoted by -999.0

Manufacturers specifications:

Velocity: Threshold 2.5 cm/s

Rotor Constant 34.6 cm/rev

Temperature: Accuracy +/-0.1C

Compass: Accuracy +/-5 deg

See http://www.glerl.noaa.gov/eegle/data/1999-00/moor_miller/vacm.meta.txt for a better laid out format, and also see http://www.glerl.noaa.gov/eegle/data/objects/obj_18.V13.4.html

Station V-13 is the closest to Palisades, and thus the most relevant to questions of Lake Michigan water flow direction in the vicinity of the reactor. Dr. Schwab has mostly addressed the macro level of water flow in Lake Michigan, but is now delving into the issue of micro level of water flow. Thus, he will address locales of tight scope, such as the immediate vicinity of the Palisades reactor, so close as it is to one operational and one potential source of drinking water for the residents (and large numbers of visitors, given the tourism of the Lakeshore region) in South Haven, Casco, and Covert.

Additionally, Dr. Rosalie Bertell, GNSH, with the International Institute of Concern for Public Health, has provided consultation to Petitioners. Dr. Bertell has also served as a longtime National Advisory Board member of NIRS. Dr. Bertell has served on the Nuclear Task Force of the International Joint Commission, where she helped in the publication of the "Inventory of Radionuclides for the Great Lakes," (Dec. 1997), as well as the 1999 "Report on Bioaccumulation of Elements to Accompany the Inventory of Radionuclides in the Great Lakes Basin." Dr. Bertell has worked professionally in Environmental Epidemiology since 1968, served on the Advisory Boards for the Great Lakes Health Effects Program of Health Canada, and the Ontario Environmental Assessment Board and has been a member of the IJC Science Advisory Board. She has published a "Handbook for Estimating the Health Effects of Exposure to Ionizing Radiation" and the popular non-fiction book "No Immediate Danger: Prognosis for a Radioactive Earth," together with more than 100 other publications. She has provided consultation to Petitioners on the issue of performing water sampling near Palisades in order to correct the methodological flaw mentioned earlier of Palisades handling the water samples before they are actually tested by an independent institution.

Dr. Bertell referred Petitioners to Dr. Hari Sharm in Waterloo, Ontario, Canada, a nuclear chemist who can test for radioactivity and toxic chemicals in Lake Michigan water

samples for Petitioners. Dr. Sharm has expressed an interest in helping to carry out this vital work and is assisting Petitioners in the process of developing a methodology for carrying out this independent assessment on the radiation and toxic chemicals being emitted by the Palisades nuclear power plant into the drinking water source, Lake Michigan, for the residents and visitors in South Haven, Casco, and Covert.

The basis-with-reasonable-specificity standard requires that an intervenor include in a safety contention a statement of the reason for his contention. This statement must either allege with particularity that an applicant is not complying with a specified regulation, or allege with particularity the existence and detail of a substantial safety issue on which the regulations are silent. *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), LBP-82-106, 16 NRC 1649, 1656 (1982), citing 10 CFR § 2.335 (formerly § 2.758). While NRC regulations have not yet changed to accommodate the conclusions of BEIR VII, this major scientific pronouncement compels a rethinking of the exposure of the public to routine radiation emissions from Palisades through their water supply. A substantial safety issue is exposed in this contention, and it must be admitted for the inquiry of a contested hearing.

Response as to Contention No. 3 (*The Palisades reactor has no place to store its overflowing irradiated nuclear fuel inventory within NRC regulations*)

The Staff argue that “[t]his proposed contention lacks basis and support . . . [and] fails to establish that a genuine dispute exists on a material issue of law or fact. . . .” Staff Answer p. 15. The Nuclear Management Company maintains that the contention is “...inadmissible because it is not supported by a basis demonstrating the existence of a genuine material dispute.” NMC Answer p. 16. In a way, the Petitioners agree; there is no material dispute over the facts, but the facts compel the conclusion that Palisades’ dry cask storage arrangements

violate NRC regulations.

Specifically, the material facts prove - and exceed the threshold showing that must be made here - that neither the old nor the more recent, "new" concrete pads holding dry casks at Palisades conform with longstanding NRC requirements for earthquake stability standards. As the attached Affidavit of Dr. Ross Landsman, formerly of the Nuclear Regulatory Commission staff, depicts, both pads were built on compacted sand and other subsurface materials, dozens of feet above bedrock and well above the ground elevation of the nearby nuclear power plant. Dr. Landsman, who has decades of experience and a direct oversight role in the inspection of dry cask storage at Palisades when he worked at NRC Region III during the critical period of dry cask storage installation and operation from 1993 to 2005, has concluded from his personal knowledge of the subsoil conditions that the older pad nearer the lake is in violation of NRC liquefaction regulations under 10 CFR Part 72.212(b)(2)(i)(B)²⁴, while the newer pad further inland is in violation of NRC amplification regulations under the same regulations. Neither the older nor newer dry cask storage pads at the Palisades plant were designed in consideration of the factors contained in the cited regulation. See Landsman Affidavit, ¶¶ 3-13.²⁵ Either violation, then, violates 10 CFR 72.212(b)(3).²⁶ This means that the cask storage pads ***have violated NRC regulations since they were constructed, and absent enforcement will continue to violate NRC regulations during a 20-year license***

²⁴[The general licensee shall perform written evaluations, prior to use, that establish that]: Cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, and soil liquefaction potential or other soil instability due to vibratory ground motion.

²⁵The Landsman Affidavit appears in electronic form annexed hereto and also in hard copy at pp. App. 3-a through 3-d of the "Petitioners' Appendix of Evidence in Support of Contentions."

²⁶[The general licensee shall]: Review the Safety Analysis Report (SAR) referenced in the Certificate of Compliance and the related NRC Safety Evaluation Report, prior to use of the general license, to determine whether or not the reactor site parameters, including analyses of earthquake intensity and tornado missiles, are enveloped by the cask design bases considered in these reports. The results of this review must be documented in the evaluation made in paragraph (b)(2) of this section.

extension and beyond.

The NRC, unfortunately, considers the older pad nearer the lake to be in compliance with regulations and allows NMC to store high-level radioactive waste there, while the NRC is supposedly still trying to resolve through ongoing inspection, investigation, and analysis the status of the newer pad, which is situated further inland from Lake Michigan. However, during this alleged period of ongoing investigation, the NRC is allowing NMC to store waste on the new pad despite the unresolved safety concerns. Dr. Landsman's understanding is that the newer pad was built big enough to accommodate all the dry casks currently stored on the older pad nearer the lake, because, despite public pronouncements to the contrary by Consumers Energy, Nuclear Management Company, and the NRC, the older pad clearly violates regulations, which means that the 18 to 19 casks currently stored on the older pad²⁷ must be moved to the newer pad. The problem is, moving the casks from the older pad to the newer one is analogous to jumping from the frying pan into the fire.

Dr. Landsman sought repeatedly while he worked for the NRC to see this unresolved safety issue corrected. Now, however, four casks are being stored on the newer pad. In addition, plans have been in place for additional casks to be loaded and stored on the newer pad in the near future, perhaps as early as fall 2005.

While the NRC staff inveighs (Staff Answer p. 16) that "[p]etitioners lack the requisite

²⁷Including the unloadable, unmovable cask #4 at Palisades, loaded in June 1994 and shortly thereafter admitted by Consumers Power to be defective, having faulty welds. Now, eleven years on, Consumers has yet to unload the defective cask, because it technically cannot do so safely. And the configuration of the 18 to 19 dry casks currently stored on the older pad nearer Lake Michigan is such that the casks furthest back cannot be moved or unloaded until all other casks in front of them have been moved out of the way first. This situation increases the risks, making it very difficult to address emergencies involving certain casks in the configuration in a timely manner.

Although Petitioners/Intervenors are withdrawing their Contention No. 7 concerning dry cask #4 as a separate contention (*see infra*), Palisades' noncompliance with earthquake standards has elevated portents for this particular vessel of high-level radioactive waste.

basis and support for their claim, highlighted by the fact that they have not produced any affidavits or other evidence as to the opinion of their 'anticipated expert'," the NRC had the benefit for years of Petitioners' expert's warnings and has done little to nothing about it, contrary to the agency's mission and mandate to protect public health and safety and the environment. NMC states (NMC Answer p. 19) that "Contention 3 is not supported by a basis demonstrating a genuine issue." Actually, it is the dry cask storage pads, and the very deadly high-level radioactive waste they hold, that is not supported by a base that is safe and secure from earthquake dangers. NMC further urges (Answer p. 19) that "[t]he results of the licensee analysis showed that the [older] pad could support the casks safely. The results are documented in a letter to the NRC dated July 27, 1994." NMC additionally cites the NRC's September 20, 1994 "Independent NRC Staff Final Safety Assessment of the Dry Storage Facility at Palisades Nuclear Power Plant Site" as further proof of issue resolution. NMC likewise points out a June 5, 1995 NRC Information Notice (95-28, "Emplacement of Support Pads for Spent Fuel Dry Storage Installations at Reactor Sites," p. 3) as proof that all is fine at the older pad nearer the lake.

But both the Staff and NMC somehow have failed to disclose the contents of a letter written by Dr. Landsman while at NRC Region III as a safety engineer and dry cask storage inspector overseeing Palisades, to the then-Commission Chairman, Ivan Selin, on February 17, 1994, warning that:

[I]f you use NRC-approved casks under Subpart K [of 10 CFR Part 72], the regulations are silent about the foundation material or the pad. Actually, it's the consequences that might occur from an earthquake that I'm concerned about. *The casks can either fall into Lake Michigan or be buried in the loose sand because of liquefaction. . . .It is apparent to me that NMSS [sic] doesn't realize the catastrophic consequences of their continued reliance on their current ideology.* (Emphasis added)

Dr. Landsman has never received a meaningful response to this warning and would attest

under oath at the hearing of this contention that his safety concerns about the older pad, which involve violations of NRC regulations and violations of public health and safety and environmental protection - remain inadequately addressed and unresolved to this day.

The NRC staff (Staff Answer p. 16) asserts that “[t]his part of the Commission’s regulations has no relation to license renewal.” NMC states (Answer p. 16) that “[t]his contention is beyond the scope of 10 CFR Part 54, because the dry cask storage pads are part of the Independent Spent Fuel Storage Installation (‘ISFSI’) facility which is distinct from – and licensed separately from – the Palisades nuclear power plant.” Both responses are disingenuous. It is impossible to disconnect the dry cask storage pad problems from the proposed license extension. If both dry cask storage pads violate NRC safety regulations and are barred from use, then where, exactly, would NMC store its bulging inventory of irradiated nuclear fuel? And where would the 22 to 23 dry casks already loaded and stored on those defective pads at Palisades be moved to? These are not rhetorical questions; the answers are integral to the 20 year license extension proposal, given that high-level radioactive waste is an inevitable byproduct of electricity production at the Palisades nuclear reactor.

NRC staff also claim (Staff Answer p. 16) that this contention impermissibly attacks NRC regulations, specifically the GEIS on reactor license extension as well as the “Nuclear Waste Confidence Rule.” But, truth be told, at present there is no place for the wastes generated during a 20 year license extension at Palisades to be stored without violating NRC regulations. The NRC’s “Nuclear Waste Confidence Decision” places *false* confidence in the availability of a geologic repository in the U.S. by the year 2025, and biases the NRC in favor of approving a license for the proposed Yucca Mountain, Nevada dumpsite (the only one under consideration). It also, by implication, biases the NRC in favor of approving a 20-year license extension at Palisades.

NMC dismisses this contention (NMC Answer p. 18) by stating “. . . it is a challenge. . .to the generic findings in the GEIS and Appendix B to Part 51.” NMC further cites a Commission ruling on license extension at Oconee which states that “[t]he Commission’s generic determinations governing onsite waste storage preclude the Petitioners from attempting to introduce such waste issues into this adjudication.” But there was not firm evidence of regulatory violation concerning onsite waste storage in the Oconee proceeding. Presumably when the NRC establishes generic findings regarding on-site waste storage it assumes either that its safety regulations are being met at the particular nuclear plant in question, or else that it plans to take enforcement action against any violations of its regulations. But, Petitioners here have articulated evidence that tends to prove in a compelling fashion that **both** of the dry cask storage pads at Palisades are in violation of NRC earthquake regulations. This begs the question, why is NRC allowing high-level radioactive waste storage on pads at Palisades that are in violation of NRC earthquake regulations?

At page 17 of its Answer, NMC states as fact something which is wholly false: that “[b]oth site specific and general licenses are issued for a maximum of 20 years, not 40 years as for nuclear power plants.” Yet, late last year, the NRC Commissioners, by a 2 to 1 split decision (with NRC Chairman Nils Diaz voting against the proposal), approved a 40 year license extension at the Surry Nuclear Power Plant ISFSI in Virginia, the oldest ISFSI in the U.S. So while the initial license may be granted for an initial 20 year period, NRC has indeed granted a license extension for an ISFSI for 40 years. This potentially monumental safety error could well be relicensed.

On page 18 of its Answer, NMC misconstrues Petitioners’ contention, perhaps to mislead the Board. NMC states “[t]he regulations do not require licensees to explore the aging of components for a facility not covered by this license renewal proceeding. . .”. It is not the

aging of the pads that is at the heart of this contention (although pad deterioration over time is a significant safety issue that must be addressed as well), but rather the fact that both ISFSI pads at Palisades have continuously violated NRC earthquake regulations since the day they were built.

At the August 28, 2005 NRC public meeting in South Haven concerning the proposed 20 year license extension at Palisades, neither NRC nor Nuclear Management Company officials could give the number of dry casks already loaded on the two pads at Palisades. Even if the Staff and NMC don't ascribe the requisite seriousness to these issues - given the deadly nature of high-level radioactive waste - the Board must.

All that is required for a contention to be acceptable for litigation is that it be specific and have a basis. Whether or not the contention is true is left to litigation on the merits in the licensing proceeding. *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), LBP-89-28, 30 NRC 271, 282 (1989), aff'd on other grounds, ALAB-940, 32 NRC 225 (1990); *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 1, 2 and 3), LBP-91-19, 33 NRC 397, 411 (1991), appeal denied, CLI-91-12, 34 NRC 149 (1991). Here, the facts alleged, coupled with the expert opinions proffered, easily meet those requirements.

A Licensing Board should not address the merits of a contention when determining its admissibility. *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), LBP-82-106, 16 NRC 1649, 1654 (1982), citing *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980); *Kansas Gas & Electric Co.* (Wolf Creek Generating Station, Unit 1), LBP-84-1, 19 NRC 29, 34 (1984); *Commonwealth Edison Co.* (Braidwood Nuclear Power Station, Units 1 and 2), LBP-85-11, 21 NRC 609, 617 (1985), rev'd and remanded on other grounds, CLI-86-8, 23 NRC 241 (1986). The petitioner simply

must provide sufficient information to establish the existence of a genuine dispute with the applicant on a material issue of law or fact. 10 CFR § 2.309(f)(1)(v) (formerly 2.714(b)(2)(iii)). See *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-35, 34 NRC 163, 166, 169-170, 175-76 (1991); *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-39, 34 NRC 273, 279 (1991); *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-91-41, 34 NRC 332, 338 (1991); *Northeast Nuclear Energy Company* (Millstone Nuclear Power Station, Unit 2), LBP-92-28, 36 NRC 202, 214 (1992); *Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), CLI-93-3, 37 NRC 135, 142 (1993); *Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 NRC 200, 205 (1993); *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-10, 40 NRC 43, 51 (1994). Certainly, Petitioners have in respect to this contention shown material facts which implicate serious issues of regulatory law. The ASLB, given the strong facial showing Petitioners have made, cannot inquire more deeply into the merits of the contention, but instead must admit it for hearing.

The standard for a safety contention in operating license cases (Petitioners recognize this is not an operating license case) is relatively loose; a contention about a matter not covered by a specific rule need only allege that the matter poses a significant safety problem [10 CFR § 50.57(a)(3)] for finding of reasonable assurance of operation without endangering the health and safety of the public. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), LBP-82-116, 16 NRC 1937, 1946 (1982). Here, of course, the contention alleges in compelling fashion the continuous violations of specific regulations. As it appears they would easily meet the operating license standard for a safety issue, the panel must admit their contention for the *continuation* of that operating license for 20 years beyond its expiration.

Because as a matter of fact, Petitioners have met - and exceeded - the pleading

requirements for this contention, the Board must, as a matter of law, proceed to hear it on the merits.

Response as to Contention No. 7 (*Non-radiological persistent toxic burdens to area water sources*)

NRC staff claim (Answer p. 22) that this contention “lacks specificity and support.”

Below is the actual NPDES report summarizing a number of areas in which Palisades is not in compliance with its National Pollution Discharge Elimination System permit requirements, specifically in continuing non-compliance concerning the toxic chemical Betz Clam-Trol.

NPDES NUMBER	GRANT	LIMIT	VIOLATION	ENFORCEMENT	STATUS
INSTANCE OF NONCOMPLIANCE			RNC DATE	ENFORCEMENT	
ACTION	DATE	STATUS	DATE	COMMENTS	

0CPCO-PALISADES POWER PIT			NON-COMPLIANT		
COVERT					
MI0001457	***FINAL***				

***** SUMMARY SECTION *****

PH	001A	11/30/00	NC	CONTINUING NONCOMPLIANCE
TRO-DISCHARGE TIME	001A	11/30/00	NC	CONTINUING NONCOMPLIANCE
OXIDANTS, TOTAL RESIDUAL	001A	11/30/00	NC	CONTINUING NONCOMPLIANCE
BETZ CLAM-TROL CT-2	001A	11/30/00	NC	CONTINUING NONCOMPLIANCE
BETZ CLAM-TROL CT-4	001A	11/30/00	NC	CONTINUING NONCOMPLIANCE

“Continuing Noncompliance” indicates that the violation cited in the above summary was not the first time such a violation had occurred, so that violations on limits of releases of persistent toxic chemicals from Palisades nuclear power plant into the waters of Lake Michigan appears to be an unfortunate, and harmful, pattern. As late as 2003 and 2004, the formal NPDES reports on the use of Clam-Trol at Palisades were mere recitations of the 2000 reporting data. See <http://www.epa.gov/region5/water/weca/reports/mi2qtr04.pdf> (for 2004), and <http://www.epa.gov/region5/water/weca/reports/mi2qtr03.pdf> (for 2003).

Thus, NMC's claim (Answer p. 26) that Petitioners' reference provides “no basis for

Petitioners' allegation or 'apparent multiple misuses of Betz Clam-Trol'" is false, for "continuing noncompliance" indicates a pattern extending over time.

The NRC staff states (Answer p. 22) that "it is not within the [Nuclear Regulatory] Commission's jurisdiction to make any determination as to the adequacy of such permits [such as NPDES permits] in protecting the environment." Yet the scope of 10 CFR Part 54 (set out at §54.4) encompasses "(a) Plant systems, structures, and components . . . [including] (2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1) (i), (ii), or (iii) of this section." Presumably, maintaining unclogged water intakes at Palisades fall within this scoping parameter. If so, then NPDES noncompliance is a relevant issue because NRC is not being truthful about the measures it is taking concerning the perennial clogging problem caused by zebra mussels in Lake Michigan. This disregard for compliance with regulations, not to mention indifference to the environmental health of Lake Michigan and the public health impacts of persistent toxic chemicals released as part of reactor operations does not comport with the NRC's supposed mandate and mission to protect public health and the environment.

Palisades' ongoing releases of persistent toxic chemicals into Lake Michigan is a violation of the letter and spirit of the "Ninth Biennial Report On Great Lakes Water Quality" by the International Joint Commission, the binational U.S.-Canadian federal governmental agency whose mandate and mission is protecting and preserving the Great Lakes. At page 35 of that IJC report, it states:

Specific Persistent Toxic Substances:

The Commission reiterates from its Sixth Biennial Report that, under the Agreement, (Great Lakes Water Quality Agreement of 1978) 'the overall strategy or aim regarding persistent toxic substances is virtual elimination, and the tactic or method to be used to achieve that aim is through zero input or discharge of those substances created as a result of human activity.' This is both necessary and reasonable. 'Persistent toxic substances are too dangerous to the biosphere and to humans to

permit their release in any quantity.'

Twenty additional years of such toxic chemical emissions from Palisades into Lake Michigan - especially if they are too inconvenient to report - will have a significant adverse impact on human and ecosystem health.

There regulations requirement that an intervenor supply the bases on which the intervenor intends to rely. *Georgia Power Company* (Vogtle Electric Generating Plant, Units 1 and 2), LBP-94-22, 40 NRC 37, 39 (1994).

Nonreporting of important, and required, information about toxic releases obscures any meaningful evaluation of the functioning of nonsafety features of Palisades which will be necessary to plant operations during the license extension period. This contention should be admitted.

Response as to Contention No. 8 (*Environmental justice denied by the continuing operations of Palisades*)

NMC states (NMC Answer p. 28) that Petitioners "...fail to challenge the Application and to demonstrate the existence of a genuine dispute on a material issue of fact or law..." and "fail[s] to provide an adequate factual basis to support any dispute with the Application."

NMC states that "...none of Petitioners' claims address the 'essence of an environmental justice claim' arising under NEPA in a NRC licensing proceeding – i.e., 'disproportionately high and adverse human health and environmental effects' on minority and low-income populations that may be different from the impacts on the general population."

Petitioners dispute these conclusions. The heart of the contention is that Palisades' 20-year license extension could very well adversely affect minority and low-income populations in disproportionately high ways not faced by the general population in the area, in particular upon Native Americans.

NMC cites (NMC Answer p. 30) NRC pleading rules requiring that contentions “must include references to specific portions of...the applicant's environmental report...that the petitioner disputes and the supporting reasons for each dispute.” Petitioners take greatest issue with NMC’s Environmental Report, Section 2.10, entitled “Historic and Archaeological Resources.”

The Environmental Report gives very short shrift to historic and archaeological resources. The potential for Native American burial sites, or other Native sites such as former villages or encampments, at or near Palisades is not mentioned anywhere in the Environmental Report.

Petitioners submit that the conclusion “no significant historical or archaeological resources were known to occur in the study area” is unsupported by the “Attachment C. Cultural Resources Correspondence” found in the Report. There are just two letters, one from Consumers/NMC to the Michigan State Historic Preservation Office, the second from the Department of the Interior to the Atomic Energy Commission.

Respecting the February 11, 2005 letter from Dan Malone at NMC and Stephen Wawro at Consumers to Ms. Martha MacFarlane-Faes at the Michigan State Historic Preservation Office (MSHPO), the first paragraph reveals that MSHPO has “concern pertaining to possible unreported archaeological properties on, or within the vicinity of, the Palisades site.” Yet NMC fails to include any documentation spelling out these concerns from MSHPO in the companies’ Environmental Report, other than the brief mention that concerns exist.

Also in the letter, Malone and Wawro state in conclusory fashion that 20 more years of nuclear activities at the site will not disturb the land, and “Therefore, NMC and Consumers do not believe a survey of the project area is necessary, as Federal and state agencies have confirmed on multiple occasions that no historic properties, archeological or architectural, are

known to exist on, or in the immediate vicinity of the Palisades site.”

However, Petitioners fear that 20 more years of operations at Palisades risks a large-scale radiological accident. Even if no accident were to occur, the daily operations of Palisades nuclear power plant releases “low” levels (and sometimes, not-so-low levels) of radioactivity into the air, water, and soil. It also generates high-level radioactive waste, large quantities of which have already been stored at Palisades for nearly 40 years, and ever-growing quantities of which will continue to be stored on-site for at least several decades to come, even if dumps targeted at Native American lands out West (sacred Western Shoshone Indian treaty land at Yucca Mountain, Nevada; the Skull Valley Goshute Indian Reservation in Utah) are opened. Since the actual opening of such dumps is ever more doubtful, this means that Palisades’ high-level radioactive waste could remain on-site indefinitely into the future. The “routine” or “accidental” radioactive contamination caused by 20 additional years of operations at Palisades would be a significant adverse impact upon Native American burial or other sites located there. Such sites are considered sacred and religiously significant in the cultures of many Native American tribes, so befouling these sites with radioactive or toxic chemical contamination or heavy industrial usage could qualify as a desecration under the terms of the federal Native American Freedom of Religion Act.

Certainly this qualifies as a disproportionate, highly adverse impact on Native Americans, that, for example, European-Americans do not face from 20 more years of operations at Palisades. There most likely are not European-American sacred burial grounds at the Palisades site, nor former village sites (also considered sacred and worthy of great respect by Native cultures) there. But there is certainly the potential, and perhaps the likelihood, that burial sites or former encampment, habitation, or village sites exist on the Palisades property. Lea Foushee, a Native American woman at the North American Water

Office in Minnesota, has explained to Petitioners that beautiful vistas were often chosen as burial sites by Native Americans since time immemorial. Palisades certainly overlooks a beautiful vista to the west, overlooking Lake Michigan. Native American cultures in Michigan also regard the westward direction as the one people travel when they pass away, passing through the "Western Door," making it even more likely that burial sites exist at or near Palisades. Traditional Grand River Band of the Odawa Indians storyteller Larry Plamondon also has told Petitioners that rivers and creeks were often chosen as habitation sites by Native Americans since time immemorial.

The Palisades nuclear power plant is bounded not only by the lakeshore to the west, but by the Brandywine Creek to the immediate south, as well as an even larger creek to the immediate north in Van Buren State Park. The possibility for significant Native American archaeological resources on the Palisades site is very real, and should not be so flippantly dismissed by NMC. It is irresponsible that NMC and Consumers would state so strongly that no "survey of the project area is necessary" when it, and federal and state agencies, appear to have done little if any such surveying in the past.

The only documentation NMC and Consumers give in their Environmental Report to support their claims is a letter dated April 7, 1972 from the U.S. Department of the Interior (DOI) to the U.S. Atomic Energy Commission (the predecessor to today's NRC). In that letter, DOI states "It does not appear that the existing plant should directly affect any existing or proposed unit of the National Park System, nor any site eligible for registration as a national historic, natural or environmental education landmark; however, the final statement should contain evidence of consultation with the State Historic Preservation Officer concerning the effects of the power station on places on or being considered for nomination to the National Register of Historic Places." This statement seems potentially irrelevant to such issues as

Native American burial sites, former village sites, etc. located on the power plant site or along the transmission line corridor. It's interesting that consultation with the Michigan State Historic Preservation Officer is mentioned, because from Petitioner Kevin Kamps' (of NIRS) recent contact with Ms. Martha MacFarlane-Faes at MSHPO by phone on August 30, 2005, it appears that very little consultation had taken place between her office and the companies involved. In fact, she admitted that the "ball may have been dropped" on these important matters. The MSHPO's files on this matter do not put to rest the question as to whether or not Native American archaeological resources at the Palisades site could be in harm's way if a 20 year license extension were granted. It's clear that the companies, Consumers and NMC, as well as the state and federal agencies, have allowed this license extension proceeding to progress to this advanced stage without adequately addressing the potential impacts to Native American sites, rights, and values.

The U.S. federal and State of Michigan agencies also have not adequately consulted with the impacted tribes in a meaningful, government-to-government manner, as is required under treaty, law, and regulation. In its February 2005 letter to the Michigan State Historic Preservation Office, NMC and Consumers also mention that: "A May 19, 1972 letter from the Michigan State Liaison Officer for Historic Protection to the AEC [Atomic Energy Commission] confirmed the DOI's determination and stated that Palisades would not 'adversely affect known historical or archaeological resources of the State of Michigan.'" They go on to state that a "Terrestrial Ecological Survey" conducted 26 years ago by a private contractor paid by Consumers "found no significant historical or archaeological resources were known to occur on the Palisades site" and that these findings were confirmed by the Director of the Michigan Department of State's Michigan History Division, which verified that "no significant historical or archaeological sites had been found in the immediate area of Palisades." We question how

“significant” and “immediate” were and are defined by these profit-driven private companies, and by these state agencies? Are Native American sites such as burials or villages considered significant, especially 25 to 40 years ago, when many of these reports referred to were published? It seems imperative that an updated, comprehensive, independent site survey be conducted before Palisades is granted a license to perform nuclear and other activities on this site for another 20 years.

It appears from the lack of supporting documentation that neither the AEC nor the DOI ever did a careful survey of the Palisades site or adjoining transmission lines. NMC and Consumers seem unconcerned about the potential for unknown Native American burial sites or other cultural resources. Yet, given the presence of creeks just north and just south of the Palisades nuclear power plant site, it seems all the more likely that Native American villages or encampments might have been located there. And given the forested, large dunes surrounding the Palisades nuclear power plant, it seems possible that even burial sites might be located there, especially considering the great beauty of the area, and the remarkable view to the west over Lake Michigan. One definition for “palisade,” after all, is “a line of bold cliffs.” (Webster’s New Collegiate Dictionary) It very well may be that the hundred-year-old Palisades Park summer community with 200 cottages immediately south of the Palisades nuclear power plant took its name from the “cliffs,” or tall forested sand dunes, on the site. Certainly Palisades nuclear plant took its name from the Palisades Park community, much to the chagrin of the residents, many of whom have opposed the nuclear reactor since before it was built in the late 1960s.

NMC and Consumers state in the 2005 letter that adequate protections are in place to safeguard cultural resources on the site. They write “Examples of activities requiring an Environmental Review include disturbance of 1 or more acres of previously undisturbed land,

any earth change within 600 feet of water, wetland and waterway activities, and structural interference with landforms, lakes and streams, among others.” But, given the decades of apparent lack of concern, perhaps it should not be surprising that such “protections” actually contain huge loopholes. For example, a good deal of Palisades nuclear power plant property – including much of the forested dunes – almost certainly is more than 600 feet from Lake Michigan. Thus, even such “protections” could still allow for overlooking or ignoring burial sites during construction projects. The nuclear companies state repeatedly throughout the Environmental Report that “NMC does not plan to undertake any major refurbishment activities,” an admission that itself has dire implications, given the deteriorated state of the reactor and its safety systems. But then again, Consumers never envisioned in the early 1970s that it would need to install dozens of 20 foot tall, 132 ton concrete and steel silos to store high-level radioactive waste just 150 yards from the waters of Lake Michigan. And yet, 20 years later, that is exactly what they did. So who knows, really, what projects the companies will need or want to perform on the site over the course of the next 20 years?

In addition to the ever growing stockpile of high-level radioactive waste stored on-site, in 2008 the so-called “low” level radioactive waste dump where Palisades has sent large quantities of atomic trash for decades will no longer accept such wastes from Palisades. It is very possible that Palisades would thus expand on-site “storage” for “low” level radioactive wastes, as well, some of which is actually intensely radioactive, despite the euphemistic name. Lastly, NMC and Consumers state in the last paragraph of their letter that it, and a copy of the response to it from the Michigan Historic Preservation Office, would be included in the Environmental Report. No such response is included. It is disconcerting, given the dearth of supporting documentation (Consumers Power Company’s 1979 “Terrestrial Ecological Survey – Palisades Plant Site” is referenced in the Environmental Report, but a copy of this survey –

seemingly the only actual site survey ever conducted, or at least mentioned in the Environmental Report or documents provided by MSHPO, is not included).

Brian D. Conway of the State of Michigan Historic Preservation Office wrote a letter on March 14, 2005 to James Holthaus at Palisades Nuclear Power Plant stating "...we have reviewed your comments and concur with the recommendations outlined in your [Feb. 11, 2005] letter...". This begs the question, who dropped the ball? NMC/Consumers, or MSHPO? Or both? It's encouraging that MSHPO has expressed concerns, apparently, in the past. But it's discouraging that NRC-imposed deadlines such as the August 8th deadline for intervening/requesting hearings and the August 22nd deadline for environmental scoping comments have come and gone, with no action regarding the potential for Native American impacts from this proposal being adequately addressed by the companies nor by the federal or state agencies.

Given the sovereignty of these tribes and bands, and the treaty rights that exist between them and the United States federal government, the NRC has a government-to-government responsibility to meaningfully consult with these tribes and bands on such significant federal actions as granting the Palisades reactor an additional 20 years of operations. An independent, comprehensive archaeological survey must be conducted before NRC grants a 20-year license extension to assure that Native American archaeological sites are not negatively impacted by future Palisades reactor operations. Such impacts as harm to lake sturgeon – sacred to some Great Lakes tribes – must also be evaluated. It is interesting and telling that NMC's Environmental Report assigns no "importance" to lake sturgeon (in Table 2.3-1, Page 2-47), despite its State of Michigan "threatened" status, and its sacred status in the cultures and traditions of various Great Lakes Native American Tribes, and its importance to the natural history of Lake Michigan as an ancient indigenous species in the

ecosystem. This is an indication that NMC/Consumers is not acknowledging or addressing environmental justice impacts of 20 more years of operations at Palisades on Native Americans.

Quite recently, a Native American cultural site came to the attention of local tribal officials who did not know about it before. An August 12, 2005 article in the Grand Rapids Press ("Sense of adventure: Historic sites will highlight a new Black River paddling pathway") had an accompanying map showing a Native American site of historical significance southeast of South Haven on the Black River, just south of 12th Street, east of M-43, and west of 66th Street/County Road 687. This is well within the ten mile zone from the Palisades reactor, perhaps even within seven miles. Dave Lemberg, director of the Great Lakes Center for Maritime Studies at Western Michigan University in Kalamazoo, played an important role in selecting the historic sites that would be featured along the water trail for canoes and kayakers described in the article. He and other historical and archaeological experts – but most importantly tribal officials and traditional elders – must be meaningfully consulted to ensure an independent site survey at and around Palisades to protect Native American cultural resources there.

