UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	Docket No. 50-309-OLA
MAINE YANKEE ATOMIC POWER STATION,	(To Increase and Modify
(Maine Yankee Atomic Power Company),	Spent Fuel Pool Storage
Applicant.)	and Systems; Compaction)

ADDITIONAL SPECIFIC CONTENTIONS ON BEHALF OF SENSIBLE MAINE POWER

Pursuant to the Order from this Board of July 20, 1982, Intervenor Sensible Maine Power here propounds the following Specific Contentions.

Introduction

The contentions set forth below are drawn from several sources. Some are prior contentions by SMP previously deferred as premature; others derive from prior contentions ruled admissible but as to which SMP urges further or additional consideration to be necessary for proper proceedings here; and still others are essentially "new" or sufficiently different to stand alone.

Where prior contentions are reasserted, they will be cited by number and subject from the SMP pleading of October 5, 1981; where argument in support of the same has already been made, it will be cited from the SMP pleading of January 24, 1982; and both the presentation and the argument of such contentions are supplemented herein.

SMP respectfully directs the attention of the Board to the "Comments" by SMP's technical advisor Mr. Shadis, a copy of which is enclosed and a reading of which is recommended at this time; the numeration used in the same is keyed to that of the Staff's SER and EIA.

SMP also urges the Board against the rewriting of the following contentions unless such be wholly necessary for their admission. There are several reasons for this. First, a pleader's own specific assertions, excepting amendments to reflect legal or factual variance, should usually control. Second, one of the primary purposes of these proceedings is that Applicant and Staff clearly and substantially demonstrate that the proposed amendments conform with the strictest protection of public safety, health and welfare, and of environmental interests. SMP respectfully submits that some of the prior rewriting of contentions practiced by the Board[1] may have changed such focus, had the effect of shifting the recognized burden of proof, or otherwise diminished the purpose and function of these proceedings.

Last by way of introduction, and while NRC guidelines may arguably favor a policy of "each contention standing alone", SMP respectfully requests that these and the prior pleadings upon contentions be considered as a totality, or in their cumulative force and effect — that is, where specific inquiries, concerns, or assertions seem to have been artificially fragmented, the Board is urged to consider and combine all the relevant statements thus far made by SMP in that particular subject area.

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[1] Upon this point SMP anticipates filing a "Motion for Clarification and Modification of Order" within the next two weeks, and requests that it be considered in ruling upon contentions.

Specific Contentions

1. Environmental Impact Statement: SMP specifically reasserts, and here incorporates by reference, the entirety of its prior contention in this subject area. (SMP's contentions of October 5, 1981, at 3-5.)[2] In support thereof SMP cites and incorporates the argument set forth in its filing of January 24, 1982, at 8-11.[2]

Other factors and considerations also supporting the need for a full Environmental Impact Statement include:

(a) Applicant's proposed d/r/c scheme will generate additional heat in the spent fuel pool. Additional heat entering the heat exchanger from the spent fuel pool will elevate the temperature of effluents entering Montsweag Bay. The environmental effects of this have not been considered by Applicant and Staff, and they should be considered and analyzed thoroughly.

(b) Relative to a loss of cooling accident under circumstances of an inadequate back-up system, Staff and Applicant seem to assert that the spent fuel pool could be flooded to promote cooling. Consideration should be given, but has not been, to the environmental effects of flooding the spent fuel pool's water into the surrounding area.

(c) Staff has also failed to consider the likelihood and the long-range future effects of permitting the increased storage, including the situation as it will exist on the date of the plant's closing in 2007, and if necessary, beyond. In the recent case Potomac Alliance v. United States Nuclear Regulatory Commission,

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[2]For the sake of brevity these documents will be cited below as "O-81" and "J-82", respectively, for the months and years in which they were filed.

United States Court of Appeals for the District of Columbia Circuit, Appeal No. 80-1862, Slip Opinion July 20, 1982), the court essentially held that the NRC's failure to make these considerations constitutes a violation of NEPA, and remanded the case for further proceedings.