The NRC Staff, in its challenge to this contention, inexplicably ignores Petitioners' arguments about the potential for disproportionately high adverse impacts on Native American cultural resources on the Palisades site that have never been identified.

Tom Goldtooth, executive director of Indigenous Environmental Network in Minnesota, and Winona LaDuke, executive director of Honor the Earth, are long-time advisors to NIRS on such matters and can serve as expert witnesses on these Native American environmental justice contentions.

Technical perfection is not an essential element of contention pleading. *Private Fuel*

Storage, L.L.C. (Independent Spent Fuel Storage Installation), LBP-01-3, 53 NRC 84, 99 (2001). The sounder practice is to decide issues on their merits, not to avoid them on technicalities. *Consumers Power Company* (Palisades Nuclear Plant), LBP-79-20, 10 NRC 108, 116117 (1979).

WITHDRAWN CONTENTIONS

Petitioners hereby give notice of the withdrawal of the following contentions from consideration:

Contention No. 5 (no permanent repository for the nuclear waste which would be generated at Palisades after 2010)

Contention No. 6 (Intensifying sand erosion and avalanche risk around dry cask storage pads)

Contention No. 8²⁸ (Increased embrittlement of re-used fuel rods as buffers to reduce embrittlement of RPV walls)²⁹

Contention No. 9 (Chronic emergency unpreparedness within EPZ)

Contention No. 10 (Economic damage in Palisades region in event of accident or attack on the power plant causing severe radiation release)

Contention No. 11 (Threats of terrorist attack and sabotage against the Palisades nuclear power plant)

Respectfully submitted for the Petitioners,

²⁸This Contention was mislabeled as No. 8 in the original Petition inasmuch as there was a separate Contention also numbered 6, but for consistency of reference is defined in this section as being No. 8.

²⁹This Contention is being withdrawn in the belief that the gravamen of it can be addressed within Contention No. 1 raised by the Petitioners, "The license renewal application is untimely and incomplete for failure to address the continuing crisis of embrittlement."

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
NUCLEAR MANAGEMENT	)	Docket No. 50-255-LR
COMPANY, LLC)	
)	
(Palisades Nuclear Plant)	)	ASLBP No. 05-842-03-LR

CERTIFICATE OF SERVICE

I hereby certify that copies of the "PETITIONERS' COMBINED REPLY TO NRC STAFF AND NUCLEAR MANAGEMENT COMPANY ANSWERS" in the above-captioned proceeding have been served on the following through deposit in the NRC's internal mail system, with copies by electronic mail, as indicated by an asterisk, by U.S. mail, first class, as indicated by double asterisk, with copies by electronic mail, or by U.S. mail, first class, as indicated by triple asterisk, and that paper copies only of "PETITIONERS' APPENDIX OF EVIDENCE IN SUPPORT OF CONTENTIONS" were delivered all parties at the following mailing addresses; all on this 16th day of September, 2005:

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RAS 10712

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

DOCKETED
USNRC

November 8, 2005 (10:00am)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Title: Palisade Nuclear Generation Station
License Renewal

Docket Number: 50-255-LR; ASLBP No.: 05-842-03-LR

Location: South Haven, Michigan

Date: Thursday, November 3, 2005

Work Order No.: NRC-693

Pages 19-222

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TEMPLATE = SECY-032

SECY-02

UNITED STATES OF AMERICA

+ + + + +

BEFORE THE NUCLEAR REGULATORY COMMISSION

+ + + + +

Before the Atomic Safety and Licensing Board

+ + + + +

NUCLEAR MANAGEMENT COMPANY
PALISADES NUCLEAR GENERATING STATION

Regarding the Renewal of Facility Operating
License No. DPR-20 for a 20-Year Period

Docket No. 50-255-LR
ASLB No. 05-842-03-LR

THURSDAY

NOVEMBER 3, 2005

+ + + + +
1555 PHOENIX ROAD
SOUTH HAVEN, MICHIGAN

+ + + + +

The above-entitled matter commenced pursuant to
Notice before Ann Marshall Young, Dr. Anthony Baratta, Dr.
Nicholas Trikouros, Administrative Judges.

NEAL R. GROSS (202) 234-4433

PRESENT:

For the Office of Commission Appellate:

Administrative Judges:

Ann Marshall Young

Dr. Anthony Baratta

Dr. Nicholas Trikouros

NRC STAFF:

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Susan Uttal

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David R. Lewis

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Terry Lodge

Kary Love

Paul Gunter

Debra Wolf - Law Clerk

I-N-D-E-X

<u>Exhibit No.</u>	<u>Description</u>	<u>Page</u>
2	May 27, 2004 memo from the Executive Director of Operations	130

NEAL R. GROSS (202) 234-4433

P R O C E E D I N G S

(9:00 A.M.)

ADMIN. LAW JUDGE YOUNG: My name is Ann Marshall Young. I am the Chair of the Licensing Board for this proceeding, and I'm going to ask -- I'm the legal judge on the Board. I'm going to ask my colleagues to introduce themselves and then I'd like to ask all the parties to introduce yourselves and who you have with you. Dr. Baratta?

ADMIN. LAW JUDGE BARATTA: I'm Anthony Baratta, I'm one of the technical judges.

ADMIN. LAW JUDGE TRIKOUROS: Nick Trikouros, technical judge.

ADMIN. LAW JUDGE YOUNG: And we have our law clerk, Debra Wolf, over here. Let's start with the NRC.

MS. UTTAL: Thank you, your Honor. Susan Uttal, the NRC, representing the NRC Staff. To my immediate right is Michael Spencer. He's with OGC but he is not entering an appearance in this case. To his right is Michael Morgan who is the project manager for renewal on the safety side. And behind me is Robert Schaaf who is the project manager on the environmental side.

MR. LEWIS: I'm David Lewis, and with me is Mr. Paul Gaukler. We're with the law firm Pillsbury, Winthrop, Shaw & Pittman, representing Nuclear Management Company in

NEAL R. GROSS (202) 234-4433

1 this proceeding.

2 ADMIN. LAW JUDGE YOUNG: All right. And Mr.
3 Lodge?

4 MR. LODGE: Thank you. I'm Terry Lodge, and
5 seated with me is Kary Love who is a Michigan attorney who
6 is not entering an appearance but will be assisting me.
7 Also with me is Paul Gunter who is one of the named
8 designees of one of the organizational Petitioners that
9 would be the Nuclear Information Resource Service, and
10 Alice Hirt who is another named designee here I believe on
11 behalf of Don't Waste Michigan. We are expecting a couple
12 of the other actual personal representatives but we are
13 prepared to proceed.

14 ADMIN. LAW JUDGE YOUNG: All right. Before we
15 get started, are there any preliminary matters from anyone?
16 Okay. Let me tell you what our plan of action is and we'll
17 proceed from there. We thought the most appropriate thing
18 to do would be to start with any argument that the parties
19 might have on the motions to strike. Then we would move
20 into hearing argument on the contentions one by one.

21 We will have the most questions for all of you
22 on Contention 1, and so we'll start with that and then
23 proceed as appropriate through the day. If we have any
24 short periods and we know that there will be less time
25 required for argument on any particular point, we can

1 change the order. But unless something like that happens,
2 that would be the order that we would plan to go with.

3 On the motions, we can either take a short
4 amount of time or a long amount of time depending upon what
5 all of you would like to do. The way we are approaching
6 this is to consider the motions as effectively asking us
7 not to consider anything in the Petitioner's reply that
8 does not focus on the matters raised in the answers. And
9 we would do that based on case law to that effect.

10 If all of you are in agreement with that
11 approach and don't wish to make any further argument, there
12 is no need to do so. That would be the way that we would
13 handle the objections essentially raised in the motions.
14 If any of you would like to make any argument that we
15 should go further than that or do anything different than
16 that, we're glad to hear your argument on that. What we
17 would probably get into, if we take that route, we'd be
18 looking at the actual reply in comparison to the answers
19 and have you argue to us which portions should or should
20 not be considered.

21 Let me just, I think the first motion was filed
22 by -- would you prefer I just, I call you NMC? As a party
23 to NMC?

24 MR. LEWIS: NMC is fine, Judge Young.

25 ADMIN. LAW JUDGE YOUNG: So, why don't we start

1 with you, Mr. Lewis?

2 MR. LEWIS: I guess I need a clarification of
3 what your contemplated ruling is. If by -- we argued in
4 our answer that the contentions did not have bases and did
5 not address the portions in the applications that were
6 deficient. We think that that information had to be in the
7 original contention and if it is submitted in the reply, it
8 required a showing that there was good cause and the other
9 lateness factors have been met.

10 So, we not think it's appropriate in a reply to
11 submit an answer that says yes, we have no basis in the
12 original contention but here's 50 pages of bases.

13 ADMIN. LAW JUDGE YOUNG: Right.

14 MR. LEWIS: And so, our position is that in our
15 legal arguments where we say they haven't discussed the
16 application, they haven't provided the basis, they don't
17 dispute what's wrong with our programs, not appropriate to
18 then cure that in a reply, that the reply should be a legal
19 explanation of why their original contention was
20 appropriate and not a cure. And we believe that is
21 consistent with what the Commission directed in the LES
22 decision.

23 ADMIN. LAW JUDGE YOUNG: That is, and I guess
24 the only thing that I would add is that in your answer, for
25 example, you did include some argument in effect about what

1 you did, in effect going beyond saying there is no basis or
2 there is no genuine issue, et cetera. You actually talk
3 about what you did and you raise, you make reference to
4 certain NRC regulations. What the Commission has said is
5 that the replies must be narrowly focused on what's raised
6 in the answer. So, if we without argument find that
7 anything in the reply focuses on what is raised in the
8 answer, we would be likely to consider that but we would
9 not consider anything in the nature that you discussed that
10 would be in effect filling in blanks that you asserted were
11 present in the original contention.

12 Now, there may be, drawing that line may not be
13 completely black and white in all instances, but that would
14 be the approach that we would take. And so, if you want to
15 make any argument, we're glad to listen to it.

16 MR. LEWIS: Let me just add that, in our
17 answer, we pointed to the sections in our application that
18 addressed embrittlement, not to address the merits of the
19 embrittlement issue but to show that the application
20 included discussions that simply had not been addressed or
21 challenged in the original petition. So, it was not our
22 intent to address the merits of the issues but simply to
23 indicate that in fact this was a topic that was addressed
24 at some length in the application and it simply hadn't been
25 disputed.

1 ADMIN. LAW JUDGE BARATTA: And you're referring
2 to, for example, in your reply to I guess would be page 11
3 and 12, for example on Contention 1 where you state, well,
4 let me just pick the statement on page 12. The application
5 also identifies the steps that NMC gives and will be taking
6 to ensure protection against -- as an example.

7 MR. LEWIS: Yes. In other words, it is a
8 legitimate contention to say an applicant hasn't addressed
9 the topic if there is nothing in the application. But
10 where in fact the application addresses the topic, then the
11 contention has to explain why that is an insufficient
12 response. And so, what we were pointing out is, yes, our
13 application had addressed this topic and it was essentially
14 unchallenged in the original petition.

15 ADMIN. LAW JUDGE YOUNG: But now, you do get
16 into some argument on the meaning of 10 CFR Section 50.61,
17 for example, and also I think, primarily that one, that's
18 the central one on 54.21(c)1 also. So, I mean, if it's
19 not, if our explanation is not clear enough to you, we'll
20 be glad to hear argument from you on it. I guess you can't
21 completely cut off any reply at all.

22 MR. LEWIS: Oh, I agree with that.

23 ADMIN. LAW JUDGE YOUNG: And obviously, one way
24 that a party or participant could reply would be to say no,
25 we did state a basis and this is what the basis was. But

1 when you get into arguments about the meanings of
2 regulations and that sort of thing, it's not as black and
3 white as I think you may have been suggesting earlier. And
4 obviously the reason for the Commission even to have
5 addressed this and to have talked about replies need to
6 focus on the matters raised in the answer is that it is not
7 always completely black and white. We understand the
8 principle that you're talking about and I think probably
9 all counsel do.

10 Do you want to make any further argument based
11 on what we've said?

12 MR. LEWIS: No, I just have to rest on the
13 pleadings and that we're ready if there are specific
14 portions of the reply that you have questions about and
15 think may need to be addressed. I'm going to need to
16 address those during the argument as well.

17 ADMIN. LAW JUDGE YOUNG: Ms. Uttal?

18 MS. UTTAL: Yes. I just have three things that
19 I want to raise. First of all, the Petitioners --

20 ADMIN. LAW JUDGE YOUNG: Excuse me. Could you
21 talk a little more to the microphone?

22 MS. UTTAL: I'm sorry.

23 ADMIN. LAW JUDGE YOUNG: And get closer to it,
24 both for us and the court reporter.

25 MS. UTTAL: The Petitioners in their reply have

1 a discussion about, that there is no prejudice to the other
2 parties. The Commission does not consider prejudice to be
3 a factor and is not in the LES case. It's compliance with
4 the regulations that is the factor. Secondly, and I think
5 I pointed this out in my brief, they rely on outdated cases
6 such as the North Anna case that had been basically
7 overturned by two subsequent changes in the rules.

8 And my third thing is something new. The
9 declaration filed by Dr. Landsman, Dr. Landsman is a former
10 employee of the NRC, recent employee. And as such, he is
11 barred by federal law, I think it's 18 USC 207, from
12 testifying. There are exceptions for expert witnesses but
13 the exception only goes to facts and observations. Dr.
14 Landsman cannot give his opinion on anything.

15 I checked this out with our ethics advisor in
16 OGC and I believe he also talked to Dr. Landsman about it,
17 so he's aware of it. Unfortunately, there were portions of
18 his declaration that contain opinion. And I have prepared
19 a redacted version where I've done a strikeout of what we
20 consider to be his opinion which I'd like to give to the
21 Board and to the other parties.

22 ADMIN. LAW JUDGE YOUNG: Well, let me just
23 address this issue of striking and redacting. I mean, in
24 modern legal practice, you don't strike things from the
25 record in terms of removing them from the record. The

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1 record is there. We may not consider them, but if there
2 were an appeal, the only you can maintain a record is not
3 to black out portions of it.

4 MS. UTTAL: Well, I didn't black it out.

5 ADMIN. LAW JUDGE YOUNG: So, redacting a
6 document and substituting it, I don't think would be
7 appropriate.

8 MS. UTTAL: What I've done it is a strikeout so
9 you can read it, what the words are. But I think that the
10 board should be aware of what the problems areas are and
11 what cannot be considered and what he cannot testify to.

12 ADMIN. LAW JUDGE YOUNG: You can certainly
13 submit that and we'll include that in the record.

14 MS. UTTAL: Okay.

15 ADMIN. LAW JUDGE YOUNG: And again, thank you
16 for bringing the statute to our attention. But again, I
17 think in our consideration of all the parties' arguments on
18 the contentions, it should be clear what we have considered
19 and what we haven't considered, and we will not consider
20 anything that is not focused on what has been raised in the
21 answers. That's what we have been directed to do in case
22 law, and that's how we plan to approach it.

23 Did you have anything further, Ms. Uttal?

24 MS. UTTAL: That's it. Nothing else, your
25 Honor.

1 ADMIN. LAW JUDGE YOUNG: Okay. And so, if you
2 want to, I don't exactly have a good -- maybe you could
3 help out by getting things from him. And we'll just make
4 that an exhibit. And could you give enough for us and then
5 one for the court reporter, and we could make that an
6 exhibit to the transcript.

7 Now, Mr. Lodge, what would you like to say on
8 this? Would you like to have any further argument or is
9 our explanation --

10 MR. LODGE: I appreciate your explanation. I
11 would like to make a couple of observations.

12 ADMIN. LAW JUDGE YOUNG: Okay.

13 MR. LODGE: Number one, I wonder if I could
14 request that we defer discussion on the Landsman
15 declaration until we actually discuss that particular
16 contention because I think that's a more appropriate point
17 in time. And also, it will give us an opportunity --

18 ADMIN. LAW JUDGE YOUNG: Can you -- I think
19 someone is not able to hear you.

20 MR. LODGE: Pardon me. It will give us an
21 opportunity to digest the strikeout version of this
22 declaration. And I at least want to examine the
23 possibility of resolving that matter if it is acceptable to
24 the Petitioners.

25 Secondly, I will confess that I have practiced

1 before the NRC several times over the years, but not in a
2 license renewal proceeding involving the revised
3 regulations. I would like to say for the record that we
4 understood the rules basically to require the contentions
5 to be a succinct statement of our contentions, of our
6 points. And we did take the responsive pleadings to be
7 analogous to a Civil Rule 12 motion to, essentially a
8 procedural attack on the method pleadings which then
9 contained in the case of NMC and the Staff, contained
10 argument going into matters of evidence and substance
11 beyond the mere procedural attack to which we then
12 responded in detail.

13 It was and remains our position that we were
14 fleshing out at best or worst the originally articulated
15 contentions. And in effect, I believe your Honor may have
16 identified that as being the process we went through. We
17 were responding to that sort of secondary more substantive
18 side of the motions to strike. Thank you. That's all I
19 have.

20 ADMIN. LAW JUDGE YOUNG: Okay. I guess maybe
21 we can make it a little bit more clear how we're going to
22 approach this. I think the inclination would probably be
23 where you provided additional, and I'm not sure that it is
24 that similar to a Rule 12 situation but where you would
25 provide additional evidence if you will that that would

1 generally be the sort of thing that I think the Commission
2 has said we would not consider in deciding whether to admit
3 a contention.

4 If on the other hand you made argument in
5 response to the example I gave before on the interpretation
6 of a regulation that would be relevant to the contention
7 that you raised in the first place, that might be another
8 sort of situation. If as we go through the contentions
9 anybody wants to raise, and I guess we would expect you to
10 raise specific points that you think we should or should
11 not consider, that would be fine. And if you want to make
12 your argument about the Landsman document, I don't see any
13 problem with doing that when we get to that contention.

14 Anyone else? All right. Okay, anything
15 further on the motions? And so, basically what we're
16 saying is what our approach will be and we would not intend
17 to make a formal ruling on the motions given the
18 explanation that we've provided. We're not going to strike
19 the entire reply. We're going to consider it in the manner
20 that you've described. And as we go to the contentions,
21 you can make any additional argument you wish to make on
22 that.

23 All right. I guess also, as we go through
24 argument on the contentions, we would start with the
25 Petitioners and then go to NMC and then the Staff. And

1 then, if we have any further argument, we will have a lot
2 of questions I think and we want to make sure that everyone
3 gets out their points. We would ask that you not just
4 repeat what you have written in your pleadings and address
5 the concerns that's explained after that. And I'll tell
6 you in advance, we will probably be interrupting to ask
7 questions as we go.

8 Any questions or anything further before we
9 move on to Contention 1? All right. Mr. Lodge, actually
10 if you could just give me one second?

11 All right, go ahead.

12 MR. LODGE: Before getting into the substance
13 of things, I would like to indicate, if it is acceptable to
14 the panel, I think this is more a request, that from time
15 to time, I hope you will indulge me in consulting with some
16 of the Petitioners. A lot of our drafting and filings were
17 essentially done and accomplished in a committee type of
18 fashion which I'm sure is probably true with the other
19 parties. In any event, I hope you will indulge my need
20 from time to time to interrupt.

21 ADMIN. LAW JUDGE YOUNG: That's fine.

22 MR. LODGE: Our first contention respecting
23 embrittlement is noteworthy in that it is the type of
24 contention that was identified by the Commission itself in
25 the Turkey Point decision that was referenced by this panel

1 in its initial, I believe the initial scheduling order, the
2 CLI-01-17 Turkey Point Units 3 and 4 decision wherein the
3 panel discusses Part 54, 10 CFR Part 54, and specifically
4 mentions among adverse aging effects metal fatigue,
5 erosion, corrosion, thermal and radiation embrittlement.

6 The gist of our contention is actually quite
7 simple: that the longer the Palisades nuclear reactor is
8 allowed to operate with the occasional necessary use of
9 fast shutdown types of technologies, the greater the risk
10 that embrittlement is an ongoing degenerative process, and
11 ultimately the enhanced possibility that a pressure thermal
12 shock will occur that causes a rupture of the reactor
13 vessel itself. We believe that this is an admissible
14 contention because of the obvious fact that we're talking
15 about a 34-year-old, I believe, or a 34-year-operation
16 record that has among other things left Palisades as unique
17 in the Byzantine part of the nuclear industry as a plant
18 that must be watched and must be closely and carefully
19 considered for its embrittlement potential.

20 As was indicated in our possibly forbidden
21 reply on the contentions, we note a distinct history of
22 'all over the map' computations using multiple computer
23 programs. We understand that there is no longer available
24 real time metal samples, so-called surveillance capsules or
25 coupons that are available to be removed from the reactor

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1 vessel upon refueling and to be analyzed for the
2 embrittlement characteristics that they may or may not
3 portray. We understand that that is probably the case
4 since the ninth refueling which was well back into the
5 1990's.

6 We understand that the --

7 ADMIN. LAW JUDGE YOUNG: Excuse me. Ma'am, I'm
8 sorry, but you're really going to have to leave that in a
9 stationary position. I think that --

10 MS. CAREY: And you say the microphones are on?

11 ADMIN. LAW JUDGE YOUNG: They should be on,
12 yes.

13 MS. CAREY: Thank you.

14 ADMIN. LAW JUDGE YOUNG: Mr. Strasma, is
15 that --

16 MR. STRASMA: Yes, stationary position. As
17 long as it's not distracting, it's fine.

18 ADMIN. LAW JUDGE YOUNG: Right. I think moving
19 around may be a little bit too distracting. Go ahead, Mr.
20 Lodge, I'm sorry.

21 MR. LODGE: Thank you. We understand from our
22 review of the Palisades embrittlement history that the
23 anticipated estimated dates at which there would be a
24 critical problem with the reactor vessel range from 1995 to
25 the present utility projection of 2014 which of course is

1 several years into the projected 20-year extension period.
2 In other words, if a 19-year chunk of time during which it
3 has been projected and anticipated, estimated or guessed,
4 that there would be the potential for a severe crisis under
5 the right circumstances from pressure thermal shock.

6 We, in short, believe that (a) the subject
7 matter jurisdiction if you will of this panel clearly
8 encompasses this particular aging degenerative problem; and
9 secondly, that the data as summarized in our originally
10 filed contentions but certainly as amplified in our reply
11 shows that this issue must be subjected to hearing. As I
12 say, we anticipate from the public domain documents that we
13 have reviewed prior to even filing the contentions, that
14 the history is so mixed, so troubled, and frankly,
15 technically controversial, that the Palisades plant has to
16 be put under a microscope as a poster child for the
17 embrittlement problem.

18 ADMIN. LAW JUDGE YOUNG: Let me just ask you,
19 obviously it would have been good to have the, from your
20 standpoint, to have the additional information that you
21 provided in the reply in the original contention. But just
22 looking at the original contention, do you want to make any
23 further argument on it alone as meeting the contention
24 admissibility standards in 10 CFR 2.309(f)?

25 MR. LODGE: Beyond the reply that we made in

1 the motion to strike, I don't believe so.

2 ADMIN. LAW JUDGE YOUNG: Okay.

3 MR. LODGE: Is your Honor getting at a
4 particular point?

5 ADMIN. LAW JUDGE YOUNG: No. I mean, you did
6 make arguments on that and we've understood them basically.
7 As I understand your argument, well, for example, on the
8 issue that Mr. Lewis raised a minute ago, that I believe
9 you said in your reply that you're alleging a failure to
10 include information rather than -- let's see. Your
11 response to the claim that you haven't included references
12 to specific portions of the application was, as I
13 understood it, that your belief is that the application
14 fails to contain information on a relevant matter. And the
15 critical fact that you're alleging to support your
16 contention is the identification of the Palisades Plant as
17 prone to early embrittlement. Am I understanding that
18 correctly?

19 MR. LODGE: Yes. Yes, correct.

20 ADMIN. LAW JUDGE BARATTA: Could I ask a
21 question with regards to the -- 309(f)2 requires you to
22 provide a brief explanation of the basis for your
23 contention. Could you, in reference to your original
24 filing, point to where that statement adheres in Contention
25 1?

1 MR. LODGE: Well, I reread this with an eye to
2 that, your Honor, in responding to the motion to strike. I
3 think that the basis is the implied in that the
4 embrittlement issue is of course explained and discussed at
5 length in the application, and we believe that, as I've
6 indicated, that the law clearly, the law on the subject
7 clearly envisions that embrittlement is a type of
8 degenerative process that's within the scope of the
9 proceeding. If you're saying, if you're questioning us,
10 did you use the word 'here is our basis', no, we did not.
11 I believe that it is implicit and we were anticipating with
12 the expertise of this panel would probably acknowledge that
13 it is the type of problem that is covered in the
14 application and therefore can be challenged.

15 ADMIN. LAW JUDGE BARATTA: Okay.
16 Unfortunately, well, because of Turkey Point, isn't the
17 Board constrained though from filling in, so to speak? You
18 know, you used the word implied in what you just said, and
19 I think in light of Turkey Point, there is some language in
20 there that says that the Board could not fill in
21 information. Could you reply to that? I'm struggling, you
22 can see what I mean.

23 MR. LODGE: I have seen, and I know the wording
24 you're referring to, I think that, frankly, that the
25 Commission's statement in that regard certainly sets no

1 objective standard unless it is that this panel is to read
2 the contention and decide if it articulates what we call a
3 justiciable issue.

4 I think that, I guess I'm filling in, I think
5 that the Commission expects that the panel is going to
6 exercise a certain amount of discretion, and also to start
7 from a certain operative framework, i.e., the presumptions
8 that the panel is aware of the contents of the application
9 and essentially measures the contention alongside of what
10 the application states on the subject. I guess our
11 position as Petitioners is that it's not filling in but,
12 because otherwise, you're talking about this panel being
13 constrained to make a rote determination that a checklist
14 has been followed or not and the contention is allowed in
15 or not. And I believe that the policy of the NRC
16 historically has been, when possible, to make
17 determinations based upon merits, not upon simply
18 procedural defects and deficiency.

19 ADMIN. LAW JUDGE YOUNG: Could you -- did you
20 have anything to add?

21 MR. LODGE: No, thank you.

22 ADMIN. LAW JUDGE YOUNG: Could you address the
23 Staff's argument that the statements you make in support of
24 your contention are generic? You said earlier that --

25 MR. LODGE: Right.

1 ADMIN. LAW JUDGE YOUNG: You referred to what
2 made the Palisades unique and you're alleging that the
3 identification is prone to early embrittlement.

4 MR. LODGE: Right.

5 ADMIN. LAW JUDGE YOUNG: But the Staff is
6 arguing that what you have provided is generic and applies
7 to, in effect applies to all plants.

8 MR. LODGE: I believe what your Honor is
9 referring to is the more embrittled a plant becomes -- the
10 longer it operates, the more embrittled it becomes. That
11 is generically true. The issue is whether there are
12 decreasing safety margins in the event of initiation of
13 emergency operating procedures which can be kind of a
14 generic truism. But I don't think the Utility nor the
15 Staff are admitting that that is a generic truism by a long
16 shot.

17 And please forgive me, I'm not trying to say
18 that the panel is quibbling over a sentence structure, but
19 we succinctly point out that our expert opinion is that
20 that is true as to Palisades. So, yes, it's plucking from
21 the land of generic truisms a statement that is then
22 applied to Palisades. And we do believe that that
23 adequately articulates an admissible contention, that the
24 longer it operates, the more dangerous it is, and that an
25 expert has analyzed the facts, an expert that presumably at

1 this point is familiar enough with the plant has made that
2 statement, offered that opinion as to Palisades.

3 This plant does not have a thermal shield and
4 we also believe that that is one of the facts that makes
5 Palisades truly unique, as I say a poster child for the
6 embrittlement problem.

7 ADMIN. LAW JUDGE YOUNG: I guess what I would
8 like you to focus on, I mean, what I took, reading your
9 contention and the basis or the support, I'm reading your
10 contention as being the bolded, let's see, the bolded
11 statement after the number one, and then the support for it
12 being the paragraph that follows that.

13 MR. LODGE: Right.

14 ADMIN. LAW JUDGE YOUNG: And when I look at
15 that, the thing that strikes me as the unique thing that
16 you're alleging is that the Palisades Plant has been
17 identified as prone to early embrittlement.

18 MR. LODGE: Right.

19 ADMIN. LAW JUDGE YOUNG: And you raise the
20 issue of timely by reference to, by use of the word
21 untimely and continuing crises.

22 MR. LODGE: Correct.

23 ADMIN. LAW JUDGE YOUNG: So, could you address
24 that a little bit more? I mean, maybe I'm overlooking
25 something, but the uniqueness that you appear to be

1 alleging is the early, being identified as prone to early
2 embrittlement presumably
3 and in comparison to other plants.

4 MR. LODGE: Yes. Several questions there.
5 Please let me organize my thoughts. Number one, while the
6 assertions may appear to be generic, the response and the
7 numerous Staff meetings, pardon me, conferences with the
8 Utility, between Staff and Utility engineers and other
9 experts has been very plant specific. It may have, the
10 result of how the embrittlement problem is handled at
11 Palisades might have replicability within the industry.

12 ADMIN. LAW JUDGE YOUNG: I'm really not, I
13 don't necessarily see any problem with -- if you raise some
14 facts that may be true for other plants, that is not
15 necessarily a reason to throw out a contention. What I'm
16 trying to get you to focus on though is the one thing that
17 you allege that, appears to be alleging that Palisades is
18 different is the reference to the timing and the being
19 prone to early embrittlement. And the Staff is arguing, as
20 I understand it, that that in addition to the other things
21 that you're talking is generic.

22 MR. LODGE: And of course --

23 ADMIN. LAW JUDGE YOUNG: What is the
24 significance of it being prone to early embrittlement?

25 MR. LODGE: May I discuss things briefly

1 please?

2 ADMIN. LAW JUDGE YOUNG: Okay.

3 MR. LODGE: Thank you.

4 ADMIN. LAW JUDGE YOUNG: But just before you
5 confer any further, let me ask another question that I was
6 going to ask, and you might refer to the first one in this
7 context. NMC talks about, under 54.21, that it intends to
8 demonstrate that the effects of aging on the intended
9 functions will be adequately managed for the period of
10 extended operation, and then gets into a discussion of
11 50.61 in addition. In your reply, you made reference to
12 50.61 as well.

13 And so, what I'm trying to get you to focus on
14 is in that context and in the context of your alleging that
15 the Palisades Plant is prone to early embrittlement, what
16 is important about your allegation or your allegations that
17 makes this an issue that should be admitted for litigation?
18 What is unique in response to the Staff's argument?

19 MR. LODGE: Thank you.

20 (Whereupon, Mr. Lodge confers with
21 the other Petitioners.)

22 ADMIN. LAW JUDGE YOUNG: Another way to look at
23 this, Mr. Lodge, another way to look at this --

24 MR. LODGE: Yes?

25 ADMIN. LAW JUDGE YOUNG: I know you've referred

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1 to some types of evidence that were this contention -- you
2 would present, but obviously if this contention were to be
3 admitted, it wouldn't make sense for you to just come and
4 give a lesson on what are the effects of embrittlement
5 generally.

6 MR. LODGE: Right. Yes. I agree wholly with
7 you on that point, your Honor. Pardon me.

8 One of the unique factors about Palisades is
9 that it has been lost to the shifting sand dunes of time.
10 The mix of copper and nickel in the reactor vessel --

11 ADMIN. LAW JUDGE YOUNG: Let me stop you, okay?

12 MR. LODGE: Okay.

13 ADMIN. LAW JUDGE YOUNG: Because I do not want,
14 by my question, to invite you to provide additional facts.

15 MR. LODGE: Right.

16 ADMIN. LAW JUDGE YOUNG: What I'm trying to get
17 you to do is provide a legal argument in the context of the
18 contention admissibility standards and in the context of
19 the contention and basis or support that you provided in
20 your original petition to respond to the Staff's concern
21 about everything being alleged in the contention and in the
22 support for it being generic. In other words, I don't want
23 you to just give me additional facts that weren't there
24 originally. But looking at your original contention, the
25 thing I see that stands out as sounding as though it's

1 unique is the identification of the Palisades Power Station
2 as being prone to early embrittlement.

3 MR. LODGE: One moment.

4 (Whereupon, Mr. Lodge confers with
5 the other Petitioners.)

6 MR. LODGE: From the application, we believe
7 that the copper and nickel content, and I understand your
8 hesitation that I venture into that, is higher than other
9 plants which makes the Palisades reactor vessel unique.
10 Furthermore, as to the 10 CFR 50.61 issue, the alternatives
11 that are portrayed in the application are not exactly
12 properly explained by the Utility. The Utility
13 references --

14 ADMIN. LAW JUDGE YOUNG: Now, again, I don't
15 want by my questions to invite you to say things that you
16 might have said in your original contention. What I'm
17 trying to get you to focus on is your original contention
18 and how the original contention raises issues that should
19 be admitted through litigation. And one of the things that
20 the Commission said in Turkey Point was that the purpose of
21 the -- hold on just a second. "The hearing should serve
22 the purpose for which they are intended to adjudicate
23 genuine substantive safety environmental issues placed in
24 contention by qualified intervenors. While intervenors
25 need not be technical experts, they must knowledgeably

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1 provide some threshold level of factual basis for their
2 contention."