(d) Under a properly comprehensive EIA or EIS the Staff should, but has failed to, consider psychological stress upon human beings within the affected area. In People Against Nuclear Energy v. Nuclear Regulatory Commission, (United States Court of Appeals for the District of Columbia Circuit, Appeal No. 81-1131, January 7, 1982),[3] the court held that an NRC failure to consider such factor constituted a violation of NEPA. Certainly such factor, especially touching the personnel to be involved in Applicant's unique and unprecedented d/r/c scheme, bears upon "the quality of the human environment" as recognized in NEPA, Section 102(2)(C).

(e) Applicant has failed to furnish sufficient information upon, and Staff has failed to consider, the points, factors, concerns and considerations set forth in the enclosed "Comments" upon the EIA and its inadequacies as there noted. Id., at 1-4. Otherwise stated, the recognized insufficiencies of the EIA further demonstrate the need for an EIS.

Supplementary Argument: On the basis of the foregoing, and on the basis of not unrelated considerations noted elsewhere herein, Applicant should be held to furnish sufficient information for, and the Staff to prepare, a thorough and detailed Environmental Impact Statement. Under controlling case law the "detailed statement"

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[3] SMP counsel apologizes, if and as necessary, for this incomplete citation; by dint of circumstance he is momentarily burdened to practice without ready access to a complete law library.

required by NEPA cannot lawfully or logically derive from omissions, generalities, or speculation, but only from full, thorough and specific factual disclosure and analysis. Upon this point, one single sentence from Staff's SER speaks volumes: "To allow flexibility in the modification plan, the licensee is not specific in the manner in which the modification sequence will be performed." Id., at 18.

SMP submits, as respectfully as possible, that the "fly now, regret later" policy here favored by Staff and Applicant should be disfavored by this Board as wholly contrary to and violative of both the purposes of these proceedings and the goals and purposes of NEPA. The one clear and proper means of controlling Applicant's pursuit of an environmental "carte blanche" is for Staff to prepare a sufficiently detailed Environmental Impact Statement.

2. Specific Operating Procedures: SMP specifically reasserts, and here incorporates by reference, the entirety of its prior contention in this subject area, (O-81, at 6), and the arguments thus far made in support thereof, (J-82, at 13).

(a) SMP also incorporates by reference all parts of the enclosed "Comments", both on the EIA and the SER, treating Applicant's failure to disclose, and Staff's consequent failure to consider or analyze, the specific operating procedures to be employed by Applicant in pursuit of its proposed d/r/c scheme.

(b) SMP also incorporates by reference all parts of Staff's EIA and SER demonstrating the lack of and the need for Applicant's filing a comprehensive and thorough factual disclosure upon the means and methods to be employed in its proposed d/r/c scheme.

(c) More particularly upon that immediately above, SMP specifically incorporates by reference, as the admission of a party,

Staff's previously-cited recognition that Applicant "is not specific in the manner in which the modification sequence will be performed."

(d) More particularly upon Applicant's failures to manage its spent fuel pool and related activities in a safe and proper manner, as referenced in SMP's original contention by citation of specific incidents, (O-81, Contention 3, Part (c), at 6), Applicant has suffered the "knockdown" of a spent fuel assembly in the reactor spent fuel area, upon which, fortunately, one of Applicant's personnel was able to "lasso" the spent fuel assembly and regain control of the situation.[4] Such incident and others like it demonstrate a clear and continuing need for Applicant to set forth, and the Staff to approve, the specific operating procedures by which Applicant plans to pursue its proposed d/r/c scheme.

(e) SMP also incorporates by reference its admitted contention upon occupational exposures, and notes that the subject matter of such contention cannot lawfully or logically be treated in any responsible manner until Applicant has disclosed the means and methods by which it plans to pursue its proposed d/r/c scheme. Otherwise stated, and by example only, these proceedings cannot properly treat an alara contention unless and until Applicant specifies how it is going to manage its proposed scheme, including the means used, the protections afforded personnel involved, the periods of worker exposure, and all such similar, related factors.

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[4]SMP respectfully declines, at least at this time, any further identification of the employees involved in this incident, based primarily upon their concerns about future job security.

[5]By the assertion of this contention SMP does not intend in any way to compromise its pending Motion that Applicant is obligated to make a prompt, full disclosure upon the means and methods to be employed in its proposed d/r/c scheme.