3 Now, you have identified an expert who is
4 retired from the NRC, and presumably that expert would be
5 able to say things other than just give us a lesson on the
6 dangers of embrittlement. The only thing I read in your
7 contention, and not to say that the other facts that you've
8 alleged aren't sufficient to support a contention on their
9 own, but the thing that you have identified as unique is
10 identification of the plant as being prone to early
11 embrittlement.

12 Why is that an issue that is substantive enough
13 that we should admit a contention on it? Without getting
14 into specific facts, why is that issue, one, how does that
15 raise a substantive that makes this contention admissible?

16 MR. LODGE: Excuse us.

17 (Whereupon, Mr. Lodge confers with
18 the other Petitioners.)

19 MR. LODGE: What your Honor is getting at, I
20 gather, is that we have articulated an expert opinion, a
21 conclusion without the underlying factual basis.

22 ADMIN. LAW JUDGE YOUNG: No.

23 MR. LODGE: No? I'm sorry.

24 ADMIN. LAW JUDGE BARATTA: Are you referring
25 to, I mean, the rule that your clients have spelled out in

1 here, is this sufficient information --

2 ADMIN. LAW JUDGE YOUNG: No, no. What I'm
3 getting at is if we were to admit this contention --

4 MR. LODGE: Right.

5 ADMIN. LAW JUDGE YOUNG: You have an expert,
6 the expert can talk about what happened at the Palisades
7 Plant.

8 MR. LODGE: Right.

9 ADMIN. LAW JUDGE YOUNG: Okay. What's the
10 impact of that? What difference does that make considering
11 the standard that, if we look at, for example, 10 CFR
12 2.309(f) Subsection 4, "You must demonstrate that the issue
13 raised in the contention is material to the findings the
14 NRC must make to support the action that's involved in the
15 proceeding."

16 Now, the findings that we must make are defined
17 at 10 CFR 54.29, Standards for Issuance of a Renewed
18 License. "A renewed license may be issued by the
19 Commission up to the full term authorized by 54.31 if the
20 Commission finds that actions have been identified and have
21 been or will be taken with respect to the matters
22 identified in paragraphs (a)1 and (a)2 of this section such
23 that there is a reasonable assurance that the activities
24 authorized by the renewed license will continue to be
25 conducted in accordance with the current licensing basis

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1 and at any changes made," and so forth. And then it refers
2 to certain matters which are managing the effects of aging
3 during the period of extended operation on the
4 functionality of structures and components that have been
5 identified to require review under 54.21(a)1 which is
6 referred to by NMC in their answer.

7 So, I'm asking you not to discuss the facts but
8 what's the legal impact of whatever facts you would present
9 in support of your contention were it to be admitted?
10 Because we don't just, I mean, if we were to admit it, we
11 wouldn't just decide based on what we think. We would look
12 to the rule that governs what are the standards for renewal
13 of a license in determining what the significance of those
14 facts were and whether they demonstrated that the license
15 should not, I would assume your argument would be, should
16 not be granted. And what we would look to in determining
17 whether NMC has shown that it should be granted or whether
18 you have shown that it shouldn't be granted is 54.29 and
19 the standards set forth there.

20 In addition to that, NMC has made arguments
21 based on 50.61 in terms of what it plans to do. So, I'm
22 really asking you to focus your argument on the legal
23 impact of the facts that you have alleged and how that is
24 substantive, how that is material to the findings that we
25 need to make.

1 MR. LODGE: Among the findings that the Board
2 has to make are that the timing of aging analyses offered
3 by the utility company are adequate essentially to protect
4 the public health and safety.

5 ADMIN. LAW JUDGE YOUNG: Well, now, I really
6 want you to focus on the actual standard which is 54.29.
7 That, we don't just say, we don't just make a general
8 finding on the public health and safety.

9 MR. LODGE: Right. If you'll indulge me for a
10 moment, within that finding is that the earlier analyses
11 that are rendered by NMC will remain valid for the 20-year
12 extension period. We don't believe that the application
13 provides that kind of assurance. Certainly the history
14 doesn't. But even the facts as articulated in the
15 application show that Palisades' management plan is behind
16 the curve, if you will, in terms of getting a grasp on the
17 embrittlement problem --

18 ADMIN. LAW JUDGE YOUNG: Okay. Now, you're
19 getting back into the facts. And what I'd really like you
20 to do is look at the facts that you've alleged in support
21 of your contention and the fact that you are alleging that
22 this plant is identified as prone to early embrittlement.
23 How does that relate to the findings that we need to make?
24 How does that relate to whether or not a renewed license
25 should be granted, whether or not the effects of aging are

1 going to be managed for the term, for the extended term of
2 the license?

3 MR. LODGE: Are you saying if the panel accepts
4 for purposes of argument that it is prone to early
5 embrittlement --

6 ADMIN. LAW JUDGE YOUNG: Right.

7 MR. LODGE: Then, well, if it's prone to early
8 embrittlement, it means that it underscores our contention
9 that Palisades is unique, that Palisades is in essence
10 cutting edge, and that the very close scrutiny needs to be
11 given to the analysis offered by the Utility as to how it's
12 going to manage that problem during the 20-year period of
13 license extension.

14 ADMIN. LAW JUDGE YOUNG: And you're saying that
15 that analysis is inadequate?

16 MR. LODGE: Yes.

17 ADMIN. LAW JUDGE YOUNG: Because, why?

18 MR. LODGE: Well, if I say why, that gets into
19 the factual --

20 ADMIN. LAW JUDGE YOUNG: Well, why in the
21 context of the standards that we must follow in making a
22 determination in 54.29?

23 ADMIN. LAW JUDGE BARATTA: What is it that's
24 unique about it that makes this the appropriate form for
25 litigation of that issue? Because I, at least that's the

1 question that I'm trying to get answered.

2 MR. LODGE: Is what your Honor is asking what
3 does the contention say is unique?

4 ADMIN. LAW JUDGE BARATTA: Well, I don't want
5 to climb on Judge Young's issue. I have my own questions
6 with respect to that. I was just trying maybe to give you
7 something to think about.

8 ADMIN. LAW JUDGE YOUNG: You would be arguing
9 presumably, if this contention were admitted, okay, you'd
10 be presenting facts to illustrate how Palisades is prone to
11 early embrittlement.

12 MR. LODGE: Right.

13 ADMIN. LAW JUDGE YOUNG: And then, you would
14 presumably make some legal argument as to the relevance of
15 that to the standards that we need to apply in determining
16 whether NMC has shown that the renewed license should be
17 issued based on actions having been identified that have
18 been or will be taken with respect to managing the effects
19 of aging during the period of extended operation, et
20 cetera. Now, what would your legal argument be assuming
21 that you have shown that Palisades Plant is prone to early
22 embrittlement and taking into account the legal argument
23 made by NMC that under 50.61, they will be submitting
24 information to show, they will be providing information to
25 the NRC three years in advance of the projected date that

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1 the plant will exceed the PTS criterion?

2 So, what legal argument would you make to say
3 these facts show that the standard defined in Section 54.29
4 has not been met by NMC with regard to the Palisades Plant?
5 You couldn't just rely on the facts and say it shows it --
6 so you need to demonstrate to us that the legal standard
7 set in 54.29 which refers back to 54.21 I believe which is
8 cited by NMC in its argument, what legal argument would you
9 make to support denying the renewed license based on the
10 standards in 54.29? Do you need a copy of that to look at?

11 MR. LODGE: If you have it, please.

12 ADMIN. LAW JUDGE YOUNG: And if you want to
13 look also at 54.21 and 50.61?

14 MR. LODGE: Right. We have that, thank you.
15 Our legal argument would be to pose the question: How can
16 the Utility presume to say that they will have a plan three
17 years ahead of its implementation based on the fact that
18 the Utility cannot demonstrate at this point that it
19 understands, has it arms around the problem of
20 embrittlement? Our legal question is what's going to
21 change between now and that indeterminate point in the
22 future whereby the utility can demonstrate that it finally
23 does have a grasp?

24 As I've indicated, the facts are going to show
25 some very deleterious problems that tend to undermine the

1 credibility of projections. And we're at a loss to
2 understand how the Utility has explained in this
3 application that it's going to be able to come up with
4 credible science and engineering based projections on which
5 to base its three-year advance notice.

6 The embrittlement problem in some hasn't been
7 managed to date. And if history is any indicator, it's not
8 going to, the Utility is not postulating any means by which
9 it proposes to really manage the problem. It's just saying
10 we'll be fine, we'll give you three years advance notice,
11 we'll select among the options and come up with some sort
12 of combined strategy. They really haven't articulated what
13 that management strategy is. They have explained in the
14 application what their options are.

15 We already, and I know, I just want to give you
16 a for instance. We know that they say annealing is in
17 there and it's one of the things we could do. But we also
18 happen to know off the record between us that they aren't
19 going to anneal, possibly because of the cost of doing so.
20 We don't know. But the point is the Utility is actually
21 saying we plan to have a plan.

22 ADMIN. LAW JUDGE YOUNG: And so, you're arguing
23 that that does not constitute an action that's been
24 identified that has been or will be taken --

25 MR. LODGE: Exactly.

1 ADMIN. LAW JUDGE YOUNG: -- with respect to
2 managing the effects of aging during the period of extended
3 operation?

4 MR. LODGE: Yes. Yes, your Honor.

5 ADMIN. LAW JUDGE BARATTA: But what is the
6 basis for that not being an action though? I mean, if I
7 say that I'm going to do something that I have identified
8 an action, what is the legal basis for that not being an
9 action I guess is what I'm saying.

10 MR. LODGE: We would have no case if the
11 Utility could credibly argue that it has managed the
12 embrittlement problem today. We don't believe the Utility
13 can make that argument. This is an evolving analysis.
14 What you're watching, and again, I'm not going to plough
15 deeply into the facts, but if you're looking at a
16 circumstance where the original anticipated danger, you
17 know, red lights, bells going off date was 1995, yet now
18 it's 2014, that's a generation estimate.

19 ADMIN. LAW JUDGE YOUNG: But let's say, let's
20 just assume for the sake of argument that there haven't
21 been any problems up to this point, because you don't
22 really allege that in your contention. What you allege is
23 that it's subject to, or it's been identified as being
24 prone to early embrittlement.

25 MR. LODGE: Right.

1 ADMIN. LAW JUDGE YOUNG: And then, in response
2 to that, NMC has said, well, what we're going to do is
3 we're going to do what 50.61 requires and we're going to do
4 that, we're going to provide the information three years
5 before the PTS criterion is exceeded which I believe, I
6 don't think there is any dispute that that would be 2014.

7 MR. LODGE: Right.

8 ADMIN. LAW JUDGE YOUNG: So, I think what Judge
9 Baratta is asking is how is identifying the action of
10 providing information to the NRC, and I guess it would be
11 2011 with regard to what they're going to do in 2014, how
12 should that be evaluated under 54.29?

13 MR. LODGE: I would just make the observation
14 first that 2011 is the expiration year for the current
15 license. So, 2014 is three years into the extension
16 period. So, the fact that the Utility is saying at the end
17 of our current license we'll provide you with a plan, the
18 Utility has not demonstrated the capability of managing the
19 embrittlement to date and is essentially in its application
20 saying --

21 ADMIN. LAW JUDGE YOUNG: But what I ask you,
22 let's assume that it has. Let's assume that it has. Is
23 there anything wrong with saying we're going to tell you in
24 2011 what we're going to do in 2014?

25 MR. LODGE: Assuming the Utility has managed it

1 to date?

2 ADMIN. LAW JUDGE YOUNG: Right.

3 MR. LODGE: Or that there simply has not been a
4 crisis to date?

5 ADMIN. LAW JUDGE YOUNG: Let's assume there is
6 no problem to date. Let's assume what you have alleged,
7 that it's been identified as being prone to early
8 embrittlement.

9 MR. LODGE: All right.

10 ADMIN. LAW JUDGE YOUNG: That's the unique
11 situation that you allege here to support your contention
12 that the application is untimely and incomplete for failure
13 to address the continuing crisis of embrittlement.

14 MR. LODGE: We are alleging that the Utility
15 itself has identified a proneness to early embrittlement.
16 We're taking public domain facts and essentially saying
17 that that is not enough. As I was saying, the plan to have
18 a plan, the fact that the Utility has not yet
19 articulated --

20 ADMIN. LAW JUDGE YOUNG: Why is the plan to
21 have a plan not enough?

22 MR. LODGE: Because the Utility carries the
23 burden of demonstrating, of running the problem to earth,
24 of having actual facts instead of multiple inconsistent
25 projections about the embrittlement problem in order to

1 have a plan. And they do not, they cannot articulate that
2 at this point.

3 ADMIN. LAW JUDGE TRIKOUROS: This question is
4 for Mr. Lodge and Mr. Lewis, but please feel free to chime
5 in. You state in your reply that, and I'll read it for
6 you, "Flux reduction of the magnitude required at Palisades
7 would require far more extraordinary measures such as the
8 installation of neutron shields on the exterior of the core
9 support barrel. It is unlikely that a plant modification
10 of this magnitude would be cost effective." That's quoting
11 from the application. And then you go on to say --

12 MR. LODGE: What page are you in, sir?

13 ADMIN. LAW JUDGE TRIKOUROS: Page 6 of your --
14 reply. You go on to say that "The Petitioners submit that
15 an effective and reliable management plan for a 20-year
16 extension must begin with the incorporation of all NRC
17 management strategies as outlined in 50.61 including
18 fluence reduction efforts, not just the company's perceived
19 cost effective ones." And you just mentioned a few moments
20 ago a comment regarding annealing and cost.

21 It appears that your interpretation of 50.61 is
22 such that cost should not be a consideration or should be a
23 minimal consideration. I'd like to understand more about
24 that and I'd like to hear what others have to say as well.

25 MR. LODGE: Well, our understanding of the

1 Atomic Energy Act is that sheer economics are not an
2 appropriate rationale when the issue is to protect the
3 public health and safety.

4 ADMIN. LAW JUDGE TRIKOUROS: The word
5 practicable in 50.61 is included. In fact it says
6 reasonably practicable, if I remember correctly.

7 ADMIN. LAW JUDGE YOUNG: You say on page 9, if
8 you don't mind my sort of amplifying on that, you say on
9 page 9 of your reply, "There is a grave issue of law here,
10 whether the economically dictated priority of Palisades or
11 the health and safety concerns of the Petitioners conform
12 to NRC regulations." Which regulations -- I assume that
13 you're referring to 50.61?

14 MR. LODGE: Yes. Correct.

15 ADMIN. LAW JUDGE YOUNG: And the licensing
16 renewal regulations. And I think the term reasonably
17 practicable is where the --

18 MR. LODGE: Can you tell me please what
19 subsection that is in?

20 ADMIN. LAW JUDGE YOUNG: That is in 50.61.

21 MR. LEWIS: (B)3 and (b)4.

22 ADMIN. LAW JUDGE YOUNG: Right. (B)3 is where
23 it first appears and then (b)4. I mean, in effect, what we
24 have here is that as explained in NMC's answer, what they
25 plan to do and what they rely on is their action that would

1 demonstrate that they will adequately manage the effects of
2 aging during the extended period of operation under any
3 renewed license is that they will comply with 50.61. And
4 it seems like you're raising an issue, one, as to whether
5 the plan to have a plan meets the license renewal criteria,
6 but also you're raising a question about what reasonably
7 practicable means and whether cost concerns can be taken
8 into account in looking at what's reasonably practicable.
9 Is that --

10 ADMIN. LAW JUDGE TRIKOUROS: Yes. I mean, in
11 essence, they have not identified what will be in their
12 plan, but they have in at least one instance in the
13 application identified what will not be in the plan. And
14 what will not be in the plan or at least what is unlikely
15 in their own words to be in the plan is the addition of
16 neutrons shields on the core support barrel. You seem to
17 be taking exception to that interpretation of 50.61 that
18 allows them to make that assertion. I'd like to understand
19 more about that interpretation of 50.61.

20 MR. LODGE: Please give me a moment.

21 ADMIN. LAW JUDGE YOUNG: Would it be useful to
22 take a break at this point and give you some time to --

23 MR. LODGE: That would be fine. Thank you.

24 ADMIN. LAW JUDGE YOUNG: Okay. Then, let's
25 take a ten-minute break, 15 minutes. Come back at 10:30.

1 (Off the record.)

2 ADMIN. LAW JUDGE TRIKOUROS: Should I repeat
3 the question I asked prior to the break?

4 MR. LODGE: If you'd like.

5 ADMIN. LAW JUDGE TRIKOUROS: The question dealt
6 with the statement in the application regarding the, that
7 it was not cost beneficial to install the modification --

8 MR. LODGE: Correct.

9 ADMIN. LAW JUDGE TRIKOUROS: -- that would be
10 sufficient to mitigate the consequences of the
11 embrittlement, namely, neutron absorption plates on the
12 core support barrel. And I was asking the question
13 regarding your interpretation of 50.61 in which you
14 indicated that such considerations are not to be made.

15 MR. LODGE: I agree somewhat that 50.61 and the
16 reasonably practicable wording in the 50.61 would certainly
17 seem to allow some consideration to be given to economics.
18 And we, therefore, I believe agree that, yes, that's within
19 the panoply of options. However, 50.61 is rather, in our
20 estimation as Petitioners, ahead of the game. The Utility
21 has the burden of demonstrating that they have a right to a
22 license extension. The 2014 date that we've been talking
23 about is a date that's been moved back four or five times.
24 The Utility has never demonstrated before and we believe
25 it's going to have great difficulty demonstrating presently

1 the basis, the justification even for the 2014 date.

2 The fact issue for hearing is establishing the
3 early embrittlement, when it began or where it is or what
4 degree embrittlement has set in at Palisades. That isn't
5 the Petitioners' burden at hearing. We believe that,
6 again, the plan to make a plan is the argument looking
7 through the application. The Utility has essentially made
8 the statement that it's probably unlikely that we're going
9 to do a technological fix or correction, the shields, the
10 core barrel, which is a signal now to the Licensing Board
11 that there is at least that option off the table in all
12 likelihood.

13 We believe that since the Utility is not going
14 to be able to establish a date certain, can't establish it
15 now, that the Utility is going to have to explain that at
16 hearing. That is the issue of fact. Our arguments about
17 50.61 are essentially academic until the license extension
18 has been determined to be grantable.

19 ADMIN. LAW JUDGE TRIKOUROS: Are there any
20 other comments regarding the use of cost effective
21 arguments?

22 MR. LEWIS: We believe that reasonably
23 practicable implies consideration of cost, and what is
24 practical necessarily includes what can you do and how does
25 it cost and is it reasonable. Reasonably practicable has

1 been used in other context by the NRC to include
2 consideration of economics. There is a Seabrook case,
3 ALAB-422, 6 NRC 33 where the --

4 ADMIN. LAW JUDGE YOUNG: You've cited that,
5 right? I think you have already --

6 MR. LEWIS: I'm not sure we have.

7 ADMIN. LAW JUDGE BARATTA: Could you give that
8 citation again please?

9 MR. LEWIS: It's Public Service Company of New
10 Hampshire, Seabrook Station, Units 1 and 2, ALAB-422, 6 NRC
11 33, 1977. Now, that's a case where the Appeal Board was
12 considering whether certain mitigation measures, not for
13 pressurized thermal shock but just to mitigate
14 environmental impacts was reasonably practicable and
15 indicated that standard, you know, let's just say in
16 consideration of costs.

17 In addition, when the Commission was
18 establishing the pressurized thermal shock rules, there
19 were a number of SOCE papers that led up to it which
20 considered what were reasonably practicable measures for
21 reducing flux reduction. The SOCE paper is SOCE paper
22 8379, February 25th, 1983. It was actually cited in the
23 statement of consideration for the pressurized thermal
24 shock rule and this is replete with references to the
25 consideration of how much different options would cost.

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1 ADMIN. LAW JUDGE YOUNG: What's the citation
2 for the SOC?

3 MR. LEWIS: It's 49 Federal Register at 4500.
4 I don't know what the first page of the Federal Register is
5 but it's at page 4500.

6 ADMIN. LAW JUDGE YOUNG: Thank you. Thanks.

7 MR. LEWIS: So, we think clearly reasonably
8 practicable requires consideration of economic. And we
9 believe that Petitioners just submitted that also. We
10 would agree.

11 ADMIN. LAW JUDGE TRIKOUROS: Do you consider
12 annealing also too costly at this point?

13 MR. LEWIS: No, it's one of the options under
14 the rules, both the pressurized thermal shock rule and the
15 annealing rule three years before you exceed the screening
16 criteria and you have to submit an analysis if you want to
17 operate past that screening criteria. And you need to
18 submit a nealing plant if you want to anneal. Those are
19 both options that are identified in our license renewal
20 application as part of our program. And so, we intend to
21 follow the regulations and make those submittals and
22 determinations at that time.

23 ADMIN. LAW JUDGE TRIKOUROS: So, you're not
24 ruling out the issuance of an annealing report three years
25 prior to 2014?

1 MR. LEWIS: No, we're not.

2 ADMIN. LAW JUDGE YOUNG: Do you want to add
3 anything on that?

4 MR. LODGE: I would just like to stress that,
5 again, we don't vociferously at this point disagree that
6 reasonably practicable includes economic balancing. The
7 point is look at the regulatory environment right now.
8 There is no NRC rule on PTS. There is not a binding one.
9 There's one that has been under discussion and is out there
10 and is being revised. But there is not a standard that
11 this Board can apply and you're faced with an applicant
12 that's saying, reading between the lines, we can't tell you
13 very accurately that there is embrittlement, only the
14 degree of embrittlement, we can tell you there is
15 embrittlement. And that's why we are very skeptical,
16 looking very askance at this 2014 date because it's about
17 as established as the earlier screening dates were.

18 So, who is to say in 2011 that the then
19 projected date isn't 2032?

20 ADMIN. LAW JUDGE YOUNG: You made a statement
21 earlier that what they have is a plan to make a plan. And
22 I think you were arguing that that doesn't meet the
23 standards for license renewal.

24 MR. LODGE: Right.

25 ADMIN. LAW JUDGE YOUNG: Can you point me to,

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1 or sort of spell out for me your argument on that? What
2 authority? I mean, we need to make any findings that we
3 make based on the standards set forth in the rules.

4 MR. LODGE: Sure.

5 ADMIN. LAW JUDGE YOUNG: So, could you tell me
6 what authority you would rely on in those rules or
7 elsewhere to support your argument that a plan to make a
8 plan, taking all your other arguments and your facts as
9 alleged to be true? How does that, what impact does that
10 have on the findings that we would need to make ultimately,
11 the legal conclusions that we would need to draw
12 ultimately?

13 MR. LODGE: Well, the requirements in the
14 54.21(c)1 as to the analyses that must be demonstrated by
15 the applicant, and I would say that the --

16 ADMIN. LAW JUDGE YOUNG: I think what NMC is
17 relying on is 54.21(c)1(iii), that they are going to
18 demonstrate --

19 MR. LODGE: Right. Right.

20 ADMIN. LAW JUDGE YOUNG: -- through the
21 information to be provided to the NRC.

22 MR. LODGE: That's correct.

23 ADMIN. LAW JUDGE YOUNG: That the effects of
24 aging on the intended functions will be adequately managed
25 for the period of extended operation.

1 MR. LODGE: That's correct.

2 ADMIN. LAW JUDGE YOUNG: And what's your
3 argument on that and with regard to the standards of 54.29?

4 MR. LODGE: That the Utility historically has
5 not, and again, I'm sort of delving into facts a moment,
6 that the history up to this point, up to the time of the
7 hearing in effect is that the Utility has not demonstrated
8 any ability to manage the embrittlement problem and we
9 believe the issue of fact is that the Utility has to
10 demonstrate what's changed, how firm is the 2014 date,
11 based upon what as opposed to the past.

12 ADMIN. LAW JUDGE YOUNG: And if the 2014 date
13 is correct, what's your argument?

14 MR. LODGE: That's the issue of fact that would
15 have to be decided and adjudicated by the Board.

16 ADMIN. LAW JUDGE YOUNG: Let's say we find that
17 that date is correct just for the sake of argument, what is
18 your argument as to how that affects the legal conclusions
19 that we would need to draw? And I guess what I'm getting
20 to, you say, you characterize the argument of NMC as being
21 a plan to make a plan?

22 MR. LODGE: Correct.

23 ADMIN. LAW JUDGE YOUNG: What's wrong with
24 that, under the legal standards of 54.21 and 54.29?

25 MR. LODGE: What's wrong with what? The

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1 uncertainty in our estimation is the, is the issue of fact.
2 If you're saying what's wrong with a plan to make a plan
3 the requirement by the Board is to find there is a
4 demonstration that the effects of aging will be adequately
5 managed in the renewal term.

6 In essence, you will be making a finding that,
7 that they might be managed in the renewal term but there
8 will not be the requisite degree of certainty that they
9 will be, you will be granting an open season type of
10 license.

11 You'll be allowing the utility to continue
12 operating under the current ages of no PTS standard, no,
13 it's under revision and the ad hoc generation long setting
14 and resetting of the date that the screening criteria are
15 breached or surpassed.

16 ADMIN. LAW JUDGE BARATTA: From a regulatory
17 standpoint, you seem to apply that this is ad hoc but the
18 regulations, specifically the EDS regulations and NMC
19 statement that they will comply with those, I don't quite
20 understand where the uncertainty comes in. I mean, that
21 rule, EDS rule does allow some, different courses of
22 action.

23 MR. LODGE: Right.

24 ADMIN. LAW JUDGE BARATTA: But they're all very
25 specifically described.

1 MR. LODGE: Right.

2 ADMIN. LAW JUDGE BARATTA: And their indication
3 is that they will comply with the rule. How is that any
4 different than, for example, statements which they might
5 make with respect to say complying with Appendix B criteria
6 or a quality control system? Or complying with Part 20 for
7 the dose?

8 MR. LODGE: All the utility is saying by
9 promising to comply with the regulation is that whatever
10 requirements we have to follow in, let's say 2011, we will.
11 And we'll postulate our 50.61 option and our choices.
12 We'll make our decision then.

13 The issue of fact is what will have changed
14 from the point in time that the Board and the Commission
15 issue a license extension until --

16 ADMIN. LAW JUDGE YOUNG: Let me stop you there.
17 Don't assume what the Board's going to do.

18 MR. LODGE: No, no. I'm saying, for purposes
19 of discussion that --

20 ADMIN. LAW JUDGE YOUNG: If the Board were to
21 grant the renewal license then --

22 MR. LODGE: I can correct, I mean no disrespect
23 at all.

24 ADMIN. LAW JUDGE YOUNG: Okay. Now continue
25 your --

1 MR. LODGE: That was kind of implicit in my
2 point of argument. The problem is is that the issue of
3 fact here is, is a gaping issue of fact. And that's why we
4 believe that it is up to the Board to establish whether or
5 not the embrittlement management history warrants and
6 conjectures by the utility as to the near term, whether
7 that warrants a license extension.

8 Not, I think it is this, the panel cannot
9 simply pass on the adequacy by saying, well they've
10 committed to following the regs that might be in effect at
11 that time. We don't even know if there will be a PTS
12 revision, a final one even by then.

13 So, in essence, we think that the issue in one
14 respect is that the utility is requesting continuation of
15 the status quo. They've already said we aren't going to
16 make a technological fix in all likelihood, so we're going
17 to continue to rely on the paucity of data and the
18 proliferation of computer projections and inferences.

19 And maybe occasionally we can get some data on
20 embrittlement problems at other reactors and maybe we will
21 use surveillance capsules that have some stepped up
22 accelerated embrittlement features to them. All of which
23 we'll use to try to figure this out. But they cannot
24 explain that they have figured it out, that there's
25 certainty that they are working essentially from a rather

1 hard science and a hard engineering basis.

2 ADMIN. LAW JUDGE YOUNG: So what you're saying
3 is that the licensee may demonstrate the effects of, that
4 the effects of aging on the embrittlement issue will, that
5 the licensee can demonstrate that it may be adequately
6 managed but not that it will be adequately managed?

7 MR. LODGE: Correct.

8 ADMIN. LAW JUDGE YOUNG: That's what your
9 argument is and then that --

10 MR. LODGE: Yes.

11 ADMIN. LAW JUDGE YOUNG: All right. Do you
12 have any questions for him?

13 ADMIN. LAW JUDGE BARATTA: I'd like to reserve
14 coming back after I --

15 ADMIN. LAW JUDGE YOUNG: We may have more.
16 Okay.

17 ADMIN. LAW JUDGE TRIKOUROS: I think there are
18 more questions.

19 ADMIN. LAW JUDGE YOUNG: You want to ask now?

20 ADMIN. LAW JUDGE TRIKOUROS: I do have one
21 question --

22 MR. LODGE: Yes, sir.

23 ADMIN. LAW JUDGE TRIKOUROS: -- regarding your
24 statement that NMC has not properly managed the
25 embrittlement effect. Can you elaborate on that? The, I

1 mean certainly they haven't introduced flux reduction
2 programs where, what have they not done?

3 MR. LODGE: They've never established and
4 apparently cannot establish the precise mix of copper and
5 nickel, that data is lost to time.

6 The surveillance coupons or capsules were used
7 up, we believe, as of the ninth refueling which was in the
8 early 1990's. I'm sorry. And in essence they are delaying
9 the, they're using fuel bundles to try to reduce the
10 irradiation effects on the reactor pressure vessel.

11 I don't know, so far as I understand, those are
12 at least three of the facets that we question in terms of
13 management practices.

14 I, perhaps I should frame it as we, it's the
15 petitioner's contention that the problem, yes, there are
16 management measures being taken. But, once again, there's
17 a, it's guess work, it's based upon paucity of information.

18 There's an argument in fact that, based upon
19 one of the conclusions the Board could reach is that based
20 upon the history that the only certain way of meeting the
21 standard is for replacement of the RPV.

22 ADMIN. LAW JUDGE BARATTA: In light of 50.61
23 though --

24 MR. LODGE: Right.

25 ADMIN. LAW JUDGE BARATTA: The way, does not,

1 doesn't that dictate the way that you can manage the
2 effects of embrittlement?

3 MR. LODGE: Indeed it does. And as I indicated
4 earlier, we don't particularly dispute the reasonably
5 practicable wording but I think that that is, that's a
6 determination that gets made, is allowed to be made only
7 after the 54.29 determination is made.

8 The utilities previously pledged, in about
9 1996, that they would nail the reactor vessel and have not
10 done so. We don't know why, but that again is one of the
11 facets of this that would be explored we believe at a fact
12 hearing.

13 But yes, sir, you're correct, 50.61 says what
14 it says. And it does allow for the selection, the
15 outlining and selection of options. But that is not a
16 determination that's being made right now.

17 ADMIN. LAW JUDGE BARATTA: All right. Well
18 let's take this a step further then though. The
19 determination now is whether or not they will manage the
20 effects of aging?

21 MR. LODGE: Right.

22 ADMIN. LAW JUDGE BARATTA: That's 54.20,

23 ADMIN. LAW JUDGE YOUNG: 21.

24 ADMIN. LAW JUDGE BARATTA: 21. 54.21.60.

25 ADMIN. LAW JUDGE YOUNG: Well actually, 54.29.

1 ADMIN. LAW JUDGE BARATTA: Okay. 54.21 and
2 54.29 require. Now I guess I'm still at a loss to
3 understand why a statement that I will comply with the
4 apple requirements for PTS screening criteria which is
5 50.61 is not satisfy that I will manage, the statement I
6 will manage the detrimental effects of aging.

7 Because again if I use your argument that a
8 statement that I will comply with the regulations is
9 insufficient to demonstrate that I've taken an action which
10 will deal with the detrimental effects then any statement
11 that I will comply with any other part of the regulations
12 would come into question as well.

13 And seems that to lead to an illogical
14 conclusion.

15 In other words, I'm trying to get back to the
16 issue of, we have to, when we're all said and done on this
17 license renewal, we have to come to a conclusion that
18 they've met the regulations. And the regulations are 54.21
19 and 54.29, require that they have a plan.

20 MR. LODGE: Um-hum.

21 ADMIN. LAW JUDGE BARATTA: Okay. And how, what
22 is it that, in the regulations that says a statement that I
23 will comply with the regulations is not a plan?

24 You know what, where in all of the, you know,
25 the part 50 would that not satisfy?

1 MR. LODGE: I think that what the utility is
2 actually saying is we intend to comply, we think, with the
3 regs that might be in affect at the time.

4 The company's operating from a lack of actual
5 data based upon surveillance capsules or coupons. We
6 believe that the standards in part 54 require a much higher
7 degree of actual knowledge, actionable knowledge than that.

8 And that, again, to state that you intend to
9 make decisions seems to abrogate what this Board's, the
10 scope of this Board's responsibility is. That in essence,
11 I mean I take that to suggest that why couldn't just
12 ongoing regulatory powers of the NRC address this
13 embrittlement problem.

14 Well, there is not an external NRC defined
15 standard and the utility keeps moving its own goal posts
16 back based upon what amounts, in some respects, to
17 speculative inference, not hard data.

18 I, it's the petitioner's position that at some
19 point and especially when they're making projections now,
20 several years into the anticipated 20 year extension period
21 that it, the buck has to stop, the determination has to be
22 made here, in 2005 or '06 as to exactly what are they
23 operating from when they say 2014, when they, when there's
24 any representation made as to the decision.

25 ADMIN. LAW JUDGE BARATTA: Well, let me take

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1 that point that you just made though. If you're taking
2 issue with their statement, which they are currently
3 operating on, under, that PTS is not a problem, isn't that
4 a challenge to the existing licensing basis and therefore
5 is specifically excluded from this license renewal hearing?

6 MR. LODGE: No, sir. Because they're making a
7 representation to the Commission that we believe we're
8 going to be able to manage this and here's how.

9 When you examine the basis for their
10 assumptions, it starts to come apart, the wheels start to
11 fall off. But that's the basis under which they're
12 currently operating.

13 It's the basis under which they propose to
14 continue operating until 2014, perhaps.

15 ADMIN. LAW JUDGE BARATTA: See, my problem is
16 I'm bound by what the Commission said in Turkey Point,
17 okay.

18 MR. LODGE: Right.

19 ADMIN. LAW JUDGE BARATTA: I mean that's --

20 MR. LODGE: Yes.

21 ADMIN. LAW JUDGE BARATTA: -- you know,
22 anything that we do has to be consistent with that. That's
23 our governing, one of our governing case logs. And one of
24 those, the aspects is I can't challenge the existing
25 licensing basis in a license renewal here.

1 And it sounds like that's what you're doing.

2 MR. LODGE: Well.

3 ADMIN. LAW JUDGE BARATTA: Could you explain to
4 me how that isn't?

5 MR. LODGE: Sir, the Turkey Point also says,
6 left unmitigated, the effects of aging can overstress
7 equipment, unacceptably reduce safety margins and lead to
8 reduction of required plant functions, including the
9 capability to shut down the reactor and maintain it in the
10 shut down condition.

11 And, and that's in the same paragraph that
12 mentions embrittlement as a, certainly a legitimate topic
13 as an adverse aging effect.

14 That's why we believe, yes, it is a current
15 operating circumstance but the utility is also telling you
16 that we're going to maintain the status quo for the rest of
17 our current license and perhaps even into the license
18 extension period.

19 It is up to this Board to examine the adequacy
20 of that proposition as a management plan.

21 ADMIN. LAW JUDGE BARATTA: Okay. I think I
22 understand now what you're saying. Thank you.

23 ADMIN. LAW JUDGE TRIKOUROS: Your assertion
24 that there had been different analyses leading to different
25 conclusions over time, all of these, I assume, have been

1 done with approved methods under the auspices of the
2 Nuclear Regulatory Commission or is that, is there
3 something missing there?

4 These are just different analyses with using
5 different methods?

6 MR. LODGE: I don't know if the NRC has
7 promulgated a very clear guideline for what are approved
8 methods.

9 I guess I'm not prepared to answer that unless
10 you have, can help me a little bit.

11 ADMIN. LAW JUDGE TRIKOUROS: Well within the
12 allowances of say regulatory guides, specific regulatory
13 guides that identify methods. I'm trying to understand if
14 what you said regarding the various analyses is implying
15 something that we should be considering of this was a new
16 part of the normal plant licensing basis.

17 MR. LODGE: Um-hum. One moment, please. In
18 our reply to the motions to strike we point to, repeatedly
19 to an NRC staff memo that suggests that the staff itself
20 does not necessarily concur with the 2014 date.

21 So the question of whether or not these are,
22 the deliberations that have been ongoing since the late
23 '80's or even earlier are an acceptable practice, which I
24 take to be your question.

25 Pardon me. We questioned whether or not an

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1 appropriate confidence level has been established through
2 all of that, all of the computations and projections. The,
3 again, the problem is that there's a PTS revision out there
4 that is not yet promulgated into formal policy.

5 This is very much an ad hoc circumstance
6 dealing with a plant that has unique engineered and lack of
7 engineered features, if you will, the radiation shield.

8 And incidently, it, I actually suppose maybe
9 the answer to your question, sir, is that maybe it is, it's
10 up to the Board to make the determination because of the ad
11 hoc nature of this ongoing technical dialogue that has been
12 going on now for a generation as to whether for another
13 generation it's going to be adequate to provide the
14 assurances that the Board has to find the utility to have
15 made.

16 ADMIN. LAW JUDGE TRIKOUROS: I was unaware that
17 2014 was in question. At least from all of the reading
18 that I have done, I could not see the 2014 was in question.

19 MR. LODGE: We actually recount the contents of
20 a staff memo at page 15 of our reply to the motion to
21 strike. I think it's mentioned, one or two times later.
22 It's mentioned at page 20.

23 It's also in our, yeah, it's in our appendix of
24 evidence that was provided to the actual memo, as an
25 exhibit, accompanying the same response.

1 ADMIN. LAW JUDGE YOUNG: Do you --

2 MR. LODGE: Yes?

3 ADMIN. LAW JUDGE YOUNG: Do you have anything
4 further you want to add?

5 MR. LODGE: No, sir. Or no, ma'am. Sorry.

6 ADMIN. LAW JUDGE YOUNG: All right.

7 MR. LODGE: Sorry.

8 ADMIN. LAW JUDGE YOUNG: If there are no more
9 questions now, should we move, all right. Let's move on to
10 you, Mr. Lewis and/or Mr. Gaukler.

11 MR. LEWIS: Thank you. Let me start by
12 addressing the assertion I heard a number of times that
13 we're working under ad hoc standards. And I think I heard
14 petitioner say at one point that there's no rule on
15 pressurized thermal shock, that there's no standard, that
16 everything's under revision.

17 It is true that there is an NRC effort under
18 way to consider revising the pressurized thermal shock rule
19 and about a half of what the petitioners cite in their
20 reply are ACRS statements that relate to potential changes
21 in the future of the pressurized thermal shock rule.

22 But we're not relying, in our license renewal
23 application, et al., on a potential revision to the rule.
24 There is a current rule and that's at 10-CFR-50.61 and
25 there's current interpreting guidance in Reg Guide 1.9 that

1 explains how you apply the rule.

2 And we are applying and being judged under the
3 current standard, not on any potential future revision. So
4 this is not an ad hoc approach.

5 We are demonstrating that we're managing aging
6 in accordance with very precise, current regulations. The
7 number of questions about the significance of the early
8 embrittlement assertion that is in the petitioner's reply,
9 let me try and address that and make a number of points.

10 First is that the plant's not unique. There
11 are other plants that will reach the screening criterion
12 before the period of extended operations. So this is
13 not --

14 ADMIN. LAW JUDGE YOUNG: I'm sorry. I thought
15 I had turned that off. Go ahead.

16 MR. LEWIS: We're not the only plant that has
17 this circumstance. And there was a May 27th, 2004
18 memorandum from the executive director of operations to the
19 Commission that identified how the license regulations
20 would apply to plants that would exceed the screening
21 criterion before the period of --

22 ADMIN. LAW JUDGE YOUNG: Repeat that statement,
23 please?

24 MR. LEWIS: There was a May 27th, 2004
25 memorandum from the executive director of operations to the

1 Commission that explained how the license regulations would
2 apply to a plant that would exceed the screening criterion
3 before the period of extended operations had expired.

4 In other words, would not be able to show that
5 they would meet the screening criterion for the entire
6 extra 20 years of operations. And that memorandum
7 identified other plants that were in the same circumstance.

8 ADMIN. LAW JUDGE YOUNG: With, just to, on the
9 prone to early embrittlement, that, as compared to the
10 other plants is this Palisades earlier or you're saying
11 it's not, I mean, there's, there would seem to be a
12 difference between three years into a term and say 18 or 19
13 years into a term, is there?

14 MR. LEWIS: I don't know the answer to that
15 question. I don't know when the other plants would expire.

16 With respect to early embrittlement, 54.21(c)1
17 gives three methods for managing a time limit aging
18 analysis. One is to show the current analysis extends
19 through the period of operation.

20 The second one is to revise the analysis to
21 make it extend. And the third is to establish a program to
22 manage aging.

23 The petitioners have suggested we're just
24 saying we're going to comply with the rules. That's not
25 really correct.

1 The pressurized thermal shock regulation is a
2 regulation that tells you exactly what you have to do at
3 every step of the way. It says, here's exactly how you
4 determine what your reference temperature for -- transition
5 is and if you're going to exceed it, here's exactly what
6 you're going to do.

7 So to a certain extent we are saying we're
8 following the rule. But we're saying we're following the
9 rule because it tells us what you do at each step to ensure
10 that the plant is safe.

11 And by saying that we meet each of these steps
12 that are specifically required by the rule, we are in fact
13 showing that there is no safety issue in the period of
14 extended operation. Because the rules do allow you to
15 operate in exceedance of the screening criterion without a
16 further NRC approval, either of annealing or further
17 analysis three years, you know, to be submitted three years
18 before the screening criterion has exceeded, demonstrating
19 that pressurized thermal shock is not a safety concern.

20 ADMIN. LAW JUDGE BARATTA: Could I, I'd just
21 like to interrupt you. I just want to ask a quick question
22 because we had some discussion about this, on the point of,
23 if you exceed, if your calculations show that you are going
24 to exceed it and, hypothetically at this point, okay, that
25 you do some new calculations and you're still going to

1 exceed it at some point, be it 2014, 2016 or whatever.

2 And you then had to come in under the rule to
3 request continued operation. Would that result in a
4 modification to your tech specs and as a result a, you'd
5 have to apply for a license modification?

6 And I'd like to ask that both of NMC and also
7 the staff.

8 ADMIN. LAW JUDGE YOUNG: And I guess going
9 along with that, if it would then that would mean that
10 there would be the right to a hearing because you would be
11 essentially proposing to amend your license.

12 ADMIN. LAW JUDGE BARATTA: That was my next
13 question to.

14 ADMIN. LAW JUDGE YOUNG: Is that a situation?

15 MR. LEWIS: Yes.

16 ADMIN. LAW JUDGE YOUNG: Is that the situation?

17 MR. LEWIS: I would like to, I'll give you what
18 I believe the answer is but I would like to consult later
19 on and if I've said something wrong I will come back.

20 But I believe that that revision would change
21 your pressure temperature curves that I think are part of
22 your tech specs and as a result, I believe there would be a
23 need for a license amendment.

24 ADMIN. LAW JUDGE YOUNG: Just. Did we want to
25 take a break at this point and see if the staff agrees with

1 that? I mean, not take a break but switch over to the
2 staff at this time.

3 ADMIN. LAW JUDGE BARATTA: If you don't mind.

4 ADMIN. LAW JUDGE YOUNG: Yes.

5 MS. UTTAL: I'm trying to find out right now.

6 ADMIN. LAW JUDGE YOUNG: Okay.

7 MS. UTTAL: I don't know if we have an --

8 MR. LEWIS: Shall I proceed or?

9 ADMIN. LAW JUDGE YOUNG: If we can get an
10 answer from the staff quickly, otherwise --

11 ADMIN. LAW JUDGE BARATTA: Or we could come
12 back to this in two minutes, or whatever you'd like to do.

13 MS. UTTAL: It will take us a couple of
14 minutes.

15 ADMIN. LAW JUDGE YOUNG: Okay. We'll, do you
16 want to take a break?

17 ADMIN. LAW JUDGE BARATTA: Why don't we give
18 you about five minutes and you can consult and then we'll
19 get the answer to that. Okay? Is that all right?

20 MR. LODGE: May I just for record purposes do
21 something to get something accomplished here for you. Mr.
22 Trikouros the memo I was referring to is Exhibit 1-G in the
23 appendix of evidence that we provided along with our reply
24 to the motions to, the combined reply to the motions to
25 strike.

1 It's a memo from Stephanie Coffin to Stephen
2 Hoffman who are NRC staff people, dated 11/24/2004.

3 ADMIN. LAW JUDGE TRIKOUROS: Can, I'm sorry,
4 can, I'm having trouble. Could you --

5 MR. LODGE: I'm very sorry. My apologies.
6 It's Exhibit 1-G, a memorandum, an internal NRC memorandum
7 from Stephanie Coffin, C-o-f-f-i-n to Stephen Hoffman dated
8 November 24th of 2004.

9 ADMIN. LAW JUDGE YOUNG: All right. Let's take
10 a five minute break. Looks like we might be able to get
11 that information.

12 (Off the record.)

13 ADMIN. LAW JUDGE YOUNG: Yes, thank you. Okay.
14 Let's get started.

15 MS. UTTAL: There's no direct requirement in
16 that, in 50.66 but if you --

17 ADMIN. LAW JUDGE YOUNG: In, I'm sorry?

18 MS. UTTAL: In 50.66.

19 ADMIN. LAW JUDGE YOUNG: 61?

20 MS. UTTAL: 61, excuse me. But if you have to
21 change the analysis and change the dates, this would
22 require several things.

23 You'd probably have to change the power
24 distribution limits which would affect the safety limits.
25 You would have to change the level of power, the license

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1 condition that delineates the power level that the plant
2 operates on and if there are any new material property, any
3 new material property data, then you would have to do a
4 tech spec change for all those things.

5 So that it is likely that a license amendment
6 or several license amendments would be required on that
7 data.

8 ADMIN. LAW JUDGE YOUNG: Which would involve a
9 notice and opportunity to request a hearing on those at
10 that point, right?

11 MS. UTTAL: Yes.

12 ADMIN. LAW JUDGE YOUNG: Okay.

13 MR. LEWIS: And Judge, I'm, I did ask and
14 consult my understanding what I said was correct about
15 changing the pressure temperature groups and the license
16 which are based on RDNDT.

17 ADMIN. LAW JUDGE YOUNG: And so you're saying
18 that that would involve --

19 MR. LEWIS: There would be a license amendment
20 also.

21 ADMIN. LAW JUDGE YOUNG: Right. Okay. Before
22 you continue on, let me just ask another question for you to
23 put in the mix.

24 Basically what, well let me back up. Clearly
25 the no regulation can be challenged in an adjudication

1 proceeding, there are other avenues to petition for rule-
2 making and so forth.

3 And clearly during, during the time that a
4 plant is licensed, if they follow 50.61, then that takes
5 care of the issues addressed under 50.61 during that period
6 of licenseship.

7 What's at issue in this proceeding is whether a
8 new, a renewed license should be issued for an additional
9 period of licenseship for 20 years.

10 And as I understand at least part of the
11 argument of the petitioner's, what you're proposing in
12 saying that you will, in 2011 I think it would be, provide
13 information to the NRC as to whether you'll be annealing or
14 whether you are going to be doing a recalculation which I
15 think everyone now agrees would involve a, the necessity
16 for a license amendment and a new hearing.

17 But apart from that, what you're saying is that
18 at that point, in 2011, you would provide that information
19 to the NRC as to what you propose to do in 2014 and that's
20 been characterized as a plan to make a plan.

21 And the argument is that the plan to make a
22 plan would not demonstrate that the effects of aging would
23 be adequately managed throughout the term of the renewed
24 license.

25 Which is sort of a different issue than whether

1 you will be complying with 50.61 by not providing that
2 information until 2011.

3 That issue is whether, assuming the
4 contention's admitted, the licensed, the renewed license
5 that, which you seek for 20 years should be granted based
6 on your demonstration that the effects of aging will be
7 managed during, throughout the entire term.

8 And from what I understand you saying, you're
9 not sure what information you'll be providing in 2011. And
10 so it's really not known what will take place after,
11 starting in 2014.

12 Can you address that argument? And I think it
13 also gets into the, to whether that's a sufficient action,
14 identification of an action that will be taken, that has
15 been or will be taken.

16 And as I understand your argument, you're
17 saying that the action that will be taken is that you will
18 tell the NRC in 2011 what you intend to do in 2014?

19 MR. LEWIS: That's correct. I would take a
20 little issue with saying this is just a plan to make a
21 plan. I mean, this is a program and we've described the
22 steps that we would do.

23 What we have not stated is what would be the
24 technical solution in 2014. What we have described is, the
25 reasonably available options that we could pursue and I

1 believe that's all that was required by the rules.

2 ADMIN. LAW JUDGE YOUNG: It's all that's
3 required by 50.61.

4 MR. LEWIS: I believe it's all --

5 ADMIN. LAW JUDGE YOUNG: But in terms of --

6 MR. LEWIS: -- that's required by --

7 ADMIN. LAW JUDGE YOUNG: -- in terms of 54.21
8 and 54.29, demonstrating that the effects of aging will be
9 adequately managed during the extended period of operation.
10 In other words, during the whole 20 years that you're
11 sinking.

12 That I think raises a different question which
13 is not quite so simply resolved by saying we will comply
14 with 50.61 by telling the NRC at that point which of these
15 two options we we're saying at this point we might take.

16 MR. LEWIS: I understand your question, Judge
17 on, I would say several things. First I would refer you
18 back to the May 27th, 2004 memorandum from the EDO to the
19 Commissioners.

20 ADMIN. LAW JUDGE YOUNG: Do you have a copy of
21 that with you?

22 MR. LEWIS: I do have a copy of it with me.
23 Can I find it at a --

24 ADMIN. LAW JUDGE YOUNG: Sure.

25 MR. LEWIS: -- on break?

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1 ADMIN. LAW JUDGE YOUNG: Sure.

2 MR. LEWIS: In describing what would be an
3 adequate program under 50.21(c)3, that memorandum
4 specifically refers to the fact that these reports are only
5 required to be submitted three years before the screening
6 criterion is exceeded.

7 Second one is an adequate program I think
8 should be judged in, you know, what protects the public
9 health and safety. Here you have a hard limit screening
10 criterion that cannot be exceeded without a Commission
11 approval, so there really is no safety issue.

12 And there's a requirement for a determination
13 later that these, whatever the technical solution is has to
14 be effective.

15 So this is a program that ensures safety. And
16 if it's a program that assures safety, I would submit to
17 you that it is an adequate program under 54.21(c)1.III.

18 ADMIN. LAW JUDGE YOUNG: Well, so are you
19 saying if you get to 2011 and you, for example, may have
20 decided that you're not going to do the annealing, you
21 proposing as an alternative that you'll do a recalculation
22 and, and am I correct in assuming as part of that, that if
23 you cannot show that you can extend that date to X date
24 that you will no longer operate after X date?

25 MR. LEWIS: You're asking me what is the safety

1 analysis that would be submitted in 2011? If we could
2 extend the screening, not extend that screening criterion,
3 if we could extend our RTPTS by further flux reduction
4 measures or modifications or better defined methods of
5 calculating fluids, you know, those are all permissible and
6 they extend the, when the screening criterion is exceeded.

7 The analysis that is permitted by 50.61, I
8 believe is more in the nature of a fracture or -- analysis
9 that shows there's a lot of conservatism in the pressurized
10 thermal shock rule and you could come in with analysis that
11 showed that in fact that your reference temperature
12 measured by other methods is better than that is predicted
13 by the PTS rule.

14 Or you could do other types of analyses to show
15 that even exceeding this, the screening criterion that
16 there's no safety issue.

17 ADMIN. LAW JUDGE YOUNG: Well, but the issue
18 I'm trying to get you to address is, that would either show
19 that you could continue operations safely or theoretically
20 it might show that you could not.

21 MR. LEWIS: And --

22 ADMIN. LAW JUDGE YOUNG: In which case you
23 would agree to shut down, basically.

24 MR. LEWIS: Not just agree to shut down, we
25 would not be permitted to operate.

1 ADMIN. LAW JUDGE YOUNG: Right. Okay.

2 MR. LEWIS: We could not operate past the
3 screening criterion without NRC approval. So it's --

4 ADMIN. LAW JUDGE YOUNG: Right. Okay. So,
5 however we want to put it, you would, you could not break
6 past that point. So I guess the point I'm trying to get
7 you to address is, at this time, you don't know what that
8 calculation would show.

9 You're saying, basically you're saying you have
10 a program but the part of the program that's at issue in
11 this contention is that part in which you say in 2011 we'll
12 tell the NRC we'll provide information to the NRC whether
13 we will do the annealing or whether we'll do this
14 calculation.

15 And at this point, you don't know whether any
16 calculation that you would do, should you go in that route,
17 would take you throughout the 20 year term, is that
18 correct?

19 MR. LEWIS: I believe that's correct. I think
20 there's a lot of confidence that these options are
21 available. I think there's --

22 ADMIN. LAW JUDGE YOUNG: Well I'm not --

23 MR. LEWIS: -- annealing is possible.
24 Annealing has been demonstrated in other countries. It's
25 been demonstrated in Russia and Eastern Europe.

1 ADMIN. LAW JUDGE YOUNG: Right. But what I'm
2 trying to get you to address is the sort of essence of what
3 the petitioners are saying in saying that it's a plan to
4 make a plan. That you don't really know at this point what
5 will occur after 2014 and yet you're asking for a license
6 for 20 years, starting in 2011.

7 And so I guess the question of whether your
8 intent to provide the information to the NRC in 2011, how
9 that really does jibe with the requirement that you have to
10 identify actions. I don't know. I mean, in a, the
11 argument that action implies more than later telling the
12 NRC what you will do and managing the effects of aging
13 during the extended, period of extended operation.

14 Now I understand the memo that you referred to,
15 which I haven't read, obviously would be something that we
16 could refer to for guidance and that would be entitled to
17 some differences as, just as any policy type statement or a
18 similar document would be entitled to.

19 But apart from that, just in the normal, plain
20 English understanding of the terms, managing the effects of
21 aging during the, during the period of extended operation I
22 think suggests something more than saying how you would,
23 what, that you will later give the NRC information on what
24 you will do three years later than that.

25 And when that's, but that's year one and year

1 three of a proposed 20 year term of operation. I mean, I
2 think you can see what I'm saying. That, I think the
3 normal understanding of those words implies more than
4 telling the NRC something later, doesn't it?

5 MR. LEWIS: No, I would respectfully disagree.
6 I believe that actions are one of the measures and steps
7 that you're going to take to make sure that this aging
8 mechanism, embrittlement is being managed in a way that
9 protects the public health and safety.

10 And we are saying that we will continue to
11 apply the screening criterion and we will no operate past
12 the screening criterion without meeting the submittals and
13 getting NRC approvals. And these submittals, you know, do
14 address options that are permissible under the, NRC
15 regulations and are reasonably available.

16 ADMIN. LAW JUDGE YOUNG: But isn't there
17 reasonable interpretation of the rules that says you need
18 to say at this point what you will do to ensure you can
19 operated the entire 20 years?

20 MR. LEWIS: I don't think it would be a
21 reasonable interpretation because it would be saying that
22 the current regulations which assure a public health and
23 safety in the current terms somehow aren't good enough for
24 the renewal term when it's the same effect that's being
25 managed in both.

1 If the, if this structure in 50.61 and 50.66
2 which is the annealing rule, is, protects public health and
3 safety in the current term as it does, as you must accept
4 you know, by, you know, accepting the NRC regulations.

5 There's also an acceptable approach and program
6 to implement during the period of extended operations.

7 ADMIN. LAW JUDGE YOUNG: I think you're, in
8 terms of 50.61 and following that, during a period when
9 you're already licensed, there's no question you'd follow
10 that.

11 But what I'm trying to get you to look at is
12 not just following 50.61 during a period when you're
13 licensed but the different question of the determination of
14 whether you should be granted an additional 20 years in a
15 renewed license when the standards for that suggest perhaps
16 something more substantive than saying we will say later
17 how we're going to handle something.

18 And I guess the other concern I have is, we're
19 talking about a context that's probably, if not the,
20 certainly an extremely significant aging issue which the
21 Commission has over and over said is the very type of issue
22 that licensed renewals are to address.

23 Back in 1991, the Commission talked about the
24 types of measures that needed to be demonstrated with
25 regard to pressurized thermal shock, for example.

1 And talked about situations needing to be
2 analyzed for the period of extended operation as a basis
3 for determining any additional aging management actions
4 that may be required for license renewal.

5 I mean, in Turkey Point the Commission talks
6 about detailed, let's see if I can find this, detailed, I
7 can't find the exact language it was talking about, but
8 detailed plans for how the effects of aging are going to be
9 managed.

10 Now, the Commission did, in a footnote in
11 Turkey Point, talk about some aging related issues being
12 adequately dealt with by regulatory processes. Which
13 therefore might not need to be subject to further review
14 during the license renewal proceeding.

15 But the example they gave in footnote two were
16 structures and components were that already must be
17 replaced at mandated specified time periods. And isn't
18 pressurized thermal shock relating to the reactor vessel of
19 a fundamentally different sort than the example given by
20 the Commission at that point?

21 I mean, isn't this the exact type of issue that
22 is within the scope of licensed renewal?

23 MR. LEWIS: Well I agree that embrittlement's
24 within the scope of license renewal. I simply disagree
25 that in order to establish an acceptable program that

1 manages aging a way that protects public health and safety
2 that it's necessary to provide a technical solution out of
3 several available options at this juncture.

4 The regulations allow you to submit those
5 programs and proposals three years before you even reach
6 the screening criterion because, quite frankly that's the
7 more appropriate time to do it.

8 You have better data.

9 ADMIN. LAW JUDGE YOUNG: Right.

10 MR. LEWIS: You're much more able to determine
11 what is, I --

12 ADMIN. LAW JUDGE YOUNG: But wouldn't you need
13 to show us, I mean if your analysis is correct, pressurized
14 thermal shock and embrittlement are aging issues that are
15 within the scope of review in a license renewal proceeding.

16 And yet, you can address them by saying we
17 will tell you what we're going to do when the time comes,
18 namely three years before we exceed the PTS criterion, if
19 I'm saying that right.

20 I mean would, doesn't that sort of give with
21 one hand take away with another?

22 MR. LEWIS: Well, Judge, it is more than that.
23 I mean there is a program of surveillance and, you know,
24 calculating when the screening criterion will be exceeded
25 and --

1 ADMIN. LAW JUDGE YOUNG: Right.

2 MR. LEWIS: -- implement flux reduction
3 measures. I mean this is --

4 ADMIN. LAW JUDGE YOUNG: But --

5 MR. LEWIS: -- parcel of the whole program.

6 ADMIN. LAW JUDGE YOUNG: But as to a situation
7 which you said was not unique, namely that a plant would
8 reach that point of exceeding the criterion, what you, what
9 I hear you saying is that even though aging of the reactor
10 pressure vessel is a legitimate issue within the scope of
11 license renewal that as to that period, starting at the
12 point that the criterion is exceeded, that that period can
13 adequately be addressed by an applicant by saying we will
14 follow 50.61.

15 And three years before that date we'll deal
16 with it by telling the NRC what we're going do to at that
17 point. And I'm not following how we --

18 MR. LEWIS: Judge?

19 ADMIN. LAW JUDGE YOUNG: -- reach any other
20 result?

21 MR. LEWIS: Judge, I would say this is not
22 unique and it's not the only example of how regulatory
23 established programs manage aging, environmental
24 qualification presents a very similar example. There is --

25 ADMIN. LAW JUDGE YOUNG: But let's stay on

1 this --

2 MR. LEWIS: I could --

3 ADMIN. LAW JUDGE YOUNG: Let's, before you, no,
4 before you get into other examples, let's stay on this one.
5 That, isn't, wouldn't it be possible for any plant to do
6 exactly what you're doing and argue that that takes it out
7 what could be an admissible contention on the issue of
8 aging of the reactor vessel?

9 I mean, how else, what other result could there
10 be on this particular issue? This particular issue of
11 aging?

12 MR. LEWIS: What I would say is a very
13 important factor in this is that the regulations don't
14 permit you to operate exceeding the screening criterion.

15 So this isn't a matter of just saying trust us,
16 we'll do something right and it never gets looked at again.

17 ADMIN. LAW JUDGE YOUNG: But if it doesn't --

18 MR. LEWIS: This is a hard limit that prevents
19 operation past the screening criterion without NRC approval
20 and therefore prohibits you from ever being in a situation
21 that --

22 ADMIN. LAW JUDGE YOUNG: But I don't, I don't
23 think --

24 MR. LEWIS: -- endangers the public health and
25 safety.

1 ADMIN. LAW JUDGE YOUNG: I don't think you're
2 answering my question. My question is this, the Commission
3 has said that these types of aging issues are the only
4 thing that are relevant in a license renewal proceeding.

5 And aging of the reactor vessel is clearly a
6 significant aging issue that's within the scope and you
7 agree with that. But what you seem to be saying is that,
8 what you're saying with regard to the Palisades plant, that
9 your identification of the action that will be taken to
10 manage the effects of aging during the period of extended
11 operation, in other words, during the entire 20 years, is
12 that three years before you exceed the criterion in 2011,
13 you'll tell the NRC which course of action you intend to
14 follow.

15 And at that point, you'll provide the
16 calculation, if that's the road you intend to follow.

17 What I'm not seeing is how any contention could
18 ever be admitted on aging of the reactor vessel and
19 pressurized thermal shock if all an applicant has to do is
20 say we will follow 50.61 in the future. That's what I'm
21 not seeing because it seems like you let it in but as soon
22 as you let it in it's out by what you've identified as
23 something that should be considered a sufficient action.

24 And what the allegation in this contention is,
25 and I'm just speaking of the original contention, is that

1 the application is not complete because it doesn't address
2 the continuing issue of embrittlement.

3 And that this plant has been identified as
4 prone to early embrittlement. I'm not seeing how any
5 contention could ever come in if a licensee simply says
6 we're going to comply with 50.61 by providing information
7 three years before we are now projected to meet the, or
8 exceed the PTS criterion.

9 So if you could address that issue, I would
10 appreciate it. Thanks.

11 MR. LEWIS: The reports that are submitted
12 three years before the screening criterion are, is exceeded
13 is one part of the program. And there are other aspects of
14 the program --

15 ADMIN. LAW JUDGE YOUNG: Right. But those,
16 we're just -- it's pass --

17 MR. LEWIS: I'm saying you can have contentions
18 that address them, they haven't been challenged in this
19 proceeding.

20 But, you know, there are aspects, other aspect
21 of the program that can be challenged with a proper basis.

22 The only issue is when do these additional
23 reports have to come in. And what I am saying is those,
24 the rules say that those reports only have to come in three
25 years before and that is sufficient to protect the public

1 health and safety --

2 ADMIN. LAW JUDGE YOUNG: Assuming you've
3 already got a license.

4 MR. LEWIS: -- because you can't operate, you
5 know, beyond the screening criterion without approval.

6 ADMIN. LAW JUDGE YOUNG: Well it's, but that's
7 assuming you already have a license. If you've already got
8 the license, clearly all you have to do is follow 50.61.

9 And all you have to do under that, after you've
10 done the surveillance and fluence reduction and all the
11 other things that you can do, when you get to the point
12 where you know you're going to exceed or the current
13 calculations say you're going to exceed the criterion on X
14 date.

15 Then in that situation, you're saying all you
16 have to do in order to show that you should be granted a
17 new license for 20 years, even though those 20 years might
18 go well beyond the date at which you are projected to
19 exceed the criterion, that all you have to do it say we
20 will provide information to the NRC three years in advance
21 of our projected date.

22 MR. LEWIS: I am saying that a contention that
23 asserts that these, that you have to make a demonstration
24 now on how you would address the situation is a challenge
25 to the rule, it is not a permissible contention in this

1 proceeding.

2 ADMIN. LAW JUDGE YOUNG: But why would you
3 need to assume that the things that you would need to
4 demonstrate, at this point let's say, taking the
5 petitioner's argument, that the things that you would need
6 to demonstrate at this point to show that you will
7 adequately manage the effects of aging would be exactly the
8 same type of information or the exact same extent of
9 information, let's say that you would need to provide the
10 NRC three years in advance.

11 I mean, couldn't there be, wouldn't, couldn't
12 there be an argument made that even though you might not
13 provide the complete calculation that you would provide
14 later with benefit of state of the art information and so
15 forth, that you would at least need to show something to
16 demonstrate that you actually will manage the effects of
17 aging during the entire period of extended operation,
18 rather than just saying, well, if we don't, then we won't
19 operate anymore?

20 But then the question arises then why are you
21 asking for a 20 year license now and saying that the only
22 demonstration you have to provide is we'll tell the NRC in,
23 three years before we exceed the criterion?

24 MR. LEWIS: Because with respect to this
25 pressurized thermal shock issue and how this matters, there

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1 really is not a difference between the license renewal term
2 and the present term. And the current term embodies those
3 measures and actions that are necessary to protect the
4 public health and safety and -- on basis to distinguish the
5 license renewal term.

6 I believe that the provisions of the current
7 rule, you know are indicative of what protects the public
8 health and safety and must be accepted as sufficient.

9 ADMIN. LAW JUDGE YOUNG: Well then you seem to
10 be agreeing with the staff that this is outside the scope
11 of license renewal because this is one of those things that
12 falls under footnote two?

13 MR. LEWIS: No. Again, I think there are, as I
14 said there are a number of other aspects of the
15 embrittlement issue that are addressed by different
16 programmatic steps, they just haven't been challenged in
17 this case.