Supplementary Argument: On the basis of all of the foregoing, SMP respectfully submits, first, that Applicant should furnish a prompt and complete disclosure upon the means and methods it plans to employ in pursuit of its proposed d/r/c scheme, and that Staff analyze and evaluate the adequacy of the same; and, secondly, that nothing of significant value can be accomplished in these proceedings unless and until both such procedures are completed.

3. Alternatives: SMP specifically reasserts, and here incorporates by reference, the entirety of its prior contention in this subject area, (O-81, at 6-7), and the arguments thus far made in support thereof, (J-82, at 14).

(a) Under any reasonable construction of, and implicit in, alara, is the requirement that Applicant consider alternatives to its proposed d/r/c scheme. Otherwise stated, Applicant cannot properly make any assertion or demonstration relative to alara without first showing that alternatives have been considered. Applicant's "rabbit out of the hat" process of nonselection lawfully and logically prohibits it from any defensible assertion relative to alara.

(b) In further factual support upon the viability of substitute power proposed by SMP, the Conference of New England Governors and Eastern Canadian Premiers meeting in Rockport, Maine, this past April announced that "Quebec Premier Rene Levesque will be soliciting customers for up to 2,000 megawatts of electricity from a hydro project in James Bay." Also upon the availability of alternative power sources, the Point LePreau, New Brunswick, nuclear generating station is now on line and producing electricity.

(c) In further factual support upon the viability of alternative means of storage, SMP respectfully directs the Board's atten-

tion to the enclosed exhibit concerning dry storage casks. These units are available now and should be considered by Applicant. They are at least environmentally equivalent, if not in fact superior, to Applicant's proposed d/r/c scheme. Further, storage by such means would require far less handling and rehandling of spent fuel, thereby reducing worker exposure to radiation.

Supplementary Argument: On the basis of all of the foregoing SMP respectfully submits that Staff and Applicant are obligated to consider the reasonable and environmentally preferable alternatives presented in SMP's prior pleading, (Id., at 6-7), and those reviewed immediately above. Last, Applicant can make no valid assurance under alara without first considering such alternatives.

4. Seismic Durability: SMP specifically reasserts, and here incorporates by reference, the entirety of its prior contention in this subject area, (O-81, at 11-12), and the arguments thus far made in support thereof, (J-82, at 17-18).

(a) Applicant's proposed d/r/c scheme, and the packing or fuel storage configuration yielded by it, should meet a more stringent standard than the existing seismic design criteria for MYAPS. There are several reasons for this. Not only has the Commission itself expressly recognized that the likelihood of a seismic disturbance meeting or exceeding such criteria is significantly greater than originally supposed, but the greater weights of fuel and the closer tolerances of storage proposed by Applicant would serve to worsen damage in the event of any significant seismic disturbance. Applicant should be held to show that the spent fuel pool in any configuration up to fully loaded will satisfy design criteria under which the likelihood of failure is not more than 1 in 10,000.

Otherwise stated, it is SMP's position that a 1 in 10,000 like-

lihood of a seismic disturbance meeting or exceeding design criteria provides reasonable margin for error. The current probability of 1 in 100 shows the need for stricter criteria.

Supplementary Argument: Under the direction of Mr. Leon Reiter of the NRC's Seismic Division, the Commission is reexamining the subject area of seismic durability at MYAPS and other sites. SMP respectfully submits that this presents an ideal opportunity to gain from such work-in-progress, applying such reexamination to this case now, rather than retroactively, at some later time, and subject to much greater inconvenience. In other words, SMP is not alone in its position that the seismic durability of MYAPS be reexamined, for the Commission seems to agree with us. What we further urge is that these proceedings can benefit more by a consideration of the Commission's work, rather than ignoring the same.

5. The "Minnesota-Potomac" Contention: SMP specifically reasserts, and here incorporates by reference, the entirety of its contention in this subject area, (O-81, at 13, contention numbered "14"), and the arguments thus far made in support thereof, (J-82, at 19-20).