18 ADMIN. LAW JUDGE YOUNG: Right. But --

19 MR. LEWIS: But I'm saying, the portion I'm
20 saying is not a legitimate issue is the assertion that you
21 have to submit an annealing plan now, nine years before the
22 screening criterion is exceeded.

23 ADMIN. LAW JUDGE YOUNG: Well, but that's not
24 the question.

25 MR. LEWIS: And commit to annealing now.

1 ADMIN. LAW JUDGE YOUNG: But that's not what,
2 that's not the situation I posed to you to consider which
3 is that you might not need to submit everything that you
4 would need to submit three years prior to exceeding the
5 criterion, but that you would need to demonstrate something
6 more than just saying you're going to comply with the rule.

7 Now, you raise another point and that is you're
8 saying other parts, other aspects of embrittlement could be
9 challenged. But really the most significant one, isn't it,
10 the point at which you are expected to exceed the
11 criterion? That's the most critical point in the --

12 MR. LEWIS: I'm going to accept that it's the
13 most critical because you can't operate past that term, as
14 far as protection of the public health and safety --

15 ADMIN. LAW JUDGE YOUNG: Doesn't that make it
16 the most critical?

17 MR. LEWIS: -- that's certainly, without --

18 ADMIN. LAW JUDGE YOUNG: The fact that you
19 can't operate past that time, doesn't that make it the most
20 critical?

21 MR. LEWIS: What it means is that in fact there
22 is no safety issue because you can't operate that, past
23 that limit and before you can continue to operate, you will
24 have to submit to the NRC a solution which will be approved
25 at that time.

1 ADMIN. LAW JUDGE BARATTA: All right. Let me
2 pose a slightly different, came at it from a slightly
3 different aspect.

4 Suppose, hypothetically that you own a plant
5 that based on your calculations and such is good for
6 another 50 years and you're coming in for a 20 year renewal
7 and that you won't, you calculate you won't exceed the PTS
8 criteria and you say that and you say that you'll just
9 comply with 50.61.

10 Couldn't an intervenor in that case use the
11 same argument that they're using to challenge that
12 statement, that you don't have a specific plan to deal with
13 it? If we accept this that an action to comply with the
14 regulations at some future date is not an action?

15 MR. LEWIS: I think the intervenor, if you have
16 an analysis that shows that you won't meet the screening
17 criterion for 50 years, the intervenor could challenge that
18 analysis. They can only challenge the analysis on grounds
19 that it doesn't comply with the NRC regulations that govern
20 how the analysis is done.

21 For example, the method of calculating what the
22 reference temperature of PTS is, is established in an
23 equation and it provides a number of parameters and you
24 have to determine the chemistry factor of the samples as
25 one of the inputs to that, the calculation.

1 A contention that says you've got to do
2 something else beyond what's in that formula would
3 challenge the rules.

4 And for example, the intervenors in their reply
5 refer to uncertainties in the flaw distribution on the
6 vessel and they refer to uncertainty in the frequency of
7 over-cooling events.

8 Those assertions are irrelevant because the
9 current PTS --

10 ADMIN. LAW JUDGE YOUNG: Irrelevant or
11 relevant?

12 MR. LEWIS: Irrelevant.

13 ADMIN. LAW JUDGE YOUNG: Thanks.

14 MR. LEWIS: Because the current PTS rule and
15 the calculation assumes the worst case flaw and assumes
16 that over-pressure event, over-cooling event will occur and
17 gives this equation which kind of establishes the screening
18 criteria, which if you're below, you're safe.

19 So those kind of assertions would not be
20 legitimate contentions. But one that says you do have the
21 wrong chemistry factor for some specific reason, you know,
22 would be a good contention. Or one that says you've got
23 the wrong fluence estimated with a real technical basis
24 would be a good contention.

25 So yes, there are ways that, simply saying, you

1 know, we're going to follow the regulations on estimating
2 when the screening criterion will be exceeded is not immune
3 from challenge.

4 ADMIN. LAW JUDGE YOUNG: But what you're
5 talking about and what you say is not unique. You don't
6 know that where during 20 year periods all the various
7 plants would fall. But what you are saying is not unique
8 is that plants would exceed the PTS criterion during the
9 term.

10 And in your situation, it's three years into
11 the term. And what you're saying is that with regard to
12 that situation, which is sort of the last, the last thing
13 that comes in a succession of events, you're saying that,
14 saying that the company will notify, provide information to
15 the NRC down the road is sufficient.

16 MR. LEWIS: When it's coupled with the
17 requirement that you cannot operate with the screening
18 criterion being exceeded, you know, without an approval of
19 these measures by the Commission, yes, that's sufficiently
20 protective of the public health and safety.

21 ADMIN. LAW JUDGE YOUNG: So I guess there could
22 be a couple of different ways of looking at this. The
23 license renewal rule says that the license can be issued up
24 to the full term, if the Commission finds et cetera, et
25 cetera.

1 So you could just say, well, right now we can
2 only show that we're going to operate up to, up through, up
3 to 2014, sometime in 2014. So we want a renewed license
4 for that period.

5 Alternatively, I think what I'd heard earlier
6 is that if you reach, if at the point of having to provide
7 that information, 2011 in your case, you decide that
8 instead of annealing you're going to do a recalculation
9 and, well, you're going to do a recalculation.

10 What you're saying is at that point there would
11 be another right to a hearing to challenge how, to
12 challenge your calculation at that point? If it extended
13 the date further on down the line?

14 MR. LEWIS: I think it depends on what you mean
15 by a recalculation.

16 ADMIN. LAW JUDGE YOUNG: Well.

17 MR. LEWIS: The reference temperature PTS is
18 determined under the rule by a very specific formula and
19 it's based on, you know, specific data entries and one of
20 them is fluence.

21 ADMIN. LAW JUDGE YOUNG: Well I mean doing a
22 calculation --

23 MR. LEWIS: If we --

24 ADMIN. LAW JUDGE YOUNG: -- with new
25 information.

1 MR. LEWIS: Yes. But for example, we could, if
2 it were possible to further reduce fluence, you know, we
3 could extend the screening criterion, that wouldn't be a
4 license amendment, that would simply be operating under the
5 current rule.

6 The, what would require approval is the
7 analysis that would be required if you were going to exceed
8 the screening criterion, if your reference temperature for
9 -- transition is, at any point, in excess of the screening
10 criterion.

11 ADMIN. LAW JUDGE YOUNG: So what you're saying
12 is if you discover some additional means of reducing
13 fluence that you don't know about now, and then you provide
14 that information in 2011, such that that would extend the
15 date, the 2014 date to a later date, then there wouldn't
16 need to be a hearing.

17 If you couldn't further reduce fluence, that
18 would involve the types of power distribution limits, power
19 level of operation, there, the information that we talked
20 about earlier, that those things would involve a licensed
21 amendment such that there would be a right to a hearing at
22 that point, right?

23 MR. LEWIS: Yes. If you submit analysis that
24 shows that it's safe to operate even though the screening
25 criterion is exceeded.

1 ADMIN. LAW JUDGE YOUNG: So are there any other
2 things that would fall within the same categories, further
3 reducing the fluence, such that there would not be the
4 right to a hearing at that point?

5 MR. LEWIS: The reference temperature of
6 pressurized thermal shock is determined by an equation in
7 50.61(c), 50.61(c) and the, it is a factor of the
8 unirradiated reference temperature for -- temperature of
9 the material, the chemistry factor of the material and the
10 fluence that material has received.

11 Any one of those three inputs, if there was new
12 information, you know, could affect when the screening
13 criterion will be exceeded.

14 ADMIN. LAW JUDGE YOUNG: The fluence in the
15 chemistry and what was the first one?

16 MR. LEWIS: The initial unirradiated reference
17 temperature for the material.

18 ADMIN. LAW JUDGE YOUNG: Could that change?
19 Doesn't sound like it could but maybe I'm, I don't --

20 MR. LEWIS: I don't know how it would --

21 ADMIN. LAW JUDGE YOUNG: Okay.

22 MR. LEWIS: I'm sorry. You're asking now a
23 technical question that I don't know the answer to.

24 ADMIN. LAW JUDGE YOUNG: You and me both. I
25 guess what I'm getting at is, if we're talking about

1 changes in the chemistry or further reducing the fluence,
2 that would seem to me, especially if there's no right to a
3 hearing on that later, that would seem to me to be the type
4 of thing that, while you might not provide information in
5 the level of detail that 50.61 would require you provide
6 three years prior to the exceeding date, 2014 in this case,
7 that you should be able to provide some information on
8 that, at this point, sufficient to demonstrate that you
9 will adequately manage the effects of aging during the
10 period of extended operation, more than just saying that
11 we're going to tell the NRC that information three years
12 before that date.

13 Does that make sense? Doesn't that make sense?

14 MR. LEWIS: No. And I'm not sure that's even
15 possible. We have, we are, we applied the equation in
16 50.61(c) to determine what the reference temperature --
17 transition is.

18 ADMIN. LAW JUDGE YOUNG: Right. But you said
19 you could, you could further reduce fluence, why wouldn't
20 you be able to have --

21 MR. LEWIS: I'm talking, you know --

22 ADMIN. LAW JUDGE YOUNG: -- some knowledge of
23 that --

24 MR. LEWIS: -- theoretically, I mean, you're
25 asking is there anything you can do. None of those thing

1 we've identified would be reasonably practical.

2 ADMIN. LAW JUDGE YOUNG: Okay.

3 MR. LEWIS: I mean, quite frankly I think you
4 would deal before you would try and do so.

5 ADMIN. LAW JUDGE BARATTA: Yes. I think that's
6 what you application actually says?

7 MR. LEWIS: Yes, it does.

8 ADMIN. LAW JUDGE BARATTA: Because, does it?
9 Because that's the very first paragraph --

10 MR. LEWIS: Yes.

11 ADMIN. LAW JUDGE BARATTA: -- in the, in that.

12 MR. LEWIS: And I was just responding earlier
13 to --

14 ADMIN. LAW JUDGE BARATTA: Yes.

15 MR. LEWIS: -- when the Judge said could you,
16 you know, could you extend the --

17 ADMIN. LAW JUDGE YOUNG: Okay.

18 MR. LEWIS: -- calculations. I mean you can't
19 buy Herculean efforts. But there's no proposal to.

20 ADMIN. LAW JUDGE YOUNG: Okay. So basically --

21 MR. LEWIS: And we have a calculation and it's
22 out to 2014 and we said that is what it is.

23 ADMIN. LAW JUDGE YOUNG: So basically what
24 you're saying is that it's, it's reasonable to assume that
25 if you decided to do anything other than anneal that that

1 would involve changes of the sort that would require the
2 right to a hearing at that point, is that right?

3 MR. LEWIS: I believe that's right. And I
4 think what I was reacting to was your earlier statement
5 that one of the options is simply to recalculate the RTPTS.

6 ADMIN. LAW JUDGE YOUNG: Okay.

7 MR. LEWIS: With the safety analysis that's
8 required in 50.61(b)4 I believe, is not just a
9 recalculation of the RTPTS, it's an analysis that says you
10 can continue to operate even though you're exceeding the
11 screening criterion for the following reasons.

12 And one might be a probabilistic fracture
13 mechanics analysis that says it's still safe. It's not
14 just, you know, I've just sharpened my pencil and I've
15 added, you know, a couple more years to my calculation.

16 ADMIN. LAW JUDGE YOUNG: Okay. I guess later I
17 want to hear more from the petitioners on that as to why,
18 if there would be a right to a hearing at that point, how
19 that impacts your contention.

20 Unless you want to say something quickly,
21 briefly right now?

22 MR. LODGE: A hearing --

23 ADMIN. LAW JUDGE YOUNG: I mean that may --

24 MR. LODGE: -- a hearing in 2014?

25 ADMIN. LAW JUDGE YOUNG: Well, I guess if

1 you're proposing to, the information would need to be
2 provided in 2011.

3 MR. LODGE: Right.

4 ADMIN. LAW JUDGE YOUNG: And if they're
5 proposing to do anything other than anneal, then that would
6 involve the proposal to amend the license such that there
7 would be a right to a hearing at that point. Am I right,
8 Ms. Uttal?

9 MS. UTTAL: It depends on what the new analyses
10 touches upon.

11 ADMIN. LAW JUDGE YOUNG: But based on --

12 MS. UTTAL: Whether it's change --

13 ADMIN. LAW JUDGE YOUNG: -- what Mr. Lewis just
14 said, it sounds as though --

15 ADMIN. LAW JUDGE BARATTA: It's highly unlikely
16 that it wouldn't require.

17 ADMIN. LAW JUDGE YOUNG: Right.

18 MS. UTTAL: Okay. But, of course I have no
19 technical knowledge --

20 ADMIN. LAW JUDGE BARATTA: I mean, we can't say
21 for certain, but.

22 MS. UTTAL: -- of anything. Yes. But the, the
23 aspects that I spoke about before, if any of those are
24 changed then there would be a license amendment required.

25 ADMIN. LAW JUDGE YOUNG: Okay. And you may

1 want to consult on that. But I'm just wondering what that
2 does to the, this contention and to your interests in the
3 subject matter of this contention, based on what you said
4 earlier.

5 MR. LODGE: We're prepared to respond now.

6 ADMIN. LAW JUDGE YOUNG: Okay. Go ahead. I
7 mean, do you mind, Mr. Lewis?

8 MR. LEWIS: No. I do have other points in the
9 argument I want to come back to later.

10 ADMIN. LAW JUDGE YOUNG: Sure. We do want to
11 come back to you.

12 MR. LODGE: Right.

13 ADMIN. LAW JUDGE YOUNG: But I just thought if
14 we'd gotten to a point that might provide some resolution,
15 maybe we could just, go ahead.

16 MR. LODGE: The regulation 50.61(b) subsection
17 6 only requires that the utility apply to, if they're about
18 to exceed the criterion, that they essentially communicate
19 with the director of NRR, not, in other words, it's a sub-
20 licensing, it's less than license modification.

21 I understand that the counter to that is, well,
22 there will be some effects for the licensing parameters.
23 My concern is, number one, if this panel finds that this is
24 not currently a -- issue, isn't there a -- problem for
25 intervenors in 2011 or '14 or '16 or whenever to try to get

1 around.

2 ADMIN. LAW JUDGE YOUNG: You mean that they
3 wouldn't have the right to a hearing then based on --

4 MR. LODGE: They wouldn't be able to, they
5 wouldn't be able to raise the type of challenge to the
6 adequacy of the basis at that point. They wouldn't be able
7 to --

8 ADMIN. LAW JUDGE YOUNG: The adequacy of the?

9 MR. LODGE: They wouldn't be able to attack the
10 lack of hard engineering or scientific knowledge about the
11 state of embrittlement.

12 ADMIN. LAW JUDGE YOUNG: Well I guess, when you
13 raise that, I mean, the problem you've got is that you
14 didn't do that in the initial contention. You provided
15 additional information subsequent to that.

16 And it used to be that we always allowed
17 amendments to petitions to flush out contentions. But
18 we're operating under new rules now which you understand
19 and obviously the whole basis of our integrity as a board
20 is that we rule based on the law and regulations, not on
21 our personal viewpoints or influence or whatever.

22 And so under the current rules, the Commission
23 has said that you have to submit the contentions full blown
24 at the outset and that the only thing that you can include
25 in a reply is information that's specifically focused on

1 issues raised in the answer.

2 So I'm not sure that your statement about what
3 petitioners can or cannot do at this point --

4 MR. LODGE: At a future point.

5 ADMIN. LAW JUDGE YOUNG: With -- at a future
6 point based on what's happening now with regard to data and
7 so forth would be affected at all. I mean it, because you,
8 because in your initial contention you didn't make
9 reference to those. Did not make reference to those.

10 And it, you know, you don't have to, you don't
11 have to give an answer right away. And if it's anything
12 other than a quick answer, maybe we should just go back to
13 Mr. Lewis --

14 MR. LODGE: All right.

15 ADMIN. LAW JUDGE YOUNG: -- at this point and
16 then later --

17 MR. LODGE: Let's do that.

18 ADMIN. LAW JUDGE YOUNG: Okay. We'll probably
19 have to break for lunch before you come back in any event.
20 So maybe we could finish up with Mr. Lewis, then break for
21 lunch and then continue on with the staff.

22 And then obviously as I said before, we don't
23 expect that the other contentions will take anywhere near
24 this amount of time. But we did want to focus on this one
25 because it does deal with an aging issue, a significant

1 aging issue that we think deserves the time to consider it
2 fully.

3 Go ahead, Mr. Lewis.

4 MR. LEWIS: Just to address a number of other
5 points. One is with respect and -- issue. The petitioners
6 asserted that, and this is a variation of the issue that
7 Judge Trikouros raised that you have to do whatever you can
8 without regard to cost.

9 They've also asserted that you have to maintain
10 the largest margin possible below the PTS screening
11 criterion. And I would submit that that's simply
12 inconsistent with the pressurized thermal shock rule that
13 the Commission has in fact explained that the pressurized
14 thermal shock screening criterion is not a safety limit,
15 it's a trip wire which triggers a plant specific safety
16 analysis.

17 It defines which licensees need to do that
18 analysis and when it should be done. And I'm citing 56
19 Federal Register 22.300 at page 22,302. This statement's
20 also in the Yankee Atomic case, CLI91-1134NRC3 at page --

21 ADMIN. LAW JUDGE YOUNG: I'm sorry. At, the
22 last one, repeat again?

23 MR. LEWIS: Yankee Atomic case CLI91-1124NRC3
24 at page 10. Similarly the NRC has said in promulgating the
25 pressurized thermal shock rule that generic PTS studies

1 already performed provide reasonable assurance that
2 operation of PWR pressure vessels with RTNDT values below
3 the screening criterion does not result in undue risk to
4 the public health and safety. That's 50 Federal Register
5 29937 at 29939.

6 And finally, the PTS rule establishes a
7 screening criterion with conservative margin to allow for
8 uncertainties below which the Commission has concluded that
9 PTS risk is acceptable for any PWR 50 Federal Reg, 50
10 Federal Register 29937 at 29941.

11 ADMIN. LAW JUDGE TRIKOUROS: So let me
12 understand. You're defining safety margin or margin of
13 safety differently. The, on the one side, the petitioners
14 are saying that the margin of safety is above the RTPT or
15 the screening criterion.

16 You're saying that even if I were at the
17 screening criterion, there's a margin of safety that's
18 built into that point.

19 MR. LEWIS: Absolutely right. And the
20 Commission has unequivocally said as long as you're below
21 that screening risk is acceptable.

22 In fact, they said the risk may be acceptable
23 without that screening criterion, but that's what requires
24 further analysis.

25 The petitioners have said a number of times

1 that we've demonstrated an inability to manage the
2 embrittlement to date and therefore what we're saying is
3 all subject to questions.

4 They have not provided any basis for that
5 assertion and in fact that wasn't even part of the original
6 contention.

7 But if you do consider it, I would submit that
8 there is no basis. In fact, the changes in our RTPTS
9 demonstrate that we have managed the issue. And there are
10 a number of things that have changed the date over time.

11 One is that the chemistry factor that is
12 applied in the equation is under the NRC regulations
13 determined by the mean of the average of industry data for
14 the way it weld with the same heat.

15 In other words, in determining what the
16 chemistry factor is, you don't just look at your own
17 specimen, you look at the specimens that are obtained by
18 other licensees and you do an average of what are the
19 chemistry factor and you apply that. And that is
20 prescribed by the regulations.

21 There is an NRC database that has the day that
22 that should be used. And when additional data is collected
23 and there was additional data that was collected when
24 Palisades did some additional analyses of steam generator
25 welds, it affects the average, that is affects the PT, the

1 RTPTS. So that could lower the PTS and did in the past.

2 In addition, the company has been extremely
3 aggressive in reducing flux over the life of the plan is to
4 reduce the fluence by a factor of three, an enormous
5 amount.

6 It has been very effective that fluence
7 reduction methods. And has, you know, spent a very large
8 sum doing so and has applied a lot of state of the art
9 methods.

10 That has move the reference temperature back
11 up. And in addition there are also some refinements to how
12 fluence was calculated.

13 So the fact that there has been different
14 estimates of when the screening criterion would be exceeded
15 at different times, in no way suggests that we are unable
16 to manage the embrittlement issue. It simply means that
17 over time there have been different changes including very
18 effective fluence reduction.

19 And the extent that the intervenors are saying
20 at one time it looked like it was going to be 1995 and now
21 it's 2014, you know, their implication is, you know, there
22 must be something wrong. I would submit to you that what
23 it means is that we've been very effective at reducing flux
24 in managing this issue. And if intervenors want to suggest
25 that, in effect, there is a problem with our management of

1 embrittlement, they need more than to point to different
2 dates, they need to go back to the very, very many
3 submittals that are on the docket, including NRC safety
4 evaluations that address how we have done the calculations
5 at different point.

6 Our current projection of, that the screening
7 criterion will be exceeded in 2014 is based on an NRC
8 safety evaluation which is on the docket, in Adams, on
9 November 14th, 2000 safety evaluation which approved our
10 method of calculating fluence and approved the chemical
11 properties, the chemical factors that we're using in
12 calculating when, what our RTPTS is.

13 So there is a wealth of information that you
14 could book to the challenge is they wanted to come look,
15 with a basis.

16 That's simply asserting the numbers must have
17 changed and therefore the company can't do its business is
18 not a valid basis.

19 ADMIN. LAW JUDGE YOUNG: Is, just to get back
20 to what you were saying earlier. I think you said earlier
21 that you thought it was extremely unlikely that you would,
22 that that would change again, didn't you?

23 MR. LEWIS: Yes.

24 ADMIN. LAW JUDGE YOUNG: Okay. So, but just to
25 make sure I understand, if it did, if you got new

1 information about the low temperatures in the chemistry and
2 the, or the new fluence reduction methods that that would
3 not lead to a hearing, am I right?

4 MR. LEWIS: I'm not aware of any further data
5 that's going to change the chemistry factor. I mean there
6 are a number of utilities that have weld wire with the same
7 heat and the chemical composition of those weld wires has
8 been examined and they're in a database and the rules say
9 that you use best estimates, which are based on the mean of
10 this industry data to determine what the chemistry factor
11 is for your weld wire.

12 So that's what's been done. So, you know, is
13 it possible, theoretically that somebody could find a lot
14 more weld wire that's never been examined and isn't in the
15 industry database and it could affect the calculation, yes.
16 But I don't know of any basis that that would occur.

17 ADMIN. LAW JUDGE BARATTA: That, looking at the
18 three factors, the only one that could change and I agree
19 with you that in all probability down all the weld wire, so
20 you know the chemistry, originally there was some
21 information on the RTT for the material, so that's null.

22 And the, that's leaves of the three factors,
23 the fluence, estimate of the fluence of the vessel is about
24 the only one that could be, could change at this point in
25 time, with any, that would be the most likely of the three.

1 Not saying that it is likely, but of the three,
2 it would be the most likely.

3 If you were to do that though, but say that
4 some methods out there that you have which leads you to a
5 different estimate of the fluence, okay, it would have to
6 be a pretty dramatic reduction in the fluence to get you
7 from you know, not talking factors of two or three, I'm
8 talking maybe --

9 MR. LEWIS: I think it would have to be, yes,
10 it would be an instance to get you all the way out, I mean,
11 it would be a very significant fluence reduction. I mean I
12 think you'd have to --

13 ADMIN. LAW JUDGE YOUNG: "All the way out"
14 meaning?

15 MR. LEWIS: Another factor of three?

16 ADMIN. LAW JUDGE BARATTA: 20 years.

17 MR. LEWIS: I think you'd have to reduce your
18 fluence by a further factor of three to get out to the end
19 of the period of extended --

20 ADMIN. LAW JUDGE BARATTA: And that type of a
21 recalculation isn't likely based on the state of the art --

22 MR. LEWIS: I can certainly see nothing that's
23 indicated that I believe that are current methodology which
24 was approved in that November 14th, 2000 SAR, really is
25 state of the art at this juncture.

1 ADMIN. LAW JUDGE YOUNG: Is it possible that
2 rather than one that took you all the way out, took you a
3 year to and then a year or two more and so forth?

4 I mean, I guess what, what they're concerned
5 about is that they want an opportunity to raise questions
6 about anything that could have an impact.

7 MR. LEWIS: Judge, all I can say is that we
8 don't have a proposal to, you know, revise our fluence
9 prediction method. We, we stated in our application we
10 have a current calculation and it's good to 2014 and it, it
11 is based on the chemical content of the weld wire and the
12 fluence prediction method that was approved by the NRC as
13 part of our current licensing basis in the November 14,
14 2000 SAR.

15 And we've said that three years before that
16 screening criterion is exceeded we will have to either
17 submit an annealing report or a further analysis. But
18 we're not going to be able to operate, you know, past that
19 screening criterion without being, you know, without NRC
20 approval.

21 That is the proposal, I mean that's what in our
22 application and I guess you're asking is could things
23 change later and is there any possibility, I, yes, but it's
24 not part of our proposal and it's not part of what we
25 addressed in our application.

1 ADMIN. LAW JUDGE BARATTA: It's not part of
2 your management plan as, or is that, your license
3 application.

4 MR. LEWIS: Yes. Yes.

5 ADMIN. LAW JUDGE YOUNG: But you could
6 understand that, you said that would take you to 2014, you
7 could understand that while there might be a right to a
8 hearing with regard to any decision to let you continue
9 operating without those changes, that should there be any
10 changes, major or minor that would just extend the
11 period to --

12 MR. LEWIS: Judge, I'm --

13 ADMIN. LAW JUDGE YOUNG: -- a time that --

14 MR. LEWIS: That's not an issue that can be
15 addressed in the hearing at this juncture either. I mean
16 there is no proposal, there is no revisions --

17 ADMIN. LAW JUDGE YOUNG: Well I understand
18 that, I understand that. But what I'm trying to get at is
19 the issue of what we're supposed to determine is whether
20 you demonstrated that you will adequately manage the
21 effects of aging for the, for the extended term.

22 And the concerns that are raised in contention
23 one have to do with whether you've done that since what
24 you're saying is we'll provide this information later.

25 If there is a right to a hearing later, on

1 anything that would allow you to operate past 2014, then to
2 some degree, as a practical matter, let's say, it sort of
3 mitigates the concern.

4 Whereas if there are changes that could be made
5 that would not lead to the right to a hearing, it doesn't
6 provide the same type of mitigation of the concern as a
7 practical matter, whatever legal significance it may or may
8 not have.

9 You understand what I'm getting at?

10 MR. LEWIS: No, I do understand, Judge.

11 ADMIN. LAW JUDGE YOUNG: Okay. Do you have
12 anything more?

13 MR. LEWIS: I do have other points. If --

14 ADMIN. LAW JUDGE YOUNG: If you want --

15 MR. LEWIS: I probably have four or five and
16 it's probably another, you know, 20 minutes.

17 ADMIN. LAW JUDGE YOUNG: Maybe we should take a
18 break, would you rather go on and finish yours?

19 MR. LEWIS: No. I think, I suspect that it's
20 probably appropriate time for a break.

21 ADMIN. LAW JUDGE YOUNG: What do you think?

22 ADMIN. LAW JUDGE BARATTA: A break is fine with
23 me.

24 ADMIN. LAW JUDGE YOUNG: So, be back at 1:30?

25 (Off the record.)

1 ADMINISTRATIVE LAW JUDGE YOUNG: Mr. Lewis, go
2 ahead.

3 MR. LEWIS: Judge, just for the record we've
4 passed out a copy to each of the judges, to the, wires for
5 each of the parties and to the reporter a copy of the May
6 27th, 2004 memorandum from the Executive Director of
7 Operations, the one we discussed earlier.

8 ADMIN. LAW JUDGE YOUNG: Okay. And this will be
9 Exhibit 2 for the court reporter. Thank you

10 MR. LEWIS: Proceeding there were a number of
11 statements by the Petitioners that Palisades no longer has
12 specimens and does not have samples.

13 Just to correct those statements there are
14 still capsules in the representative surveillance program
15 with base metal and with weld material. I believe there's
16 three capsules left. The, I think what would have been the
17 more correct statement is that the weld material in those
18 capsules is no longer considered representative of the
19 critical welds because of changes in standards and changes
20 in recognition of what that critical weld is over time.

21 But the assertions that we no longer have a
22 representative surveillance specimen for weld material in
23 our program is really irrelevant to the PTS issue for, for
24 this reason.

25 The NRC rules do not require that the reference

1 temperature for neal ductility transition be based on
2 surveillance materials.

3 50.61C establishes the equation that's used to
4 predict what the RT and DT is.

5 50.61 C1 talks about the unirradiated reference
6 temperature for the material and says if a measure of value
7 of that RT and DT, which stands for unirradiated, is not
8 available a generic mean for the class of material may be
9 used and 50.61 C1 ii gives the generic mean to be used for
10 welds. It's minus 56 degrees for the Palisades weld so
11 it's specified in the rules.

12 50.61 C1 iii A through B give the standard
13 deviations that are then used to account for the margin of
14 uncertainty. They're specified in the rule.

15 50.61 C1 iv-A establishes the chemistry factor
16 that is to be used. And it establishes several permissible
17 methods. One is to use the best estimate values which are
18 the means of measure values for weld wire with the same
19 weld wire heat numbers as the critical welds.

20 As I explained earlier there is an industry
21 database with the chemistry factors for the welds that have
22 the same weld wire heat number.

23 So in every step of the equation 50.61 C1
24 specifies the parameters to use in the absence of a
25 surveillance specimen.

1 And that's exactly what we're doing. This is a
2 very conservative approach.

3 There was a statement that Palisades has higher
4 copper content in its weld than other plants. I believe
5 that's incorrect. I think we're in the middle of the road
6 and I don't know of any basis for the Petitioners
7 assertion. Certainly it was, no basis was given in either
8 their original petition or their reply.

9 Finally there was an assertion that our
10 prediction of exceeding the screening criterion in 2014
11 cannot be counted on because of a statement in an NRC staff
12 email by Stephen Hoffman and the assertion in that email
13 was simply that we had indicated that we would exceed the
14 screening criterion in 2014 and the statement was I don't
15 know whether we agree with that.

16 That does not undercut our assertion. It's
17 simply a statement by a member of the staff doesn't know
18 whether that's right or wrong. So I submit that does not
19 provide a basis to contradict our estimate.

20 And as I mentioned earlier our current
21 prediction of when the screening criteria will be exceeded
22 is based on the method of fluids and the chemistry factors
23 that were approved by the NRC in the November 14th, 2000
24 SAR.

25 So the only thing we applied is our approved

1 methodology is in making that statement.

2 By that I would add that the accuracy of that
3 assessment was never mentioned in the original petition and
4 I think was, is one of the areas where it's simply a brand
5 new allegation that's appearing for the first time in the
6 reply.

7 That's all I have.

8 ADMIN. LAW JUDGE YOUNG: All right. Any
9 questions for him before we move on. Okay. Ms. Uttal.

10 MS. UTTAL: Yes. Thank you, your Honor.

11 It's --

12 ADMIN. LAW JUDGE YOUNG: And actually before you
13 start let me ask you to in your remarks please focus on the
14 footnote to, in Turkey point in your argument about whether
15 or not this contention is within the scope.

16 You seem to be basing it on footnote two in
17 Turkey point --

18 MS. UTTAL: I don't know if I have that with me.

19 ADMIN. LAW JUDGE YOUNG: That was the one that I
20 read where they said that some aging related issues are
21 adequately dealt with by regulatory processes and need not
22 be subject to further review during the license renewal
23 proceeding.

24 An example might be those structures and
25 components that already must be replaced at mandated

1 specified time periods.

2 MS. UTTAL: That's the footnote?

3 ADMIN. LAW JUDGE YOUNG: Uh-huh.

4 MS. UTTAL: Well, I guess I should have, we
5 should have been more precise in our brief. I mean what
6 is, what is out of scope is anything having to do with
7 current licensing basis. So that compliance with 50.61
8 would be out of scope.

9 ADMIN. LAW JUDGE YOUNG: But that, I mean in
10 several places the Commission talks about PTS and I mean
11 certainly this is an aging issue. So unless you rest it on
12 footnote two I don't, I don't really quite understand your
13 argument.

14 Because I mean what would not fall within that?
15 I mean isn't virtually everything that could conceivably be
16 related to aging also currently regulated? I mean that
17 seems to be a pretty wide sweeping argument.

18 MS. UTTAL: I think that in terms of what can be
19 attacked in, in license renewal would be the adequacy of
20 the TLAA.

21 ADMIN. LAW JUDGE YOUNG: Okay. And the
22 management of --

23 MS. UTTAL: The management of, of aging issues.

24 ADMIN. LAW JUDGE YOUNG: Right.

25 MS. UTTAL: But what can't be attacked is the,

1 is this Turkey point, the current licensing basis.

2 Judge, I don't have Turkey point with me and
3 it's probably a failing on my part not to have reread IT
4 before I got here so. I don't know if --

5 ADMIN. LAW JUDGE YOUNG: Well, let me read you
6 what I'm, in sum, this is, I don't know which page it's
7 from but in sum our license renewal safety review seeks to
8 mitigate the "detrimental effects of aging resulting from
9 operation beyond the initial license term citing 60 Federal
10 Register at 22463.

11 To that effect our rules focus the renewal
12 review on plant systems, structures and components for
13 which current regulatory activities and requirements may
14 not be and that's emphasis of the Commission, be sufficient
15 to manage the effects of aging in the period of extended
16 operation.

17 And then there's footnote two which states:
18 some aging related issues are adequately dealt with by
19 regulatory processes and need not be subject to further
20 review during the license renewal proceeding.

21 An example might be those structures and
22 components that already must be replaced at mandated
23 specified time periods.

24 MS. UTTAL: Okay, well, there's no requirement
25 that this one be replaced at, at mandatory specified time

1 limits. But there is a regulatory scheme for dealing with
2 the embrittlement of the vessel and that's in 50.61.

3 So I guess it's kind of a hybrid. I mean part
4 of is current licensing basis and part of it is, is an
5 aging issue.

6 ADMIN. LAW JUDGE YOUNG: Well, can you give me
7 an example of, of something that would be subject to aging
8 that would not be covered in the current licensing basis?

9 MS. UTTAL: Would you have a copy of Turkey
10 point?

11 ADMIN. LAW JUDGE YOUNG: Yeah. We have a copy
12 of Turkey point if you'd like to look at it.

13 MS. UTTAL: Yeah.

14 ADMIN. LAW JUDGE YOUNG: Thank you.

15 MS. UTTAL: If we could get back to it after
16 I've a time --

17 ADMIN. LAW JUDGE YOUNG: Okay.

18 MS. UTTAL: -- a chance to look at it. It is
19 the staff's position that compliance with 50.61 is
20 sufficient to meet the TLAA and to meet part 54.

21 The licensee has indicated that they will
22 comply with it. They put a program in place that shows
23 the, the steps that they will take and it's our position
24 that nothing more is required under part 54 other than
25 demonstrating compliance with 50.61.

1 They can't operate if they're out of
2 compliance. And 50.61 in addition to having all the
3 specifications of, of how you would do the analysis and
4 things like that also has a requirement that if there are
5 any changes in anything that, that has to be reported and a
6 new analysis has to be done. That's 50.61 1B1 --

7 ADMIN. LAW JUDGE YOUNG: Right. Well, let me
8 ask you the same question I asked Mr. Lewis and that is,
9 that would essentially mean it seems that while aging
10 issues are the only types of issues that can be raised in,
11 and non, non generic environmental issues that can be
12 raised in a license renewal proceeding that when you're
13 talking about PTS and embrittlement and you've got a
14 situation where a plant is projected to exceed the PTS
15 critierian within the license renewal term, which I'm told
16 is not unusual, that the way to exclude a contention under
17 your argument would simply be to say we will provide that
18 information three years before the date we projected, see
19 the criterion.

20 And that would under your argument
21 automatically exclude any contention --

22 MS. UTTAL: Now there, there --

23 ADMIN. LAW JUDGE YOUNG: -- related to that.
24 Related to --

25 MS. UTTAL: Well, probably other contentions

1 that can be formulated. And I don't want to be in a
2 position of giving ammunition to people about contentions.
3 But I suppose someone can say compliance with 50.61 is not
4 sufficient under 54. I mean this is the staff's position.

5 ADMIN. LAW JUDGE YOUNG: It --

6 MS. UTTAL: But we see that as --

7 ADMIN. LAW JUDGE YOUNG: Not sufficient, what
8 do you mean not sufficient?

9 MS. UTTAL: I'm, that there was some, as you
10 were postulating before that there's something else that
11 must be done other than compliance with 50.61 which is not
12 the staff's position.

13 The staff's position is, compliance with 50.61
14 is sufficient to meet part 54. But I guess that a
15 contention could be formulated that would say compliance
16 with 50.61 is not enough to meet part 54.

17 But that's not the contention here.

18 ADMIN. LAW JUDGE YOUNG: Well, in effect, in
19 effect it really is in the sense that what the contention
20 says is that the license renewal application is untimely
21 but incomplete for failure to address the continuing crisis
22 of embrittlement.

23 And that the, in essence what we have here is a
24 situation where the alliation is that, that Palisades is
25 prone to early embrittlement and that the application does

1 not address the continuing crisis of embrittlement.

2 The, the defense to that as it were is well,
3 yes, we do because we address it in 50.61. But the
4 contention is that it's not addressed and, and the, the
5 argument as I understand it is 50.61 under what, what NMC
6 has, has proposed under 50.61 is a plan to make a plan.
7 And that that does not address --

8 MS.UTTAL: Well, I don't agree that it's a plan
9 to make a plan. They've shown, they've shown that they
10 will comply with 50.61. 50.61 has certain requirements.

11 The requirements are that three years before
12 you'll reach the criterion that you tell, that you send
13 your plan in, you send your SE in or tell us that, that
14 you're going to anneal and you, and you comply with the
15 reporting requirements.

16 But I think that the, that in, in posing your
17 question you're reading a lot into this contention that's
18 just not there.

19 I mean they say that the application is
20 fundamentally deficient because it does not adequately
21 address technical and safety issues arising out of
22 embrittlement etcetera etcetera.

23 So where is it, where is it insufficient, what
24 page, what section. Why is it insufficient. What would,
25 you know, what is, what is the allegation.

1 Then they allege that Palisades is prone, has
2 been identified as prone to early embrittlement. Where is
3 it identified? Who identified it? What's the basis for
4 making --

5 ADMIN. LAW JUDGE YOUNG: Is there really any
6 dispute about that though? I mean is there? Every, I mean
7 it's, it's pretty well recognized by everyone here that the
8 date projected to exceed the criterion is 2014.

9 MS.UTTAL: That's true but, you know, the basis
10 for saying it's prone to early embrittlement may be because
11 it's older than a lot of the other plants. I mean the, the
12 statement without, without any support is, is not
13 admissible as a part of the contention.

14 ADMIN. LAW JUDGE YOUNG: Well, now --

15 MS.UTTAL: And that --

16 ADMIN. LAW JUDGE YOUNG: -- let's back up for a
17 second. The contention as I understand it is the bolded,
18 the bolded sentence at the --

19 MS.UTTAL: Right. And the other stuff is the
20 basis.

21 ADMIN. LAW JUDGE YOUNG: Right. And so --

22 MS.UTTAL: That --

23 ADMIN. LAW JUDGE YOUNG: And so what you seem
24 to be arguing is that the basis needs to have a basis.

25 MS.UTTAL: No. What I, what I'm arguing is is

1 that the basis, the contention doesn't meet the contention
2 pleading requirements. And the basis do not, there's
3 nothing in the contention that gives us the factual basis
4 which is required or the basis for this expert's opinion.

5 We don't, I don't know what he's an expert in.
6 He could, he could have been in, in the CIO's office for
7 all I know. I mean there's no, there's no facts that he's,
8 that this expert is basing his opinion on.

9 The, the statement itself is not enough. I'm
10 not saying that the basis needs a basis. I'm saying that
11 the contention and its basis have to meet the contention
12 rule. It has to have facts, expert opinion. It has to be
13 shown to be material etcetera.

14 ADMIN. LAW JUDGE BARATTA: Then so it's your
15 belief that this does not rise above a mere allegation
16 which the Commission has specifically highlighted as not
17 being admissible in, I forget which ruling it was but they,
18 they said that our admissibility rules are strict.

19 MS. UTTAL: By design.

20 ADMIN. LAW JUDGE BARATTA: By design?

21 MS. UTTAL: Yes. This, this contention is, is
22 insufficient under our contention pleading rules and should
23 not --

24 ADMIN. LAW JUDGE YOUNG: Let me see, I'd like to
25 see if you could help me with that a little bit. Let's go

1 through the, the admissibility criteria under 2309F.

2 First the need to provide a specific statement
3 of the issue of law or fact to be raised or controverted.

4 I don't think you dispute that part. Let me
5 get your, right.

6 MS.UTTAL: I don't, I don't see it there, no.

7 ADMIN. LAW JUDGE YOUNG: I'm sorry, what?

8 MS.UTTAL: I don't see anything addressing
9 that.

10 ADMIN. LAW JUDGE YOUNG: In your, in your?

11 MS.UTTAL: In my pleading.

12 ADMIN. LAW JUDGE YOUNG: Okay.

13 MS.UTTAL: Okay.

14 ADMIN. LAW JUDGE YOUNG: Okay. So then we
15 assume that it does do that.

16 Provide a brief explanation of the basis for
17 the contention.

18 You're arguing that this brief explanation has
19 not been provided?

20 MS.UTTAL: Well, it's, it's very brief but.

21 ADMIN. LAW JUDGE YOUNG: It is very brief
22 there's no doubt about that.

23 MS.UTTAL: I mean there's no --

24 ADMIN. LAW JUDGE BARATTA: Could you, could you

25 --

1 MS. UTTAL: There's no requirement of how long
2 the brief one has to do.

3 ADMIN. LAW JUDGE BARATTA: Could you be
4 specific as to what sentence provides that brief
5 explanation of the basis?

6 MS. UTTAL: Well, they don't cite where their
7 problem is with the, the licensee's application.

8 ADMIN. LAW JUDGE YOUNG: Well, let's save --

9 MS. UTTAL: They just say the general --

10 ADMIN. LAW JUDGE YOUNG: -- that for when we
11 got to the part --

12 ADMIN. LAW JUDGE BARATTA: There's another
13 one --

14 MS. UTTAL: Okay. They, they, they make a basic
15 generic statement that the prone to early embrittlement.

16 ADMIN. LAW JUDGE YOUNG: But isn't that a fairly
17 significant statement to make in the context of a license
18 renewal where they're asked where the, what's being sought
19 is a 20 year license renewal and the, and there's an
20 allegation effect that the, that the plant has been
21 identified as prone to early embrittlement to support a
22 contention that says that the application is incomplete for
23 failure to address the continuing crisis of --

24 MS. UTTAL: But it --

25 ADMIN. LAW JUDGE YOUNG: -- embrittlement --

1 MS. UTTAL: It's, it's not sufficient because
2 it has, it doesn't have any support. It's just a statement
3 with no support showing the basis for this, now I'm getting
4 the basis to the basis.

5 But, but to, to say that, that this basis is
6 sufficient because it's, it's, the basis doesn't address
7 the fact that there are no facts or expert opinion --

8 ADMIN. LAW JUDGE YOUNG: Well, any fact --

9 MS. UTTAL: -- to support --

10 ADMIN. LAW JUDGE YOUNG: -- in a, in a
11 contention or in a basis for a contention is alleged,
12 right? I mean it not, it's not proven.

13 MS. UTTAL: Yeah, because it's a contention but
14 there are, there are no facts here. There's nothing here.
15 These are general statements that it's prone to early
16 embrittlement. No --

17 ADMIN. LAW JUDGE YOUNG: Isn't that, isn't that
18 an alleged fact?

19 MS. UTTAL: Not without support. I could say
20 the moon is made out of green cheese. I mean it, it, I'd
21 have to prove that somehow or at least show where I got my
22 information from.

23 ADMIN. LAW JUDGE BARATTA: Well, my question
24 there on that is I've looked at the, those sentences and,
25 and what I'm having trouble with and that's why I asked Mr.

1 -- there is, is how does that act a, a foundation of a
2 theory or process or a principle according to which the
3 hypotheses is, is based.

4 In other words the hypotheses is that the
5 application is untimely and incomplete because it doesn't
6 address embrittlement. And, and the statement that the
7 Palsadies Nuclear Power Station is identified as prone to
8 early embrittlement of the reactor pressure vessel.

9 How does that support or provide a foundation
10 for the hypotheses that the license renewal application is
11 untimely and incomplete?

12 ADMIN. LAW JUDGE YOUNG: I think her --

13 MS. UTTAL: I don't think --

14 ADMIN. LAW JUDGE YOUNG: -- argument is does
15 it.

16 MS. UTTAL: I don't think it does because
17 there's nothing in the basis that shows that this
18 application is untimely. And in fact the licensee has
19 addressed embrittment in the application so the, the, the
20 contention itself is incorrect.

21 I mean there, there can be no denying that
22 embrittment is, is addressed in the license application. So
23 this, this statement to begin with is incorrect.

24 Therefore I don't see where there's any support
25 for what they say the contention is.

1 ADMIN. LAW JUDGE YOUNG: Okay. That's your
2 position on, on subsection two. You're arguing that it's
3 not within the scope of the, of the license renewal
4 proceeding for the reasons you gave earlier.

5 ADMIN. LAW JUDGE BARATTA: I'd like to explore
6 that further.

7 MS. UTTAL: Well, let me the read the Turkey
8 point and then.

9 ADMIN. LAW JUDGE BARATTA: Okay. Go ahead,
10 sorry.

11 ADMIN. LAW JUDGE YOUNG: Demonstrate that the
12 issue raised in the contention is material to the findings
13 the NRC must make to support the action involved in the
14 proceeding which takes us to 5429.

15 I think your, I think you argue that it's not,
16 let's see. You may not raise a question about that one.

17 MS. UTTAL: I can't get them all.

18 ADMIN. LAW JUDGE YOUNG: You raise a question
19 about whether an genuine issue, a genuine dispute exists on
20 a material issue of law or fact.

21 MS. UTTAL: Right. Again the, the contention
22 says that they failed to address embrittlement. And they
23 have addressed embrittlement. Therefore there is no
24 material issue because they're, they're incorrect in their
25 initial supposition.

1 Initial thesis is wrong.

2 ADMIN. LAW JUDGE YOUNG: What about the part of
3 the initial thesis that alleges that it's incomplete and,
4 and raises the timeliness issue in conjunction with the
5 allegation that the plant's been identified as prone to
6 early embrittlement?

7 MS.UTTAL: This, there is nothing, first of all
8 there's no explanation about what they mean is untimely.
9 If I see that, something that says the license renewal
10 application is untimely that means it's filed late.
11 There's nothing about that in, in the support for this
12 contention. And incomplete not because they didn't
13 adequately address the continuing crisis of embrittlement.
14 But incomplete for failure to address it. And there is no
15 failure to address here.

16 And then again the, the statements made in the
17 basis are without support. There are no facts to support
18 them. There's no opinion to support them. They don't
19 point to anything specific sources. They're supposed to
20 provide a concise statement of the alleged facts or expert
21 opinion which supports the requestors petition, the
22 requestors position on the issue and how much the
23 petitioner intends to rely together with references to the
24 specific sources and documents on which the requestor
25 intends to rely to support its position. There's none of

1 that in there. So they completely failed on five.

2 And if they fail to meet one of the criterion
3 in 2.309 then the contention is inadmissible. And I think
4 they've --

5 ADMIN. LAW JUDGE YOUNG: No doubt, you're right.

6 ADMIN. LAW JUDGE BARATTA: On, on 309 step six,
7 okay. I heard did you say that you feel their, their
8 statement is that it's incomplete for failure to address is
9 wrong?

10 MS. UTTAL: Yes, because they've addressed
11 embrittlement in their TLAA. In addition to, to that
12 problem they're supposed to provide, the intervenors, are
13 supposed to provide references to specific portions of the
14 application including the applicant's environmental and
15 safety report that the Petitioner disputes and the
16 supporting reasons for each dispute or if the Petitioner
17 believes that the application fails to contain information
18 on a relevant matter as required by law the identification
19 of each failure and supporting reasons for the Petitioner's
20 belief.

21 Well, as to pointing at specific portions of
22 the application that they completely failed to do that and,
23 in, well, it's a requirement under, under --

24 ADMIN. LAW JUDGE BARATTA: Well, there's only,
25 there's only one page in the application that it could be

1 referring to though I mean. That was, I thought that
2 was --

3 ADMIN. LAW JUDGE YOUNG: Okay --

4 ADMIN. LAW JUDGE BARATTA: Yes, that's why I,
5 you know, to me they did.

6 MS.UTTAL: I've, I've been, I've been asked to
7 show why, why --

8 ADMIN. LAW JUDGE BARATTA: Yeah, I understand, I
9 understand --

10 MS.UTTAL: -- it doesn't comply with our, with
11 our regulations.

12 ADMIN. LAW JUDGE YOUNG: Well, now I believe
13 that the reply to that though was that their argument is
14 that this, this involves a failure, a failure of the
15 application. That the application is incomplete. And that
16 it's incomplete because it doesn't address the continuing
17 crisis of embrittlement and, and they tie that to the
18 allegation of fact that it's been identified as prone,
19 being prone to early embrittlement.

20 There is case law that says a petitioner, a
21 petitioner must provide documents, expert opinion or at
22 least a fact based argument.

23 And there's also case law that says the
24 contention rule should not be used a fortress to deny
25 intervention that what you need is enough to indicate that

1 further inquiry is appropriate. That what you need is
2 indication that the purpose of the contention rule which I
3 think was quoted in Turkey point.

4 Basically something to indicate that the
5 petitioners are qualified, able to litigate the issue that
6 they raise.

7 So what we have here is we have an allegation
8 that the application is incomplete for failure to address
9 the continuing crisis of embrittlement supported by this
10 factual allegation about early embrittlement and the
11 identification of an expert who used to work with the NRC.

12 So on the face of that it would seem that that
13 provides something to indicate that further inquiry might
14 be appropriate.

15 Under, under the case law that I've just cited
16 to you, and I understand it's your position that they
17 haven't met any, haven't met these things and, and that
18 there should, but what I'm trying to get you to address is
19 the general issue that they've raised.

20 The brief statement, very brief, but, but it's
21 a concise and brief statement of, of their concern.
22 They're supporting it with the reference to an expert who
23 used to work at the NRC. Whose obviously I, I think it's,
24 can be assumed that they're not going to bring a financial
25 expert in.

1 So let's get past that point.

2 What I hear you saying is that not only have
3 they not satisfy some of the technical requirements of the
4 contention and admissibility rule but that this is not even
5 a significant issue that, that's within the scope of
6 license renewal.

7 And you sort of start to lose me there --

8 MS. UTTAL: Okay.

9 ADMIN. LAW JUDGE YOUNG: -- at least.

10 MS. UTTAL: Even, put aside the issue about
11 outside the scope. And let's just talk about the
12 contention itself because I disagree very strongly with all
13 due respect with what you've said. There is, this is --

14 ADMIN. LAW JUDGE YOUNG: Well, I'm asking you
15 questions so.

16 MS. UTTAL: Oh, okay.

17 ADMIN. LAW JUDGE YOUNG: You don't need to agree
18 or disagree because you can attack everything I'm saying as
19 question and --

20 MS. UTTAL: Okay. Well -- well, this contention
21 as it was submitted in, in the, the first pleading does not
22 contain what is expected, what the Commission expects to
23 see in contentions.

24 It contains a lot or a few unsupported
25 statements. The statement that it's identified as prone to

1 early embrittlement is not supported. It is not up to the
2 Board or even any of the other parties to come in and, and
3 fill in the blanks of who said it and whether it's general
4 knowledge and, and things like that. Then --

5 ADMIN. LAW JUDGE YOUNG: But if you look at the,
6 let's stop right there.

7 If you look at the case law that says a
8 document, documents, expert opinion or at least a fact
9 based argument.

10 I mean in a license renewal proceeding where
11 there's an allegation of a plant being prone to early
12 embrittlement doesn't that at least raise your antenna a
13 little bit --

14 MS. UTTAL: What --

15 ADMIN. LAW JUDGE YOUNG: -- that, that is, that
16 this might be, might warrant further inquiry? And then
17 when you read on and you see we've got an expert who used
18 to work at the NRC.

19 I mean doesn't that even cause you to wonder
20 whether there might be cause for further inquiry?

21 MS. UTTAL: Judge, I think the issue is the
22 burden is on the Petitioner to provide a sufficient --

23 ADMIN. LAW JUDGE YOUNG: Right.

24 MS. UTTAL: -- a sufficient contention --

25 ADMIN. LAW JUDGE YOUNG: But what I'm asking

1 you to do is answer the question I just asked. Based on
2 what's here like I said I don't know who Demitrios Bezdekas
3 is and what his expertise and what his connection with this
4 plant is. So I can't comment on whether he has any
5 expertise and whether this very general statement has any
6 meaning.

7 And I don't think the, the Board can read into
8 it that just because he worked at the NRC that he's an
9 expert in this particular field that we're talking about
10 here because there's no support provided.

11 And the general statement that it's prone to
12 early embrittlement without more is not enough to raise
13 this, this proposed contention to the level that's required
14 by our stringent pleading rules to allow it to be admitted.

15 Now the, the quotes that, that you quoted from
16 the cases are general, are general quotes and, yes, there
17 are cases where you don't rely on technicalities. Some of
18 the cases that were cited by the Petitioners point that
19 out.

20 But when they're talking about technicalities
21 let's say in the Sequoia Fuels case. In the Sequoia Fuels
22 case the technicality was that a another intervenor had
23 copied the contentions from the first intervenor, had not
24 copied the basis in. So the Board allowed them to amend,
25 to put the basis in.

1 That was felt to be a technical thing. There
2 was another one where they failed to sign the pleading and
3 that was felt to be technical.

4 In here there's a complete failure to comply or
5 almost complete I guess, it's not complete but almost
6 complete failure to comply with our pleading requirements.
7 And I don't think that we can pull it up and make it a good
8 contention by, by reading things into it that are just not
9 there.

10 ADMIN. LAW ADMIN. LAW JUDGE TRIKOUROS: I have a
11 question. The, the, again I'm back on the reasonably
12 practical able question.

13 The applicant said that they were not going to
14 make a modification as we discussed earlier because it was
15 not reasonably practical able.

16 How, do you, does the NRC do an evaluation of
17 that and make a determination that indeed that is not
18 reasonably practical able?

19 MS. UTTAL: I'm not sure we have the person here
20 that can answer that question because it would be done by
21 the, the people that are reviewing the, the request, done
22 by the people that are reviewing the request under 50.61
23 not the people that are reviewing the license renewal
24 because they have not made that, that, they have not sent
25 their program in as we know because we've been discussing

1 it.

2 ADMIN. LAW JUDGE YOUNG: Okay.

3 MS. UTTAL: But I do agree that it involves a, a
4 cost benefit analysis and considering safety --

5 ADMIN. LAW JUDGE TRIKOUROS: Right. And we have
6 this May 27th letter which indicates that the first thing
7 to do is the flux reduction program. That's reasonably
8 practical able. And if that program doesn't prevent the
9 problem then you move on to the, the other two areas that
10 are identified in here.

11 Right now as I see it the, there's only one
12 statement in the application that says it's very costly
13 and, and let's move on. And so that's where I am right
14 now.

15 MS. UTTAL: I think I lost you. I'm going to
16 assume that the staff checks the figures because I've seen
17 things like SAMA analysis where they do cost versus SAMA
18 severe accident mitigation alternatives where they, they
19 measure the cost versus the, the benefit in deciding
20 whether it's worth while to do the SAMA.

21 So maybe that they do something like that. And
22 the staff looks at the analysis. But that's a guess I
23 don't know for sure.

24 ADMIN. LAW JUDGE TRIKOUROS: And again this all
25 comes back for me to the question of reasonable assurance

1 under, under 54.29.

2 MS. UTTAL: Uh-huh.

3 ADMIN. LAW JUDGE TRIKOUROS: Whether or not you
4 can simply put 50.61 and that, and that's reasonable
5 assurance.

6 The May 27th letter does say that.

7 MS. UTTAL: And that is the staff's position.

8 ADMIN. LAW JUDGE TRIKOUROS: And we have that
9 but.

10 ADMIN. LAW JUDGE BARATTA: I'd like, I'd like to
11 just ask a couple questions relating to the concept of cost
12 and benefit.

13 Are there places in the regulations that you're
14 aware of where cost and safety are specifically balanced?

15 MS. UTTAL: No, I'm just, I'm just saying I was
16 aware when they do a SAMA analysis that they do some kind
17 of analysis like that.

18 ADMIN. LAW JUDGE BARATTA: So, so you're not
19 familiar with other parts of the regulation whether they
20 might be done?

21 MS. UTTAL: Well, I think there's a cost benefit
22 analysis that's done in the environmental area.

23 ADMIN. LAW JUDGE BARATTA: But not in the
24 safety, right?

25 MS. UTTAL: I don't know offhand, I'm sorry. I

1 don't know if this is exactly on point but in, in the
2 environmental area cost benefit analysis specifically
3 excluded except for the SAMAs that --

4 ADMIN. LAW JUDGE BARATTA: No, I was looking --

5 MS. UTTAL: -- answer your question at all --

6 ADMIN. LAW JUDGE BARATTA: I was wondering if
7 in the, in the safety area whether there was any, whether
8 it be in part 50 or some other part of the --

9 MS. UTTAL: I, I just don't know, I'm sorry.

10 ADMIN. LAW JUDGE BARATTA: The, with the
11 exception of Appendix K the prescriptiveness of this 50.61
12 the only other place I can think of that I've seen that
13 type of prescriptive requirement is in and is in Appendix
14 K.

15 Is this, am I wrong in that or are there, or is
16 that frequently done where they, they really lay out in
17 detail what you have to do as opposed to providing more
18 general requirements which you then develop a methodology
19 as to how to meet those?

20 MS. UTTAL: I know in decommissioning funding
21 they lay out a formula that you have to follow but that's,
22 you're probably asking from a technical basis for saying --

23 ADMIN. LAW JUDGE BARATTA: Well, even, even in
24 the decommission funding, what I'm trying to get at is, is
25 it, it doesn't seem like this is typical. It seems like

1 this is very prescriptive.

2 MS. UTTAL: Yes.

3 ADMIN. LAW JUDGE BARATTA: The way to put it.

4 And that that's not typical of most of the regulations.

5 MS. UTTAL: I, you, you're probably correct
6 because in a lot, and if you read the, the SRP's in various
7 areas things are, are told this is the way we'd like to see
8 it but if the licensee comes in with a different method and
9 as long as it meets the regulatory criteria then, then
10 that's acceptable.

11 I think that a lot of our regulations are
12 becoming performance based.

13 ADMIN. LAW JUDGE BARATTA: This, this one
14 definitely isn't though. This is not a performance
15 based --

16 MS. UTTAL: Well, you have to meet certain
17 criteria, certain, you have to meet the criterion and they
18 tell you how you're going to get there. What you have to
19 do.

20 I, I would have to ask the staff about, I'm
21 looking here.

22 Well, in terms of 50.61 there's this specific
23 three year time period and that's so that there's
24 sufficient time to review the plan to make sure that it's,
25 it's sufficient.

1 ADMIN. LAW JUDGE YOUNG: Sufficient to what?

2 MS. UTTAL: You don't, to meet, to, so that they
3 will be able to meet the criterion when they finally, so
4 they will not go over the criterion when they, when they
5 finally reach that year.

6 ADMIN. LAW JUDGE YOUNG: So that they'll be able
7 to manage the effects of aging?

8 MS. UTTAL: Yes, exactly. And there are a few
9 other regulations that involve these kind of time limits.
10 Again the decommissioning funding one is one.

11 ADMIN. LAW JUDGE BARATTA: So my point being is,
12 is that, could that possibly, because of prescriptiveness
13 of the regulation could that possibly be something that
14 would fall under that note two that was mentioned earlier
15 in Turkey point?

16 MS. UTTAL: I don't, I'll have to think about
17 that.

18 ADMIN. LAW JUDGE BARATTA: Okay. That's fair.

19 ADMIN. LAW JUDGE YOUNG: Any more questions.

20 ADMIN. LAW JUDGE TRIKOUROS: I want to discuss
21 margin of safety but I don't know if I should do it now or
22 later.

23 ADMIN. LAW JUDGE YOUNG: I think so. Do you
24 have anything more that you want to argue unless we have
25 questions?

1 MS. UTTAL: No, I think that most everything has
2 been covered.

3 ADMIN. LAW JUDGE TRIKOUROS: I'd like to just
4 take a few minutes to make sure I understand if there's a
5 consensus on what margin of safety means.

6 When I read the Petitioners documentation I
7 seem to see the definition of margin of safety as being
8 having a, a temperature that's, that's above or below if
9 you will the screening criterion. And that the margin of
10 safety is that temperature difference from the screening
11 criterion.

12 I, when I, when I hear the applicant's
13 arguments I, I hear a, that the margin of safety is
14 actually embedded at the point of the screening criterion.
15 That even if you were there there's a margin of safety
16 that, that's, that's built into that number.

17 Am I, am I reading incorrectly or is there two
18 different, are there two different margins of safety here
19 that I'm hearing?

20 MR. LODGE: Probably. The --

21 MR. LEWIS: The, sorry.

22 MR. LODGE: Sorry.

23 MR. LEWIS: You're certainly correct in our view
24 and we cited the NRC's statement of consideration where
25 they indicated that the margin of safety was inherent in

1 the screening criterion and as long as you're below the
2 screening criterion the risk is acceptable to those safety
3 issue.

4 ADMIN. LAW JUDGE TRIKOUROS: That's your
5 definition?

6 MR. LEWIS: And that's based on the statement of
7 consideration and explaining the rule.

8 MR. LODGE: We believe that the margin of safety
9 also implicates the concept of confidence levels. I mean
10 is there a 90 percent degree of confidence in that margin,
11 a 25 percent. So, yes, the numerical temperature is a
12 beginning point.

13 But the, the degree with which you can rely on
14 that level is significant.

15 ADMIN. LAW JUDGE BARATTA: Okay. Could you
16 explain that a little bit more. I didn't, because the,
17 the, I understand what you're referring to about confidence
18 level.

19 MR. LODGE: We question the degree of confidence
20 that can be ascribed given the lack of knowledge about the,
21 the mystery metal that the reactor vessel is made of. The,
22 the mix of copper and nickel.

23 The, rather than relying on generic industry
24 standards that may or may not have much direct relevance to
25 the facts at Palisades.

1 ADMIN. LAW JUDGE BARATTA: I, I thought I heard
2 earlier that the, the regulation prescribes what you're
3 supposed to do in that case. And that that's what was
4 done.

5 MR. LODGE: Insofar as --

6 ADMIN. LAW JUDGE BARATTA: In so far as the
7 composition of the material when you don't have the actual
8 material for that particular weld then you are to use
9 values that are contained in the table. And that's
10 dictated by the regulations.

11 MR. LODGE: One moment please.

12 ADMIN. LAW JUDGE YOUNG: 50.61 C1 it's small
13 Roman numeral iii, is that what you're?

14 ADMIN. LAW JUDGE BARATTA: Three.

15 MR. LODGE: Yes. The, we think that the Exhibit
16 2 has, offers a very useful interpretation of what the
17 expectations are of a licensee. And it particularly
18 addresses the 50.61 C1 iii option. The, on the first page
19 it indicates that the third option, which is the C1 iii, if
20 the licensee demonstrates that the effects of aging on the
21 intended functions and systems will be adequately managed
22 for the period of extended operation, which of course is 20
23 years.

24 On the second page it states that the license,
25 is that, the second full paragraph --

1 ADMIN. LAW JUDGE YOUNG: Excuse me, the second
2 full paragraph of?

3 MR. LODGE: The second page, pardon me. Page
4 two of the May 27th 2004 --

5 ADMIN. LAW JUDGE YOUNG: May 27th, letter, okay.

6 MR. LODGE: The, the Exhibit 2.

7 ADMIN. LAW JUDGE YOUNG: Okay, say that again.

8 MR. LODGE: I'm sorry. The, the first sentence
9 of the second full paragraph page two indicates that the
10 license renewal applicant that chooses the C1 iii option
11 must provide an assessment of the current licensing basis
12 TLAA for, for pressure thermal shock, a discussion of flux
13 reduction program, you can read it. I'm, I'm not going to
14 go through all that.

15 And identify the viable options that exist for
16 managing the aging effect in the future.

17 What you've heard, what we've heard today from
18 the applicant is their plan is we'll get you a plan
19 sometime in the future and plan D the plan to provide a
20 plan, plan B is we'll shut down if we exceed the criterion.

21 Then on page three at the top, the first full
22 paragraph it indicates if a reactor vessel is projected to
23 exceed the PTS screening criteria B3 50.61 B3 requires the
24 licensee to implement a flux reduction program that is
25 reasonably practical able to avoid exceeding the PTS

1 screening criteria.

2 The operative word in that sentence to us is
3 implement a flux reduction program not plan to provide a
4 scheme to implement.

5 ADMIN. LAW JUDGE BARATTA: But you're, the
6 second sentence though goes on if the program does not
7 prevent which evidently they've concluded that it's not
8 reasonably practical able to do then, then the licensee can
9 choose between other options.

10 MR. LODGE: Correct, sir. That's --

11 ADMIN. LAW JUDGE BARATTA: And that's what they
12 said they're going to do.

13 MR. LODGE: Well, I, I guess I don't follow
14 your, your logic there. And I --

15 ADMIN. LAW JUDGE BARATTA: Well --

16 MR. LODGE; Well, in the, in the application
17 they state at page 4-10 the flux to the reactor vessel
18 would have to be reduced by an additional factor of three
19 in order to reach March 24, 2031.

20 Mr. Lewis has acknowledged that they're not
21 going to be able to achieve that with current technological
22 capabilities. So --

23 ADMIN. LAW JUDGE BARATTA: So there's, there's
24 no dispute that it's not reasonably practical able to do
25 that.

1 MR. LODGE: Correct. And in fact all they're
2 saying, all the, all the utility is saying to you today is
3 we can get we think to 2014 three, seventeen years short of
4 2031.