Supplementary Argument: To borrow a line from Judge Learned Hand, writing in a First Amendment case during the First World War: "No one can guess the nature of events remaining held within the womb of time." SMP respectfully submits that the nature of judicial events, relative to this contention, have recently been resolved favorably to intervenor by the decision in Potomac Alliance, supra, at 3-4. Potomac Alliance holds that it is a violation of NEPA and the Atomic Energy Act where the NRC Staff fails to consider the situation or eventuality proposed in this contention. Under Potomac

Alliance, then, this contention should be admitted, and Staff should make the inquiry as required in the noted case.

In part (b) of its original contention SMP admittedly makes the further or different argument that Applicant's failure to consider all costs and effects over such longer period invalidates whatever, if any, cost-benefit analyses Applicant has conducted. While this part of this contention might fit more appropriately under an "alternatives" heading, what SMP is asserting is that, for any proper cost-benefit analysis to be made — comparing one means of storage to another — Staff and Applicant should show that they have considered the long-term health, safety and environmental effects of Applicant's proposal, including some estimate or analysis of its future economic costs. By way of example only, were Applicant to adopt passive dry cask storage, it might well eventuate that such storage mode required far less supervision than maintaining Applicant's spent fuel pool, in its more hazardous configuration, for a possibly indefinite period of time. Otherwise stated, Applicant should show us that it has made "the best environmental buy" not only for the short term, but for the longer term as well.

6. Class 9 Accident: SMP specifically reasserts, and here incorporates by reference, the entirety of its contention in this subject area, (O-81, at 9, contention numbered "7"), and the arguments thus far made in support thereof, (J-82, at 15-16). SMP further asserts:

(a) Any heat added to the PCC as a result of an accident within the reactor containment — such as a major steam line break, or LOCA and core melt — could reasonably be expected to overtax the single heat exchanger which the PCC shares with the spent fuel pool cooling system.

Supplementary Argument: Applicant's proposed d/r/c scheme will generate more heat than existing storage, such heat to be dispersed through a heat exchanger shared by the PCC and the spent fuel pool cooling system. Applicant should be held to show that such system can accomodate the increased heat from the spent fuel pool and the increased heat from a core melt and the other sources noted. Thus SMP asserts that the proposed modification would affect the ability of the spent fuel pool to operate in the event of a class 9 accident.[6]

7. Increased Fuel Handling Accident Risks and Consequences: Working conditions under Applicant's d/r/c scheme increase the possibility and consequences of spent fuel handling accidnets, and exposures could exceed the NRC dose limit to the public of 300 REM/Thyroid/Plant Site Boundary.

Without additional safeguards as yet unspecified in the application, working conditions described in the EIA and SER, as well as the Applicant's submittals, significantly increase the risk of a fuel handling accident during spent fuel transfer operations. A fuel handling accident with freshly-discharged fuel should be, but has not been, analyzed for Applicant's spent fuel pool building. By comparison, an analysis of a fuel handling accident within the reactor containment has been performed by Applicant and has shown an upper limit site boundary thyroid dose of 170 REM.[7]

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[6]In asserting the facts noted under 6(a) above, towards satisfying basis and specificity requirements in this contention, SMP does not intend to compromise its further position that credible accident scenarios can be modelled in which would require evacuation or abandonment of MYAPS, and that Applicant is obligated to show that its spent fuel pool would be self-sustaining during such period.

[7]Per letter from Mr. J. L. French of Applicant to the Commission, March 18, 1977.

The spent fuel pool building is pierced by a number of penetrations which provide less adequate sealing than those of the reactor containment. Such building is constructed of sheet metal panels which are lap-joined only at their edges in contrast to the monolithic construction of the reactor containment. Unless each seam and orifice of the spent fuel pool building is periodically and routinely inspected and maintained, and unless technical specifications require sealing of the large doors in the cask-loading and new-fuel-receiving areas during fuel transfer operations, it can reasonably be anticipated that a spent fuel handling accident with freshly discharged fuel during transfer operations will result in a site boundary dose to the thyroid in excess of the regulatory limit.