5 And so the two options that are specified, your
6 Honor, in, in that sentence you just referred to, are
7 annealing --

8 ADMIN. LAW JUDGE BARATTA: Uh-huh.

9 MR. LODGE: -- or providing safety analysis to
10 determine what modifications are necessary to prevent
11 failure of the reactor vessel.

12 It appears to be taken in context, it appears
13 to us, that that is to be done now. If they, they've
14 admitted now today, 2005, they can't otherwise achieve the
15 flux reduction by a factor of three.

16 ADMIN. LAW JUDGE BARATTA: But I, what I'm
17 getting hung up on is, is I don't understand how that, that
18 doesn't meet, you know, the, first off this letter although
19 it, it should be given deference is not binding.

20 MR. LODGE: I understand, sure, sure.

21 ADMIN. LAW JUDGE BARATTA: Okay. I mean it's
22 not --

23 MR. LODGE: Certainly.

24 ADMIN. LAW JUDGE BARATTA: -- it is not a
25 regulation.

1 MR. LODGE: Right.

2 ADMIN. LAW JUDGE BARATTA: All right.

3 MR. LODGE: But it's, this --

4 ADMIN. LAW JUDGE BARATTA: So we're all clear on
5 that.

6 MR. LODGE: Correct.

7 ADMIN. LAW JUDGE BARATTA: But it should be
8 given deference and I'd like to, I would like to explore
9 your, what you're saying because I, I'm having trouble
10 seeing that.

11 MR. LODGE: Well --

12 ADMIN. LAW JUDGE YOUNG: Can I ask a question to
13 see if I understand it.

14 ADMIN. LAW JUDGE BARATTA: Sure. And if he can
15 help --

16 ADMIN. LAW JUDGE YOUNG: Okay. Let me see if I
17 understand what you're saying.

18 ADMIN. LAW JUDGE BARATTA: All right.

19 ADMIN. LAW JUDGE YOUNG: You're saying that what
20 this letter says on page two is that the selection of which
21 of the other two options they're going to follow needs to
22 be done at this point and that then later details of the
23 approach selected are to be submitted at least three years
24 before the projected date?

25 MR. LODGE: Yes, your Honor.. And --

1 ADMIN. LAW JUDGE YOUNG: And you, I guess notice
2 that, I would assume that you're basing that on the
3 sentence that says details of the approach selected are
4 required to be submitted at least three years before
5 implying that.

6 MR. LODGE: And also the second sentence of that
7 same paragraph, your Honor, that says, if the flux
8 reduction program does not prevent the reactor vessel from
9 exceeding the PTS screening criterion at the end of life.

10 And now is that the projected 2031 end of life?
11 Because we know today, we know now, that the utility admits
12 that they cannot provide that confidence level. And, and
13 it says the licensee can choose between the two options.
14 And, and annealing appears arguably to be off the table so
15 the other analysis --

16 ADMIN. LAW JUDGE YOUNG: Off the table?

17 MR. LODGE: Not, not an option.

18 ADMIN. LAW JUDGE YOUNG: But haven't they said
19 they --

20 MR. LODGE: They said they --

21 ADMIN. LAW JUDGE BARATTA: That's the second
22 time you've said that. I'm, I don't, I specifically asked
23 that question and I was told that it is not off the table.
24 So I don't understand --

25 MR. LODGE: Well, there was a rather resolute

1 assertion made by the utility approximately eight or nine
2 years ago, 1996 or 7 their intention to perform a nealing.
3 And it hasn't happened. No step toward it beyond some
4 public assertion to that effect has been made.

5 ADMIN. LAW JUDGE BARATTA: Well, there is a
6 very clear statement on page 4-10 of the license
7 application.

8 MR. LODGE: Right.

9 ADMIN. LAW JUDGE BARATTA: And it says other
10 alternatives that would be considered would include
11 completion of safety analysis as specified in 50.61 B4 and
12 thermal and nealing treatment as specified in 50.61 B7.

13 And I, i get back to looking at the letter that
14 we're talking about. It says license renewal applicant
15 that chooses to use C13 option for managing must provide an
16 assessment of the current licensing basis which it seemed
17 like they did.

18 They said hey, you know, we're, we can't meet
19 it beyond 2014 a discussion with flux reduction program
20 which is in the beginning section there that they began a
21 low leakage core etcetera and they, they still ran out of
22 room in 2014.

23 And then it goes on, the letter says that an
24 identification viable options exist for managing the aging
25 effect in the future which seems to be what they did in

1 that part I started out with a few minutes ago.

2 So I guess I have trouble understanding why,
3 what they're required to do in this letter or what the
4 staff letter to the chairman said isn't what they're doing
5 which seemed to be what you were saying a few minutes ago.

6 MR. LODGE: Well, the Petitioner's position is
7 that we know today that the utility is not going to be able
8 to implement a flux reduction program that can avoid
9 exceeding the, the PTS screening criteria through 2031.

10 And that the, essentially the utility is saying
11 if assuming things don't change we'll be making some
12 proposal by 2011.

13 We return to our arguments made earlier today
14 that what data, what degree of, of confidence, what, what
15 science, what engineering that is based on relatively firm
16 facts can the utility produce then that they can't produce
17 now.

18 ADMIN. LAW JUDGE BARATTA: But we only have the
19 regulations to go by.

20 MR. LODGE: Right.

21 ADMIN. LAW JUDGE BARATTA: That we are required
22 to follow and I don't see the basis for your claim that
23 they're not doing that particularly in light of this
24 letter.

25 ADMIN. LAW JUDGE TRIKOUROS: This letter is not

1 a regulation and it wouldn't be surprised to be that the
2 timing issue is left out of here that it's trying to make
3 its, whatever point it's trying to make so I, I wouldn't
4 read it as a regulation. I don't think it was meant for
5 that purpose.

6 And there is a three year requirement then that
7 is in 50.61. So --

8 MR. LODGE: Well, that sentence beginning, and I
9 understand this is, this is an interpretation, an
10 enlightened interpretation but, but it's a take.

11 But it says that the license, the license
12 renewal applicant that chooses the C-13 option must provide
13 an assessment of the current licensing basis, discussion of
14 the flux reduction program implemented, implemented not
15 planned to be explained later, in accordance with 50.61 B3
16 and an identification of the options that exist for
17 managing.

18 Yes, they've identified what the options might
19 be but they have not specified, discussed the flux
20 reduction program implemented in accordance with 50.61 B3.

21 MR. LEWIS: May I address that point. The
22 application does specifically address the flux reduction
23 program that's been implemented in the second paragraph in
24 4.2 and specifically the core redesign which went from a --

25 ADMIN. LAW JUDGE BARATTA: Are you referring to

1 where it says Palisades began the use of a low leakage core
2 design?

3 MR. LEWIS: Yes.

4 ADMIN. LAW JUDGE BARATTA: That's again on page.
5 4-10 of the --

6 MR. LEWIS: That's correct, I mean we've
7 implemented an ultra low leakage core which took a
8 considerable time and engineering analysis and effort to
9 redesign the core so that new assemblies are, the inside
10 the core instead of around the periphery to further reduce
11 flux by using third and fourth cycle assemblies in the
12 periphery.

13 And further by putting shielding simply, each
14 shielding assemblies in front of each of the six critical
15 axial welds. It's described in the FSAR and in many
16 documents, the shielding assemblies are assemblies where
17 the first four rows are steel tubes, the assemblies are 15
18 by 15 rods.

19 On the other side there's another four rows of
20 steel tubes in the middle are basically depleted uranium
21 tubes. Those assemblies shield each of the critical axial
22 welds.

23 It's a very aggressive and extensive flux
24 reduction program that has been implemented.

25 ADMIN. LAW JUDGE TRIKOUROS: I, I think there's

1 no doubt that there's been a, a, the implementation of a
2 flux reduction program. Not, not an issue in my mind.

3 MR. LEWIS: Right.

4 ADMIN. LAW JUDGE TRIKOUROS: And it says clearly
5 in the application. However, the, the, this issue of
6 reasonably practical able efforts is still, is still out
7 there in terms of additional modifications. Who makes the
8 determination as to what is reasonably practical able and
9 trying to balance that with the comments of the Petitioners
10 that economic factors are perhaps being cavalierly
11 brutalized.

12 That's where I was coming from before. I
13 still, we still don't have closure on that.

14 MR. LEWIS: There, there are two elements of
15 that. It's, it's those measures that are reasonably
16 practical to avoid exceeding the screening criterion during
17 the period of extended operation or during the, before the
18 end of life.

19 So in order to raise a genuine issue here I
20 would submit that the intervenors would have to show that
21 there is some measure that we haven't considered that is
22 both cost effective and capable of getting you all the way
23 out to the period of extended operation and they certainly
24 have not done that.

25 MR. LODGE: We, 50.61 B3 requires the licensee

1 to implement, implement a flux reduction program reasonably
2 practical to avoid exceeding the PTS screening criteria.
3 The utility can get the plant as far as 2014 not 2031.

4 And we believe that there has to be a plan, a
5 plan to fail, a plan to shut down at 2014 or at such point
6 as the criterion is exceeded is not a plan to manage.

7 ADMIN. LAW JUDGE YOUNG: We started out with you
8 answering a question. Do you, or do we need to follow up
9 on that any more at this point or?

10 ADMIN. LAW JUDGE TRIKOUROS: No. I think, I
11 think we have an answer to the question.

12 ADMIN. LAW JUDGE YOUNG: Okay. So you're, you
13 can also respond to any of the other arguments --

14 MR. LODGE: Thank you.

15 ADMIN. LAW JUDGE YOUNG: -- of the other two
16 parties.

17 MR. LODGE: I did want to bring the panel's --

18 ADMIN. LAW JUDGE YOUNG: Did you have something
19 else you wanted to say first?

20 ADMIN. LAW JUDGE BARATTA: I never quite got the
21 answer to my question about the uncertainty. That's what I
22 was trying to get out originally.

23 ADMIN. LAW JUDGE YOUNG: Do you want to?

24 ADMIN. LAW JUDGE BARATTA: I, I just, it, it,
25 you made that, that statement several times but from what

1 we've heard I, I gathered that, you know, again that these
2 regulations were prescriptive as to what you have to do if
3 you don't have this or you have that.

4 So how, how does the, how you, what's the basis
5 for your statement that the uncertainties are unknown if
6 the regulations tell you you've got to do something?

7 And specifically the regulations tell you you
8 have to do something with respect to the makeup of the weld
9 material if you don't have the weld material.

10 MR. LODGE: One moment please. I wonder if we
11 might have a five minute break in order to formulate it.

12 ADMIN. LAW JUDGE YOUNG: Okay.

13 (Off the record.)

14 MR. LODGE: Sorry, not trying, not trying to be
15 cute or misleading with the response.

16 But it's very difficult to answer your question
17 Dr. Baratta, without understanding whether or not it's
18 backed up by data from original actual irradiated material
19 as opposed to accelerated aging samples of as, as opposed
20 to computer projections.

21 The representations that Mr. Lewis made about
22 the capsules were that, did, did not indicate they were
23 actual bits of metal of the same material that the RPV at
24 Palisades was actually constructed from.

25 A 1992 NRC interim safety evaluation that we

1 don't have extra copies of that I will certainly provide
2 the, the panel as well as a 1991 letter from Consumers
3 Power to the NRC indicate that Consumers Power, and I'm
4 reading from the 1991 letter, Consumers Power Company does
5 not have chemistry measurements for the Palisades vessel
6 specific belt line welds nor does it have a surveillance
7 specimen made with the same material and heat of wire.

8 Consumers Power Company does have copper and
9 nickel measurements for the actual vessel belt line
10 material.

11 In the staff, the, the interim safety
12 evaluation dated 1992 the staff concludes the surveillance
13 plate material was removed from plates that are in the
14 Palisades belt line, however, the surveillance weld
15 material is not from a Palisades belt line weld hence it
16 has no value in determining the effect of neutron
17 irradiation on the Palisades belt line welds.

18 We believe that there are significant
19 uncertainties that, that pose the issue, that pose the
20 issue of fact that we believe should be heard by the panel.

21 Issues of, of public confidence in the margin
22 of safety are not obviated simply because regulations are
23 being followed in some fashion.

24 We differ of course with whether or not the
25 regulations are, are truly being followed that 50.61

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1 according to the executive director for operations it
2 appears to me that the details of the approach selected are
3 what, are the subject of that three year notice.

4 But that the, the, the plan and the
5 implementation of the plan begins at an earlier point
6 outside of that three year time period. And we believe
7 that the only meaningful way that that regulation can be
8 interpreted is that in, because, because the utility does
9 not provide confidence that it can implement a flux
10 reduction program out to 2031 but only to 2014 and that if
11 they don't make it they will shut down is not a plan. It
12 is, it is a failure. And the Petitioners believe that that
13 has to be, the subject has to become then the subject of
14 hearing.

15 ADMIN. LAW JUDGE YOUNG: Before you go on and
16 this may give you something to focus on in your remaining
17 argument. But I want to make sure I ask you this before,
18 before you go on from contention one.

19 First a simple question, maybe not a simple
20 answer. But you've provided a lot more with your reply
21 than you did in your original contention. And we've
22 discussed what we'll consider and what we won't consider.

23 But why did you not provide that at the outset?
24 Can you, I mean just explain that. What, what the
25 situation was. What your reasons were.

1 And then if you could also in your remaining
2 time expand a little bit on if there were a hearing what
3 you would anticipate litigating.

4 And also if you could address that in the
5 context of there being the right to a hearing at a later
6 point if anything proposed would involve the types of
7 issues that were discussed before that would require an
8 amendment to the license.

9 And we heard discussed the things that would
10 and the things that might not or would not.

11 I just want to make sure that, that you address
12 those sort of basics --

13 MR. LODGE: All right.

14 ADMIN. LAW JUDGE YOUNG: -- in addition to
15 anything else.

16 MR. LODGE: Well, the, I guess the --

17 ADMIN. LAW JUDGE YOUNG: And I should say, I'm
18 sorry, I did interrupt you again.

19 But for you and all, and the other parties as
20 well, I don't think anything that any of us say should be
21 taken to indicate that, you know, we have made a decision
22 one way or the other, that we see things one way or the
23 other.

24 But obviously we do see the issues being
25 significant enough to, to warrant full discussion and it's

1 in that context that, that I ask these questions and the
2 others that we've asked as well.

3 MR. LODGE: As a grassroots intervention
4 comprised of volunteers it is a logistical difficulty to
5 come up with the type of response that we ultimately
6 replied with at the beginning of the process.

7 We took our interpretations at the face value
8 of, of the NRC regulations to mean that a short, a, a brief
9 concise statement would probably be a preferable item for
10 the Board to consider.

11 And also we were mindful of the Turkey point
12 observation that to trigger full adjudicatory hearing
13 Petitioners must be able to "proffer at least some minimal
14 factual and legal argument in support of their
15 contentions". That cites to a Duke Energy Corporation
16 case.

17 We believed that part, the law of parsimony was
18 perhaps preferable in terms of setting up the outlines of
19 what the intervention would be.

20 I confess to some misunderstanding of exactly
21 what the expectations were and we, as I say, put our
22 contentions together as a committee involving many many
23 dozens of volunteer hours in assessing a great deal of
24 public domain material.

25 I don't know how responsive that is to your

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1 first question. As to --

2 ADMIN. LAW JUDGE YOUNG: Did you, did you have,
3 I presume that you did have access to the expert you've
4 cited?

5 MR. LODGE: Yes. oh, yes.

6 ADMIN. LAW JUDGE YOUNG: Okay.

7 MR. LODGE: And we consulted with him
8 actively --

9 ADMIN. LAW JUDGE YOUNG: Okay.

10 MR. LODGE: -- in the weeks before, correct.

11 Your second question was essentially what would
12 we anticipate educating or, or contending evidentiarily at a
13 hearing on this issue.

14 Well, obviously we would attempt to through the
15 discovery process as well as the adjudication try to
16 establish, pin down exactly what efforts to the extent that
17 there are, have been deliberations that are a matter of
18 public record, to get to the bottom of the embrittlement
19 computations.

20 We would also expect to establish the
21 uncertainties that we've talked about today by way of
22 proving them as indisputable or maybe disputed but, but
23 fact.

24 And furthermore presumably if the Board were to
25 admit this contention then the Board is considering whether

1 or not 2014 projection of exceeding the criterion is
2 acceptable from a regulatory standpoint.

3 So we would certainly be attempting to make the
4 argument that it is not and that a plan in, announced,
5 enumerated in 2011 is not an adequate regulatory, doesn't
6 address the regulation.

7 ADMIN. LAW JUDGE YOUNG: And which regulation
8 are you referring to?

9 MR. LODGE: 50.61. Essentially along the lines
10 of, of the Exhibit 2 discussion.

11 ADMIN. LAW JUDGE YOUNG: The Exhibit 2
12 discussion being that 50.61 is a, is a, is a way to resolve
13 the 54.29 --

14 MR. LODGE: In, in 21 C iii, C-13 --

15 ADMIN. LAW JUDGE YOUNG: -- and 51 and 21 --

16 MR. LODGE: Yes, your Honor.

17 ADMIN. LAW JUDGE YOUNG: -- issues?

18 MR. LODGE: Yes. Finally you asked and I don't
19 want to, pardon me if I'm not couching this.

20 You essentially asked if, if, what's, what's
21 the problem in just waiting until a plan is promulgated and
22 objecting to it then, i.e. 2011.

23 Number one there might be a change in the
24 regulation, might by that time. Number two that's a
25 independent decision that we believe is, it's an ongoing

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1 licensing type of determination.

2 I believe that the scope of an objection which
3 could be raised at that time as I hinted this morning, may
4 not allow a litigation of the adequacy of the, of the
5 decision, the underlying basis for the ultimate decision
6 that's made may not, we may not be able to reach through
7 that proceeding to get to the, the underlying computations
8 of, calculations, margins of error discussions, that sort
9 of thing.

10 ADMIN. LAW JUDGE YOUNG: I'm sorry, I didn't
11 follow you.

12 MR. LODGE: Well --

13 ADMIN. LAW JUDGE YOUNG: You made references to
14 the decision and, and --

15 MR. LODGE: When, all right --

16 ADMIN. LAW JUDGE YOUNG: -- when you were
17 talking about the decision --

18 MR. LODGE: In 2000, let's say --

19 ADMIN. LAW JUDGE YOUNG: -- decision --

20 MR. LODGE: -- the decision we would anticipate
21 presently to be made in 2011 by the utility. The election
22 of, of options.

23 We, I'm, I'm not, I don't believe having
24 litigated before the NRC before in ongoing licensing
25 proceedings we do not believe that from a legal standpoint

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1 it would be possible to get to this issue of --

2 ADMIN. LAW JUDGE YOUNG: Which issue?

3 MR. LODGE: The issue of, of adequacy of the
4 solution, the resolution proposed by the, by the company
5 in, in that type of proceeding.

6 The, the basis, as I understand the NRC regs
7 for that type of proceeding and I'm by no means expert and
8 I didn't review them today or yesterday, it would appear to
9 me that all that need be proven by the NRC and/or utility
10 is that we've considered various technical criteria and
11 here's our resolution, our proposed resolution.

12 It, it is difficult to get behind or into the
13 basis of the computations at that point because it's a,
14 it's a narrow selection of alternatives as opposed to
15 laying out a long term plan to manage embrittlement which
16 is the scope of the 20 year proceeding.

17 ADMIN. LAW JUDGE YOUNG: Well, let me, let say
18 something and then anybody can correct me to the extent
19 that they think I'm wrong.

20 If there were a, a situation where the plant or
21 the company is, were to proposed to amend its license then
22 the standard that comes in at that point is essentially the
23 same standard as for the initial grant of initial license
24 of showing that whatever you propose to do is, is in
25 keeping with the safety and security and I can't remember

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1 the exact language. But it's actually a broader standard
2 than the license renewal standard as I understand it.

3 Now anyone can speak to that.

4 Mr. Lewis, do you want to speak to that?

5 MR. LEWIS: I really don't understand the, the
6 assertion that, you know, subsequent proceeding challenging
7 for example the efficacy of annealing that, the efficacy of
8 annealing would not be able to be looked at.

9 I mean I just don't understand the legal
10 argument, I'm sorry, your Honor.

11 ADMIN. LAW JUDGE YOUNG: There would be a, there
12 would be an application to amend the license and in that
13 application the applicant, and again feel free to add,
14 correct, whatever, the application, the applicant would
15 have to demonstrate that what they were proposing to do
16 was, met the, the general standard for safety and the
17 protection of the public.

18 And they would have to back that up and, and
19 there would be notification to the public and the public
20 would have the right to petition for a hearing to challenge
21 anything that was said in the application.

22 Now that's sort of a summary but.

23 MR. LODGE: Well, I think that, what would
24 actually be afoot here is the NRC would render a proposed,
25 or a decision or a proposed decision which then could be

1 challenged by someone petitioning for a hearing.

2 ADMIN. LAW JUDGE YOUNG: Actually that's not
3 generally the way it occurs in my understanding and again
4 subject to correction.

5 But generally what happens with a license
6 amendment is that there's an application to amend the
7 license and before the staff may or may not make a decision
8 before any ultimate decision is made and any adjudication
9 that may be granted based on an inadmissible contention.

10 If a, if a contention is admitted then the
11 applicant would have the burden of showing with respect to
12 the issue in the admitted contention that their application
13 of, meets the standard, the same standard for issuance of
14 an initial license mainly, mainly safety and the protection
15 of the public. And I'm not using the precise language.

16 But I'd ask counsel for the other parties have
17 I misstated anything or left anything out in your view?

18 MS. UTTAL: You're correct that when a license
19 amendment comes in it's noticed with an opportunity for a
20 hearing. But if there's no significant hazards then the
21 amendment may be granted prior to the hearing or prior to
22 the, to the finishing of the hearing.

23 But if not then you'll wait until, until
24 everything --

25 ADMIN. LAW JUDGE YOUNG: Right.

1 MS. UTTAL: -- is resolved. Once the federal
2 registry notice is published then they would have 60 days
3 to get their application, their intervention, petition and
4 contentions in.

5 ADMIN. LAW JUDGE YOUNG: You would not be
6 challenging any action that the NRC took. The NRC, what
7 the staff does on a separate track whether they made a no
8 significant hazards determination or, or had not made a
9 determination by the time this, the, the adjudication
10 proceeding were underway.

11 The issue is not whether what the NRC has done
12 is correct. The issue is whether the license amendment
13 sought by the applicant should be granted.

14 MR. LODGE: Well, your Honor, we're not clear
15 sitting here in 2005 what the license amendment
16 implications of selection of an alternative would be.
17 Because obviously among other things the alternative has
18 not been chosen.

19 And what I was hearing by way of discussions
20 before the lunch break was, well, there might be
21 implications for changing the operating, the previncable
22 operating temperature or some other feature.

23 That is a very indirect way to get at the heart
24 of the issue which is the adequacy of the, the computations
25 underlying the selection of that alternative.

1 If, if it would help the panel I wonder if we
2 might request to maybe respond briefly on this tomorrow if
3 we're, if we meet tomorrow.

4 ADMIN. LAW JUDGE YOUNG: I think we probably
5 will meet tomorrow. Yeah, I don't see any problem with
6 that, do you? Okay.

7 Okay. Well, why don't you finish up whatever
8 argument you want to make today and then we can move on
9 and, and do as much of the other contentions.

10 MR. LODGE: I have one last observation --

11 ADMIN. LAW JUDGE BARATTA: We're, we're going to
12 let him respond tomorrow then, right?

13 ADMIN. LAW JUDGE YOUNG: Yes, if he, and then if
14 you --

15 MR. LODGE: I just have --

16 ADMIN. LAW JUDGE YOUNG: -- want to add
17 anything tomorrow --

18 ADMIN. LAW JUDGE BARATTA: Oh, all right, all
19 right.

20 ADMIN. LAW JUDGE YOUNG: -- I can, as well.
21 But I mean, I didn't mean to imply that you couldn't
22 also --

23 MR. LODGE: There's one additional response I'd
24 like to make today. I, as I understand it, please correct
25 me if I'm wrong.

1 Tomorrow my intention would be to, to elucidate
2 a little bit more our objection if you will to the
3 possible, having to wait and see in 2011, okay.

4 My one final observation today is that it's
5 unfortunate that the NRC staff doesn't recognize Mr.
6 Bezdekas' qualifications. He was the, one of the in-house
7 engineering experts who identified Palisades as being one
8 of the embrittled plants as early as 1981 according to a
9 not man apart for instance the earth article we've read
10 that is based on upon a number of hard news sources in the
11 American Physical Society.

12 Mr. Bezdekas identified, was one who identified
13 in the first ten years of operation the Palisades plant as
14 having early earmarks or hallmarks of an embrittlement,
15 serious embrittlement problem among 14 other, 13 other
16 reactors.

17 And I think that his qualifications would be
18 readily discernable possibly in information that's not a
19 matter of public domain information but available to the
20 NRC staff as it was evaluating how to respond to the
21 contention.

22 Thank you.

23 ADMIN. LAW JUDGE YOUNG: Okay. All right.

24 Let's move on to , it's ten to two. If anyone
25 wants to take a minute to reorganize their papers to the

1 appropriate point, actually, it might be good to hear from
2 the, hear from all of you as to whether proceeding in the
3 order, the numbered order as they were submitted is the
4 best way to do it, or whether another order might be
5 appropriate, doing some of them together.

6 For example, it's been suggested maybe there's
7 a relation between 2 and 7. Anything, anybody have any --

8 MR. LEWIS: I would suggest we just go in
9 numbered order, your Honor.

10 ADMIN. LAW JUDGE YOUNG: Okay. Go ahead, then,
11 on Number 2. And I guess, I guess with regard to all these
12 remaining contentions, I think it would be helpful if you
13 focused a good, at least a good part of your argument on
14 the, particularly the next three; 2, 3 and 7, on the scope
15 issues in light of the Commission's Turkey Point decision
16 and subsequent case law on scope, because I think you have
17 a harder row to hoe with these on the scope issue.

18 MR. LODGE: Well, with respect to Contention
19 Number 2, we believe that the, our assertion, of course, is
20 that the natural process, if you will, of aging of the
21 reactor systems, including pipes, the plumbing,
22 essentially, and the inner and outer loops, is going to
23 increase routine licensed releases of radiation, and
24 possibly other toxic material.

25 ADMIN. LAW JUDGE YOUNG: But, the thing is,

1 you, to be within scope you need to allege that there's
2 something related to managing the actual effects of aging
3 or the time limited aging analyses, if you're talking about
4 the two being, it would have to address that directly. And
5 I think the arguments to be made are that these issues are,
6 if they haven't been pretty specifically identified as not
7 within the scope, I think it's pretty clear that you need
8 to have something that's directly related to aging in order
9 to be within the scope.

10 MR. LODGE: As we understand it, the drinking
11 water supply intake for the City of South Haven is not
12 currently operating as that; but within approximately a
13 decade, it will be turned on and will be integrated into
14 the local portable water supply system. And our contention
15 is that there is no management plan that takes into account
16 the potential for incremental radiation and toxic chemical
17 leakage from the plant, given that we believe that National
18 Oceanographic and Atmospheric Administration models confirm
19 the water flow in Lake Michigan toward that intake pipe.

20 ADMIN. LAW JUDGE YOUNG: Hasn't, didn't the
21 Commission in Turkey Point, though --

22 ADMIN. LAW JUDGE BARATTA: Yeah, that's what
23 I'm looking for, I thought, the problem I, excuse me for
24 interrupting, but the problem that I had with this one is
25 that it was so close to what the Commission ruled on in

1 Turkey Point, that it has to be already outside the scope.

2 That's --

3 ADMIN. LAW JUDGE YOUNG: There was a contention
4 in Turkey Point that alleged that aquatic resources at
5 Biscayne National Park will become contaminated with
6 radioactive material, chemical waste and herbicides during
7 the license renewal term, and consequently will endanger
8 those who consumer aquatic food from the area.

9 And, the second one had to do with allegations
10 that severe and unusual challenges to the safe storage of
11 high level radioactive spent fuel, whether in spent fuel
12 pools or at dry cask storage, presented a problem. And the
13 Commission found that both were outside the scope of a
14 license renewal proceeding.

15 And again, you know, our job is to be
16 independent adjudicators and base our decision on the law,
17 on the alleged facts; and doing that, make sure that we are
18 fair to all parties. In other words, we don't sway in
19 favor of any party, we base our decision on the law and the
20 regulations. And in these instances, the Commission has
21 been pretty clear in what it said, in case law precedent
22 that's based on the license renewal regulations.

23 ADMIN. LAW JUDGE BARATTA: Why doesn't -- I
24 guess in Turkey Point, the Commission said that the issues
25 raised in Contention 1, which is the one dealing with a

1 similar topic, raises only topics that are -- Part 51 is
2 generic Category 1 issues, and the contention therefore
3 grants as no dispute material to the NRC's license renewal
4 decision on Turkey Point, and therefore it's not liticable.
5 And if I could understand what, how yours differs from
6 that --

7 MR. LODGE: Differs factually in that we're
8 talking about a water line intake that would be a component
9 of a portable public water supply versus more indirect
10 seepage pollution into bodies of water.

11 ADMIN. LAW JUDGE YOUNG: Is there a Category 2
12 issue that identifies that as, basically for environmental
13 issues, if they're Category 1, they're generic; if they're
14 Category 2 then you, that would, might warrant a hearing if
15 there's a contention this otherwise meets the admissibility
16 standards.

17 MR. LODGE: Well, we believe it's a plan-
18 specific, I mean, it's a very fact-specific circumstance,
19 specific to the Palisades Plant in that, as I say, it's,
20 yes, we understand that, the Category 1 and Category 2
21 differentiation. Yes, it's very site-specific in that the
22 water intake is less than a mile from the shore, and it is
23 oriented in the explicit direction of the Palisades Plant.

24 ADMIN. LAW JUDGE YOUNG: I'm sorry, repeat that
25 again.

1 MR. LODGE: The pipe is less than a mile
2 offshore and aimed, if you will, oriented in the direction
3 of the Palisades Nuclear Plant; and as well, the, what we
4 understand to be the currents of Lake Michigan have a
5 tendency to flow in the direction of the intake pipe.

6 ADMIN. LAW JUDGE YOUNG: Issues involving
7 impacts -- impacts --

8 MR. LEWIS: Category 2 issues are at
9 51.53.(c)4, I believe; 51.53(c), and they're all listed
10 in --

11 ADMIN. LAW JUDGE YOUNG: Appendix B, aren't
12 they?

13 MR. LEWIS: Appendix B, I think Table B-1.
14 51.53(c) --

15 ADMIN. LAW JUDGE YOUNG: The beginning of
16 Appendix B talks about impacts of -- Table B-1, summary of
17 findings on -- issues for license renewal Nuclear Power
18 Plants. Impacts of refurbishment on surface water quality,
19 Category 1; impacts of refurbishment on surface water use,
20 water use conflicts, ground use, impacts of refurbishment
21 on ground water use and quality, generic issue, and their
22 various types of ground water quality degradation.

23 The ones that are, that are not generic are
24 listed as ground water use conflicts, portable and surface
25 water and D watering plants that use greater than 100

1 gallons per minute, ground water use conflicts plants using
2 cooling towers withdrawing makeup water from a small river,
3 ground water use conflicts -- wells, ground water quality
4 degradation cooling ponds at inland sights, those are the
5 ground use water and quality ones that would be site-
6 specific.

7 And as I understand the reasoning, the ones
8 that are identified as generic that they would be generic
9 to all plants, and so they are dealt with on that generic
10 basis. So, I guess my question would be, what authority
11 would you have that, you're saying that they're unique
12 aspects, but what legal authority would you have that this
13 could be argued to be within the scope, because of any
14 unique aspects, if not found in Appendix B or 51, any part
15 of 51, I guess, 51.53 was the one that Mr. Lewis mentioned.

16 MR. LODGE: I would need a few minutes to
17 review the regs to possibly be able to respond to that.

18 ADMIN. LAW JUDGE YOUNG: Well, the question
19 relates to 2, 3 and 7, and then on 8 the environmental
20 justice, there may be some other questions. Have you read
21 the case law about environmental justice and the policy
22 statement on environmental justice?

23 MR. LODGE: Yes.

24 ADMIN. LAW JUDGE YOUNG: Okay. You want to
25 take a break and then we'll come back and start going

1 through these after you've had a chance to look at it?

2 MR. LODGE: All right.

3 ADMIN. LAW JUDGE YOUNG: Okay, let's come back
4 at 4:00, we'll go for another hour or so, and then 5:30 we
5 start the Limited Appearance Statements.

6 (Off the record.)

7 ADMIN. LAW JUDGE YOUNG: Mr. Lodge, go ahead.

8 MR. LODGE: What was the pending point in our
9 discussion?

10 ADMIN. LAW JUDGE YOUNG: Well, the scope. The
11 scope issue is a significant one --

12 MR. LODGE: The scope on the water intake
13 issue.

14 ADMIN. LAW JUDGE YOUNG: Right.

15 MR. LODGE: We believe that the, that this is a
16 Category 2 issue in two possible respects, and in looking
17 at the Appendix B of Part 51, one of them, one reason is
18 that we believe that the lake is comprised in part of
19 ground water, but there is a ground water use conflict
20 involving a portable water supply, which is, shows as a
21 Category 2 matter of concern.

22 Further, I would point out that one of the
23 other facts specific to this controversy is that when the
24 water intake was planned and approved and constructed by
25 South Haven, it was presumably based upon the belief that

1 the plant, that Palisades, would not be operating in the,
2 at the end of the period of ten years from now. And --

3 ADMIN. LAW JUDGE YOUNG: Could I just ask you,
4 do you know whether the plant uses more than 100 --

5 ADMIN. LAW JUDGE BARATTA: Gallons per minute.

6 ADMIN. LAW JUDGE YOUNG: -- gallons per minute?

7 MR. LODGE: No, I do not.

8 ADMIN. LAW JUDGE BARATTA: Because that
9 determines whether it's one or two.

10 MR. LODGE: Right.

11 ADMIN. LAW JUDGE BARATTA: What, it's my
12 reading of, and please, somebody, if this is an incorrect
13 reading, when we talk about a conflict, what we talk about
14 is, the plant and some other entity are using a water
15 source for the same purposes, and as a result causing the
16 other entity to be denied use of that water.

17 In other words, if we're both, the example
18 that's given in Turkey Point is the plant's using it for
19 whatever reason, for irrigation, okay?

20 MR. LODGE: Right.

21 ADMIN. LAW JUDGE BARATTA: And somebody else is
22 using it for irrigation, and then there's a drain on the
23 source so that there's a competition going on there, as
24 opposed to what you were alleging in the contention which
25 is, it's not a competition, it's a contamination issue.

1 MR. LODGE: Right.

2 ADMIN. LAW JUDGE BARATTA: The conflict here is
3 two entities trying to use the same water for the same
4 purpose and because of, there's not enough, you can't get
5 there from here. And that's why there's distinction
6 between less than 100 and greater than 100. So, it's not
7 clear to me how that would move your contention stated into
8 a Category 2, versus a Category 1, in other words, become a
9 plant-specific issue, a generic issue.

10 MR. LODGE: Right.

11 ADMIN. LAW JUDGE BARATTA: And my, if anybody,
12 the staff of the applicant, if I'm misquoting what it, the
13 regulations are saying --

14 MS. UTTAL: That's correct, you're, you are
15 correct.

16 MR. LODGE: May I articulate what we believe the
17 second part of Appendix B? That might apply here.

18 ADMIN. LAW JUDGE BARATTA: Sure, yeah, please.

19 MR. LODGE: It is under the socioeconomic's
20 section of the appendix, and is entitled, "Public Services
21 and Public Utilities", describes as a Category 2, an
22 increased problem with water shortages at some sites may
23 lead to impacts of moderate significance on public water
24 supply availability. As I was indicating, at the time that
25 the water intake was conceived and constructed, it was

1 anticipated, the public record indicated that the plant was
2 going to be operating, I guess, through 2011.

3 And we believe that this is actually a late, a
4 later developing controversy as a result, because of the
5 fact that the plant may now be operating through 2031. In
6 other words, it was conjectured that the plant would not be
7 operating and would not be posing a risk of contamination
8 at the time that the water intake would go into service as
9 a portable water supply source.

10 ADMIN. LAW JUDGE BARATTA: What was the
11 socioeconomic, what section of the regulations is that, I
12 missed it.

13 MR. LODGE: It's in Appendix --

14 ADMIN. LAW JUDGE YOUNG: It's in this next one.

15 MR. LODGE: Yeah, it's in Appendix B, right,
16 the following page.

17 ADMIN. LAW JUDGE YOUNG: It was that page.
18 This one, I think.

19 MR. LODGE: It says, Public Utilities.

20 ADMIN. LAW JUDGE YOUNG: No, no, I'm sorry,
21 it's this one here I think you're talking about, the third
22 one down?

23 MR. LODGE: Yes.

24 ADMIN. LAW JUDGE BARATTA: Okay, but --

25 MR. LODGE: We anticipate that there might be a

1 different view on the community's part as to the safety and
2 security of their water supply as a result of an extended
3 operation.

4 ADMIN. LAW JUDGE BARATTA: So what you're
5 interpreting as the reference to water shortages as, are
6 you implying that that, water, a shortage of clean water or
7 something, is that what you're implying that that means?

8 MR. LODGE: That the South Haven community may
9 view it as an undesirable and unanticipated contamination
10 source.

11 MS. UTTAL: Judge; I believe that that section,
12 the staff tells me, relates to the use of water by the
13 staff of the plant, by the addition of however many more
14 people are working there, not use of other entities.

15 ADMIN. LAW JUDGE YOUNG: Well, why don't you go
16 ahead and make your argument, and then we'll just move on
17 and hear the arguments of the, of the NMC and the staff.

18 MR. LODGE: The argument on this point?

19 ADMIN. LAW JUDGE YOUNG: Yes, Number 2.

20 MR. LODGE: I believe we've essentially made
21 it, that the, it falls within the scope because it is a
22 site-specific type of problem and matter of public,
23 portable water supply concern.

24 ADMIN. LAW JUDGE YOUNG: Do you want to address
25 the other --

1 MR. LODGE: May we address them separately?
2 You're -- with the other contentions?

3 ADMIN. LAW JUDGE YOUNG: I wasn't going to say
4 the other two contentions --

5 MR. LODGE: Oh, sorry.

6 ADMIN. LAW JUDGE YOUNG: I was going to say the
7 other arguments about the vagueness and lack of
8 specificity.

9 MR. LODGE: The BEIRS VII report, we believe,
10 changes the parameters. The BEIRS VII report was co-
11 sponsored among other entities by the Nuclear Regulatory
12 Commission, and it's conclusion suggests very strongly that
13 there is not a safe level of radiation when you're talking
14 about human exposure.

15 We believe that that figures into the
16 assessment of this particular threat to the public water
17 supply. We believe that --

18 ADMIN. LAW JUDGE YOUNG: But does -- how does
19 that bring, how would, are you saying that would somehow
20 bring it within the scope, or --

21 MR. LODGE: We think that in a practical sense
22 that the municipality of South Haven, the citizens of South
23 Haven and any other users of the municipal water supply,
24 are, once they're better educated about the, about the
25 findings of the BEIRS VII study, may well reject the use of

1 that particular part of the system to draw water from Lake
2 Michigan.

3 ADMIN. LAW JUDGE YOUNG: The question I had
4 asked, and I don't want to, you can make that argument,
5 but, was, my question related to the specificity and the
6 arguments that your contention and basis were vague, and I
7 don't, I know you didn't mention the BEIRS VII report in
8 the original contention.

9 You, basically the allegation you make,
10 assuming scope, is that due to the direction of the flow
11 and the close proximity to the drinking water intake, that
12 there would be contamination. And then you say you hope to
13 produce public records of toxics and radiation testing.

14 MR. LODGE: Which we, some of which we provided
15 in the reply to the contentions.

16 ADMIN. LAW JUDGE YOUNG: And again, you know,
17 your other, a strict requirement that's been made stricter
18 --

19 MR. LODGE: Correct.

20 ADMIN. LAW JUDGE YOUNG: But those are the
21 requirements that govern, so I don't want you to rely on
22 what you provided in your reply and assume that we're going
23 to consider that --

24 MR. LODGE: Correct, I understand.

25 ADMIN. LAW JUDGE YOUNG: Because -- say what

1 we're going to do on those types of issues.

2 MR. LODGE: Getting current data on the
3 radioactive content of the water in and around the intake,
4 it's not possible at the present time because of it's
5 current use. It is owned by Pacific Gas and Electric and
6 is a natural gas facility, and we don't have permission,
7 nor is there public domain data available, but we don't
8 have permission to obtain any kind of raw data, any kinds
9 of samples that we could provide data to the panel with,
10 and the parties.

11 We have no further argument on this contention.

12 ADMIN. LAW JUDGE YOUNG: Okay. Mr. Lewis?

13 MR. LEWIS: Thank you. Petitioner has offered
14 this contention as a safety issue. They divided their
15 contention from the safety issues and environmental issues
16 and this is one they listed as a safety issue, which I
17 assume means that they're challenging the required showing
18 in Part 54 as opposed to the Environmental Review. Clearly
19 this is not a contention that has anything to do with the
20 management of aging.

21 Petitioner's saying, well, contamination can
22 result from leaky systems, but they do absolutely nothing
23 to identify any error in our integrated plan assessment,
24 they don't identify any component within the scope of the
25 rule that may leak, or any inadequacy in any of the aging

1 management programs. So, they clearly do not raise an
2 issue within the scope of Consumer Part 54.

3 With respect to the environmental issues that
4 are within the scope of this proceeding, it clearly falls
5 within none of those. The better place to look for, one of
6 the issues that can be raised is 50.51.(c)3, those define
7 specifically the issues that have to be addressed by an
8 applicant --

9 ADMIN. LAW JUDGE YOUNG: 50.51 or 51 --

10 MR. LEWIS: Sorry, 51.53.(c)3, excuse me --
11 10C4-51.53.(c)3 raises the environmental issues that have
12 to be examined in the license renewal procedure. And, the
13 contention that the Petitioners are raising does not fall
14 within the scope of any of those issues.

15 Petitioner's have referred to two issues now
16 for the first time. They've referred to the, an issue
17 concerning ground water use conflict, which is addressed in
18 51.53.(c)3C, that issue has to do with whether a plant is
19 withdrawing groundwater, and groundwater does not mean
20 surface water, groundwater means water in the aquifers,
21 whether they are pumping so much water that they are
22 depressing the aquifers, and they're creating a zone of
23 influence that then prevents other people from withdrawing
24 water from wells. That's clearly nothing to do with the
25 assertion of how the contamination of intake for a water

1 supply system.

2 The second reference they made is to
3 socioeconomic impacts on public utilities with water
4 shortages. That issue is defined more specifically in
5 51.53(c)3I, the issue has to do is whether license renewal
6 is going to cause such a population increase because of a
7 large refurbishment task force that has to come on to
8 refurbish the plant. They can get a great influx of
9 workers and the local water supply can't serve those
10 increased number of workers and their families and whatever
11 secondary increases in population might result from a large
12 increase in the workforce.

13 51.53(c)3I specifically refers to the impacts
14 from the population increase. This has nothing to do with
15 a contamination of the water supply system, so neither of
16 those Category 2 issues encompass this contention.
17 Petitioner has suggested that, this site-specific aspect so
18 they can raise it, but a Petitioner cannot raise a Category
19 1 issue as the issues that the NRC has resolved generically
20 just by saying, there's some site-specific aspect.

21 The Category 1 issues are resolved by rule, and
22 therefore they can only be reopened by a petition for a
23 waiver of those rules, and certainly the Petitioners have
24 made, filed no such petition in this proceeding. The
25 Petitioner has also referred to the BEIRS VII report, I'm

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1 not sure what their assertion of the significance of that
2 report is.

3 The releases from the plant are governed by
4 Part 20, there's been no showing, this really goes to
5 basis, this is outside the scope, but there's been no
6 showing that there's any releases in excess of the Part 20
7 limits, and that alone is a basis for denying this
8 contention.

9 The only assertion that I've heard recently
10 about the BEIRS VII report from the public interest groups
11 is that it's reaffirmed the appropriateness of the linear
12 no threshold hypotheses for establishing radiation
13 protection standards. The Part 20 limits are, in fact,
14 based on the linear no threshold hypothesis, so there's no
15 inconsistency between the BEIRS VII report that I'm aware
16 of and the NRC's current regulations. If there were, that
17 would require away from the ruling, the Part 20 regulations
18 are certainly not subject to attack in this proceeding,
19 absent permission from the Commission.

20 Finally, I do want to clear up about the intake
21 that the Petitioners seem to be referring to. I think
22 there may be some confusion from what it's, what's been
23 referenced. The current intake for the South Haven water
24 supply system is, operational I think it's about four miles
25 north of the plant and about a mile out to the lake.

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1 That intake is subject to sampling of the
2 Palisades REMP program, the Radiological Environmental
3 Monitoring Program. The Petitioners say, well, that's like
4 the fox guarding the henhouse, but this is an NRC mandated,
5 NRC inspected program, and there's no basis for suggesting
6 that the ongoing laundering of that current intake is in
7 any way inadequate.

8 There is a new plant that was built adjacent to
9 Palisades, it's the Covert Generating Plant, I think is the
10 name of it. It's a, I believe it's a combined cycle plant,
11 and it built a new intake for that plant. My understanding
12 is the city of South Haven asked the Covert Generating
13 Company, which is an LLC, to design the intake so that it
14 could be used in the future to supply old water to a new
15 public water supply system if one is built.

16 But that is not currently the case, so it has
17 the capacity, I think the pumps have the capability to
18 provide intake, provide a water supply, new water treatment
19 facility in the future. But currently it's not serving in
20 that capacity, it's only providing water to the Covert
21 Generating Plant.

22 ADMIN. LAW JUDGE YOUNG: Is the plant use, does
23 the plant use more than 100 gallons per minute or less? Do
24 you know?

25 MR. LEWIS: Does Palisades withdraw ground

1 water at more than 100 gallons per minute?

2 ADMIN. LAW JUDGE YOUNG: Mm-hmm.

3 MR. LEWIS: I'm told no; I'm sorry, I wasn't
4 ready for that question.

5 ADMIN. LAW JUDGE YOUNG: Okay. Well, that
6 distinguishes under the ground water use and quality which
7 are generic and which, you say no they, it does not --

8 MR. LEWIS: That issue will be addressed in our
9 environmental report. It is a Category 2 issue, we will
10 explain --

11 ADMIN. LAW JUDGE YOUNG: Category 2?

12 MR. LEWIS: Yes, that ground water conflict
13 issue is a Category 2 issue, and therefore our
14 environmental report has to explain why it's applicable or
15 not.

16 ADMIN. LAW JUDGE YOUNG: Why it's what?

17 MR. LEWIS: Applicable or not to our plant. A
18 number of the Category 2 issues are not necessarily
19 applicable to each plant.

20 ADMIN. LAW JUDGE YOUNG: Well actually, if it's
21 less than 100 gallons per minute, it's a Category 1 issue.

22 MR. LEWIS: It's really a Category 2 issue, but
23 what the generic environmental impact statement determined
24 is if plants are drawing less than 100 gallons per minute,
25 there should be no significant environmental impact. We

1 don't know what old plants are, therefore we require each
2 applicant, in their environmental report, to explain if
3 they are above this limit. If there is, there's a further
4 assessment, if they're not, then everything is within the
5 scope of the GEIS.

6 ADMIN. LAW JUDGE YOUNG: And, just one other,
7 you referred to 51.53(c)3 --

8 MR. LEWIS: I, capital I.

9 ADMIN. LAW JUDGE YOUNG: Right, and then, but
10 what I was looking at, under C3, small Roman Numeral 2.

11 MR. LEWIS: Have I missed a Roman 2, yes, I'm
12 sorry, it's 51.53(c)3, small double i, I missed the small
13 double i.

14 ADMIN. LAW JUDGE YOUNG: And then --

15 MR. LEWIS: Big capital I.

16 ADMIN. LAW JUDGE YOUNG: And then B or I, you
17 said I?

18 MR. LEWIS: I.

19 ADMIN. LAW JUDGE YOUNG: Big, large I?

20 MR. LEWIS: Large I. Too many sub-sections in
21 that regulation.

22 ADMIN. LAW JUDGE YOUNG: So you don't fall
23 under any of the --

24 MR. LEWIS: The specific provision I was
25 referring to in 51.53(c)3ii, big capital I is the

1 statement, "Additionally, applicant should provide an
2 assessment of the impact of population increases
3 attributable to the proposed action on public water
4 supply". That is the issue that is a Category 2 issue, and
5 again, it has nothing to do with a contamination scenario,
6 it has to do is, is there going to be a large population
7 increase from a great increase in the workforce at the
8 plant, that then taxes the local public services.

9 ADMIN. LAW JUDGE YOUNG: Okay. Anything
10 further?

11 MR. LEWIS: No.

12 ADMIN. LAW JUDGE YOUNG: Ms. Uttal?

13 MS. UTTAL: Staff has nothing to add.

14 ADMIN. LAW JUDGE YOUNG: Okay. Anything
15 further from you on this one?

16 MR. LODGE: No, your Honor.

17 ADMIN. LAW JUDGE YOUNG: Okay. Then let's go
18 onto Number 3, which is the fuel storage, storage pads --

19 MR. LODGE: Yes.

20 ADMIN. LAW JUDGE YOUNG: -- issue. Which is, I
21 believe, also comparable to the second contention and
22 Turkey Point, that we wanted to hear from you on.

23 MR. LODGE: Very good. I believe that from a
24 drafting standpoint, based on it's face, this particular
25 contention has fewer problems than we have discussed,

1 expecting other contentions. Our contention is that, I
2 believe I understand that the objection is going to be that
3 this is a separately regulated type of facility.

4 We believe that this is a structure on-site,
5 under the exclusive control of the utility company, and I'm
6 talking about the concrete pads, on which dry casks are
7 located, that is certainly something that poses a potential
8 problem because of the passage of time. And with the
9 passage of time comes the increasing possibility of an
10 earthquake.

11 What you have, of course, is a second floor NRC
12 technical person --

13 ADMIN. LAW JUDGE YOUNG: Back up for a second.

14 MR. LODGE: Yes.

15 ADMIN. LAW JUDGE YOUNG: Let me hear that, you
16 just made a statement that, that I thought was going to end
17 one way, and it ended with increasing possibility of -- I
18 thought you were going to end it by referring to increasing
19 aging somehow, but you ended it by saying, increasing
20 possibility of earthquakes. Is that what you said?

21 MR. LODGE: Yes, it is.

22 ADMIN. LAW JUDGE YOUNG: Okay, so I guess --

23 MR. LODGE: The gist of Dr. Landsman's
24 objection as articulated while he was an official at the
25 NRC, was that there is not an adequate safety margin in the

1 design and construction of the second concrete pad, in
2 particular.

3 ADMIN. LAW JUDGE YOUNG: Which, and again, I
4 don't want to cut you off --

5 MR. LODGE: Right.

6 ADMIN. LAW JUDGE YOUNG: -- but I am for a
7 moment, and then you can start up again, but if it's an
8 aging issue, then it may be relevant in a license renewal
9 context.

10 MR. LODGE: Correct.

11 ADMIN. LAW JUDGE YOUNG: If there's another
12 issue, it may be a serious issue for which there may be
13 other avenues of challenge, but they wouldn't fall within a
14 license renewal proceeding if they didn't relate to aging
15 or it didn't, weren't a site-specific environmental issue.

16 MR. LODGE: Sure.

17 ADMIN. LAW JUDGE YOUNG: So, that's why I
18 interrupted in the first place, because I wasn't sure how
19 the increased possibility of an earthquake by virtue of
20 passage of time would fall within either of those.

21 MR. LODGE: I understand that. Let me finish
22 the thought here.

23 ADMIN. LAW JUDGE YOUNG: Okay.

24 MR. LODGE: Perhaps it will help.

25 ADMIN. LAW JUDGE YOUNG: If you want to start

1 over again, I apologize.

2 MR. LODGE: No, that's all right.

3 ADMIN. LAW JUDGE YOUNG: I'm interrupting your
4 train of thought.

5 MR. LODGE: The surge pads are part of a
6 continuum of waste, spent fuel management at the site. The
7 spent fuel pool at Palisades was full to capacity by 1993,
8 which necessitated the resort to the use of dry cask on-
9 site storage. That prospect appears inevitably that dry
10 casks will continue to be used in an on-site storage factor
11 into the renewal period, probably, possibly, let's just put
12 it at that, possibly for the entirety of the 20-year
13 period.

14 I think functionally there is very little
15 distinction that can be made between the spent fuel
16 facility and the dry cask storage facility in terms of the
17 fact that there's a musical chairs type of process that
18 occurs when there is a periodic refueling. There will be
19 periodic refuelings of the plant during the 20 year
20 extension period, of course; there will be additional
21 motion movement of, after the five year holding period in
22 the spent fuel pool, of spent fuel into dry casks that will
23 be erected on the second pad.

24 The second pad is not the only focus of our
25 concern, but for purposes of discussion it is particularly

1 important, because Dr. Landsman, while an NRC employee,
2 identified and, in a public record type of fashion,
3 registered objections to the conformants of that pad's
4 construction design with, and location, with earthquake
5 safety regulations.

6 We believe that since this is a structure, on-
7 site, and I understand, and the Petitioners understand
8 well, that there's a separate licenser, if you will, that
9 has allowed the use of the pads to hold dry storage casks.
10 But we're not talking about the casks, we're talking about
11 the structures, the dry, pardon me, the concrete pads
12 themselves.

13 We believe that it is within the scope, as
14 delineated in Turkey Point, spent fuel is within the scope,
15 arguably, subject matter jurisdiction, if you will, of, the
16 Commission mentioned that in the Turkey Point decision, we
17 believe that this is simply another stage of the spent fuel
18 storage process.

19 ADMIN. LAW JUDGE YOUNG: How would the spent
20 fuel come in? You're, I think you're saying this is an
21 environmental contention, how would that, if you were to
22 allege that, how would that come into, how would it be
23 within the scope?

24 MR. LODGE: Well, spent fuel, the spent fuel
25 pool is something that the panel can consider the

1 management capability of NMC in, for the license extension
2 period. We believe that part of that management entails
3 emptying the spent fuel and moving it elsewhere on-site.

4 ADMIN. LAW JUDGE YOUNG: Are you, when you're
5 talking about management, are you talking about management
6 effects of aging? And if not, are you talking about any
7 site-specific environmental issue?

8 MR. LODGE: It is a site-specific environmental
9 issue, we believe.

10 ADMIN. LAW JUDGE YOUNG: And, can you help me
11 by pointing me to --

12 MR. LODGE: Once again, 51.53.

13 ADMIN. LAW JUDGE YOUNG: -- resources --

14 ADMIN. LAW JUDGE BARATTA: I guess I'd like to
15 understand, when you do that, again, going to Turkey Point,
16 the, in that instance, the intervenor maintained before the
17 License Board that the possibility of catastrophic
18 hurricanes justified this plant-specific contention on
19 spent fuel accidents. If I substituted catastrophic
20 hurricanes, if I substituted the word catastrophic
21 earthquakes, what would be the difference?

22 Because it just seems like the two are so
23 parallel and the Commission already rejected it, then, you
24 know, what is unique about your contention that
25 differentiates it from the one in Turkey Point, which was

1 rejected?

2 ADMIN. LAW JUDGE YOUNG: And I think what we're
3 looking at here is, you know, there may be serious issues
4 raised, but the question for us has to be, and is limited
5 to, whether it falls within the scope of this proceeding in
6 addition to meeting the other requirements, but if it's not
7 within the scope of this proceeding, then any remedy would
8 be through the main, the other two would be the 22.06 and
9 the rule making under 28.02, I think it is, I'm not sure.

10 ADMIN. LAW JUDGE BARATTA: 28.

11 ADMIN. LAW JUDGE YOUNG: 22.06 and then 22.80
12 or something, let's see. 22.06 or 28.02, either one. I
13 think the Commission discussed those recently in a decision
14 in the Millstone case that was issued just last week.

15 MR. LODGE: The characteristics of the sand at
16 the Palisades site, is such that it's been referred to by
17 geologists as singing sand. It, dunes can move very
18 quickly, erosion over the period of the license extension
19 is a very unpredictable phenomenon that has not been
20 quantified adequately in the application at all.

21 ADMIN. LAW JUDGE YOUNG: Well, again, I'm sorry
22 to keep interrupting you, but I really want to try to get
23 us focused on this, you may be raising a very serious
24 issue, I don't know. You may be raising a very serious
25 issue that needs to be addressed, and certainly everybody

1 knows that what happens with -- has a big effect on the
2 management of high level waste and spent fuel, but all we
3 have jurisdiction over here are things that would be,
4 relate to aging issues or site-specific environmental
5 issues that would not be generic issues under Appendix B of
6 51.53, Appendix B 51, Part 51.

7 So, we need to, I guess, go through the same
8 process that we did for the last one in terms of, just
9 saying that it's site-specific, or talking about the
10 dangers of the sand movement is a little general in terms
11 of giving us the assistance we need to see how this would
12 fall within or not, the scope of the license renewal
13 proceeding.

14 MR. LODGE: May I have a moment, please?

15 ADMIN. LAW JUDGE YOUNG: Particularly in light
16 of Turkey Point. And you might want to look under Uranium
17 Fuel Cycle and Waste Management Section of the Appendix B.
18 Part 51, sub-Part A, Appendix B, yeah.

19 MR. LODGE: The erosion potential is a function
20 of time. I would point out that one of the circumstances,
21 the circumstances enumerated in the Landsman declaration,
22 and I understand that that came in as part of the reply to
23 contentions, but the Landsman declaration points out that
24 the, a major problem with the second pad in particular,
25 neither was constructed in contact with bedrock, and in

1 fact, there's a, perhaps a 100 or even 150 feet of sand
2 that, in the case of the second pad, was mechanically
3 tamped down, pressure tamped, to make a foundation for the
4 construction of the pads.

5 Concrete ages over time, erosion can change the
6 distribution of stress from the great weight of the casks
7 themselves over time. Even in the absence of an
8 earthquake, there can be changes in short in the
9 structure's capability to adequately hold the great weight
10 of the dry casks.

11 We believe that it falls within the scope of
12 Turkey Point in this way that in the decision it says,
13 "Left unmitigated, the effects of aging can overstress
14 equipment, unacceptably reduce safety margins, and lead to
15 reduction of required plant functions, including the
16 capability to shut down the reactor", whatever, "and
17 otherwise prevent or mitigate the consequences", basically
18 to make it impossible to mitigate consequences of accidents
19 with a potential for off-site exposures. So, we believe
20 that it is within the scope.

21 And finally, we've not, admittedly have not
22 filed a motion for this, but certainly have been
23 considering the possibility of a 10-CFR-2.758 request for a
24 waiver based upon the exception, the exceptional
25 circumstance here, where you have what we believe to be,

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1 and suggest prima facie, is an authoritative expert opinion
2 that was rendered while the employee was an employee of the
3 NRC, and which still is, the controversy exists as an
4 unresolved issue, that is to say that the potentially
5 defective designer construction of the pads persists as a
6 problem today.

7 We've learned from a federal register notice
8 that permission has been granted to the utility to load
9 seven additional dry storage casks on the second pad during
10 the month of October, I don't know if that's actually
11 happened, but the prospect is very distinct. And the
12 Commission, as a regulator, has appeared to have committed
13 itself in the face of an unresolved issue with effects for
14 a public health safety with index.

15 ADMIN. LAW JUDGE YOUNG: So, which rule is,
16 you're asking for an exemption from a particular rule?

17 MR. LODGE: From, if indeed the panel were to
18 find that this issue, on it's face falls outside the scope
19 of, I guess, Part 54, that we would, we would respectfully
20 request that a waiver be considered to allow the issue in.
21 I will, tonight, look at, follow the panel's suggestion and
22 I'll look up the Millstone discussion. I'm very curious to
23 see that.

24 ADMIN. LAW JUDGE YOUNG: Right. And actually,
25 what's, I'll just tell you briefly that, what appears to be

1 the bottom line on this, apart from pointing to the
2 alternate routes of 22.06 and 28.02, the Commission says
3 that you have to meet all four factors of, let's see -- if
4 someone could help me with the exemption, what's the
5 section, 2 --

6 ADMIN. LAW JUDGE TRIKOUROS: 758.

7 MR. LEWIS: Not any more.

8 ADMIN. LAW JUDGE YOUNG: 2.758 -- pardon?

9 MR. LEWIS: 2.390 now, I can't remember. It's
10 changed.

11 ADMIN. LAW JUDGE YOUNG: I know. Let's see,
12 3.09(c) I think maybe. 3.09(c), let's look at that.

13 MS. WOLF: That's non-timely filings.

14 ADMIN. LAW JUDGE YOUNG: No, that's non-timely
15 filings, I'm sorry, the exemption rule, the rule that
16 governs exemption of rules.

17 ADMIN. LAW JUDGE TRIKOUROS: It's 2.335.

18 ADMIN. LAW JUDGE YOUNG: 335, okay, okay, what
19 the Commission points out is that in order to grant an
20 exemption or waiver, you must meet four factors, all four.
21 The rule's strict application would not serve the purposes
22 for which it was adopted; the movement has alleged special
23 circumstances that were not considered either explicitly or
24 by necessary implication as a rule-making proceeding
25 leading to the rule sought to be waived, and we're talking

1 about the license renewal, scope rule.

2 Three, the circumstances are unique to the
3 facility rather than common to a large class of facilities,
4 and by waiver of the regulations necessary to reach a
5 significant safety problem. And then, the, I believe the
6 Commission ends up its discussion by referring to the 28.02
7 alternative brief that could be taken, and you probably do
8 need to read that if he's give it to you.

9 MR. LODGE: Absolutely will.

10 ADMIN. LAW JUDGE YOUNG: If you need a copy we
11 can --

12 MR. LODGE: That would be, that would be great,
13 thank you.

14 ADMIN. LAW JUDGE YOUNG: Because that, that
15 case involved a certified question to the Commission,
16 suggesting that the Commission might consider whether a
17 waiver was appropriate in that case.

18 MR. LODGE: Is, I mean, was the Commission --

19 ADMIN. LAW JUDGE YOUNG: They're responding to
20 the Board's certifications.

21 MR. LODGE: Okay, all right. Thank you.

22 ADMIN. LAW JUDGE YOUNG: So, if you want to
23 address that tomorrow --

24 MR. LODGE: Yes.

25 ADMIN. LAW JUDGE YOUNG: That's fine, but it

1 sounds as though what you're saying is that unless we
2 somehow found this to be a site-specific issue, that would
3 bring it under some Category 2 --

4 MR. LODGE: Right.

5 ADMIN. LAW JUDGE YOUNG: -- and exclude it from
6 all the Category 1 issues, that you would ask to have the,
7 an exemption from the rule.

8 MR. LODGE: That is correct.

9 ADMIN. LAW JUDGE YOUNG: Do you have anything
10 else to say on this point?

11 MR. LODGE: No, not at this point, thank you.

12 ADMIN. LAW JUDGE YOUNG: Okay. Mr. Lewis?

13 MR. LEWIS: Thank you, your Honor. The Turkey
14 Point decision is squarely on point. I agree with Judge
15 Baratta, it couldn't be closer unless it had referred to an
16 earthquake instead of hurricane. The storage of spent fuel
17 on-site is a Category 1 issue, and in fact the Category 1
18 determination was that spent fuel could be stored safely
19 and without environmental impact during the period of
20 extended operation. So it's absolutely clearly barred in
21 this proceeding absent a waiver, and there has been no
22 request for a waiver in this proceeding.

23 The Petitioners raised this as an environmental
24 issue, and that's why the Turkey Point decision applies,
25 but it's also clearly not a safety issue under Part 54, the

1 contingent has absolutely nothing to do with aging
2 management, and it does not relate to any component within
3 the scope of the rule. Those components are defined in
4 54.4, and it's just, it does not fall within any of those
5 provisions because it is a separately licensed facility.

6 Just one last point, I did hear Petitioners
7 refer to erosion being time-related. To the best of my
8 recollection erosion isn't mentioned anywhere in the
9 original petition, the reply, or Dr. Landsman's affidavit.
10 The issue had to do with liquefaction and amplification
11 from earthquakes, and so my belief, based on a quick check,
12 is that this is a brand new assertion that's just popping
13 up for the first time in the pre-hearing conference.

14 ADMIN. LAW JUDGE YOUNG: Anything further?

15 MR. LEWIS: That's --

16 ADMIN. LAW JUDGE YOUNG: Ms. Uttal?

17 MS. UTTAL: I have nothing to add, your Honor.

18 ADMIN. LAW JUDGE YOUNG: Okay, it is almost ten
19 to 5:00, do you think that that's enough time to get into 7
20 or do you want to save 7 and 8 for tomorrow and take a
21 little bit longer break before the Limited Appearance
22 Statements?

23 MR. LODGE: I would request that, your Honor.

24 ADMIN. LAW JUDGE YOUNG: Any objection?

25 MR. LEWIS: Not --

1 ADMIN. LAW JUDGE YOUNG: All right, then we'll
2 come back tomorrow and finish 7 and 8 along with your
3 additional comments on Contention 1 and Contention 3. And,
4 we will reconvene here at 5:30 to hear Limited Appearance
5 Statements, and all, counsel for all the parties are
6 welcome to stay up here, the only thing I would ask is, Mr.
7 Lewis, if you wouldn't mind moving one direction or another
8 since the, or at least we, somehow get the podium for the
9 Limited Appearance Speakers.

10 MR. LEWIS: I'll have to move into the --

11 ADMIN. LAW JUDGE YOUNG: Yes, so that we can
12 maybe pull that forward and be able to see and hear
13 everybody. Okay, thank you.

14 (Whereupon at 4:48 p.m., the meeting
15 was adjourned.)

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CERTIFICATE

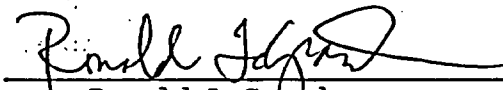
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in the matter of:

Name of Proceeding: Nuclear Management Company
Palisades Nuclear Generating
Station License Renewal

Docket Number: 50-255-LR;
ASLBP No: 05-842-03-LR

Location: South Haven, MI

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