Under the conditions and procedures described in Applicant's submittals, the EIA and the SER, the likelihood of a spent fuel handling accident is manifestly increased. This is so because the frequency and the overall number of times which freshly discharged spent fuel is handled over present operations, physical working conditions are adverse, and the time constraints under which fuel must be transferred are more narrow. For example, it is suggested that if bulk pool temperatures reach or exceed 154° F. during transfer operations , fuel will be removed and returned to the reactor pool. It has not been specified that fuel will not be in the tranfer tunnel when an excess temperature level is noticed, or how many fuel assemblies will be moved at that time.

Workers on the spent fuel handling crane will be subjected to high temperatures and humidity, and possibly reduced visibility, which will place added demands on their ability to maintain the

alertness and precision required during such operations. It has nowhere been specified what measures, (E.g., training, schedules, devices or the like), will be employed to mitigate such effects upon the spent fuel workers.

Previous experience at MYAPS, under more ideal conditions, has seen workers fall into the spent fuel pool, the mast on the fuel loader rotated with a fuel assembly only partially into the storage rack, and fuel loaded into the wrong racks.

Even given a two- to three-week delay in transfer during which short-lived isotopes decay, it is SMP's position that the radioactive waste fuel here in issue presents a significant risk unless handled with meticulous care not assured in the EIA, the SER, or Applicant's manifold submittals. Further, in the all-too-likely event that a fresh spent fuel handling accident does take place, it has not been shown that its effects will not exceed regulatory limits.

Argument: SMP urges our Board that, in pursuit of its d/r/c scheme, Applicant is lawfully and reasonably obligated to show that it has considered and protected against the harms and hazards here noted. More particularly, given the more adverse working conditions and more stringent demands upon spent fuel pool workers, the increased amounts of waste fuel, and the unaddressed "leaky" nature of the spent fuel building, both Applicant and Staff should be held to a significantly enhanced consideration and showing that Applicant's proposed d/r/c scheme will protect against the risks and consequences of a spent fuel handling accident, including a worst-case analysis of a freshspent fuel handling accident. Perhaps more simply stated, Applicant is seeking the Commission's approval to handle more radioactive waste under increasingly adverse circumstances,

and it is burdened to show that it can and will do so safely, without increased harms or hazards to the public safety, health or welfare, or to environmental interests.

8. Cumulative or General: SMP urges this Board, additionally, that Staff and Applicant must reassure the Commission and the public upon all the concerns and considerations set forth in the enclosed "Comments", to which counsel here again directs the attention of Board members. More specifically SMP asserts, from said "Comments", that:

(a) Staff and Applicant should be held to a greater degree of accountability upon end plates, spacer grids and like waste fuel assembly components as to which adequate analysis has thus far not been made;

(b) Neither Staff nor Applicant has sufficiently analyzed the need for or means of retrieving any foreign objects likely to become lodged in Applicant's significantly more compact spent fuel storage configuration, nor any means of handling the stored fuel in such configuration should such become necessary, whether in the event of retrieving foreign objects, for inspection, or otherwise;

(c) Relative to spent fuel pool cooling and systems, Staff and Applicant should be held to incorporate a specific cooling-off period in technical specifications, further specify the details of Applicant's speculative "put-some, take-some" methodology, account for the likelihood and the means of managing a torn pool liner, and furnish a pin cooling analysis relative to the buildup of crud deposits and other adverse effects from "upwelling"; and

(d) Applicant should furnish suffiecient information for, and Staff should prepare an analysis of chemical incompatability and galvanic attack as developed in the enclosed "Comments".

On the basis of the foregoing, SMP respectfully submits that these stated contentions should be admitted, and that the concerns and considerations set forth above should be more specifically examined in these proceedings.

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CERTIFICATE OF SERVICE

I hereby certify that I have mailed copies of the foregoing specific contentions to the following, first class regular postage prepaid, this 30th day of August, 1982:

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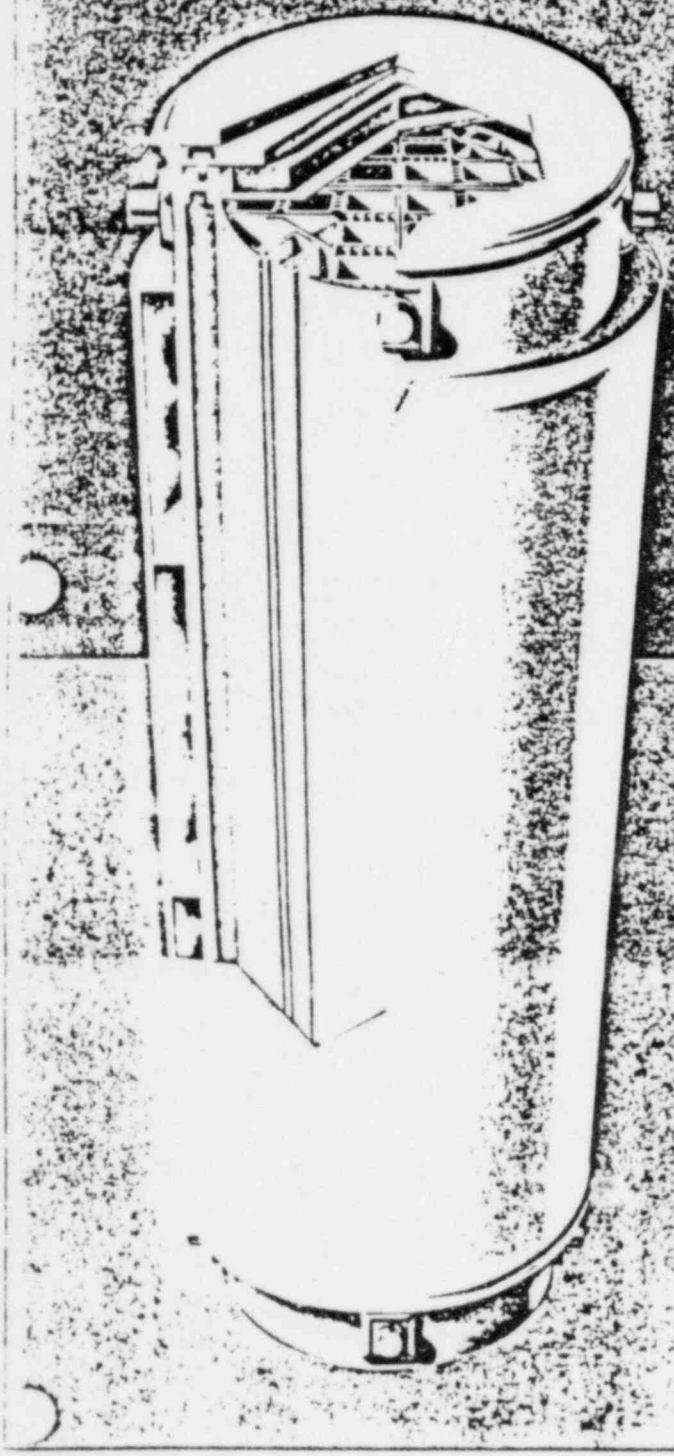
New, Low Cost, Passive Cooling

DRY STORAGE CASKS FOR ON-SITE STORAGE OF SPENT NUCLEAR FUEL



The REA-2023

Designed by Ridihalgh, Eggers and Associates, the REA-2023 provides a high-capacity container for safe interim storage of spent fuel elements. The following are some of the key features of this new system:

SIZE: Outside 8 foot diameter x up to 16 feet in length.

WEIGHT: Maximum lifting weight, with fuel, is less than 100 tons.

CAPACITY:

FUEL TYPE

	Intact		Consolidated	
	Qty.	MTU's	Qty.	MTU's
BWR elements	52	10	104	20
PWR elements	24	11.5	48	23

CONSTRUCTION: The unit consists of a double containment design with a welded final closure. The various components include a rugged, smooth stainless steel outer skin, a lead gamma shield, water neutron shield and a basket featuring Boral neutron absorbing plates. The primary containment vessel is also stainless steel, designed according to ASME Boiler and Pressure Vessel Codes.

OPERATION: This new system uses existing loading and unloading procedures which are common to utilities. Handling is accomplished by a redundent lifting yoke and two sets of lifting trunions. An additional set of pivoting trunions are also used. Can be handled and stored in either a horizontal or vertical attitude. Design permits continuous monitoring of both primary and secondary containment.

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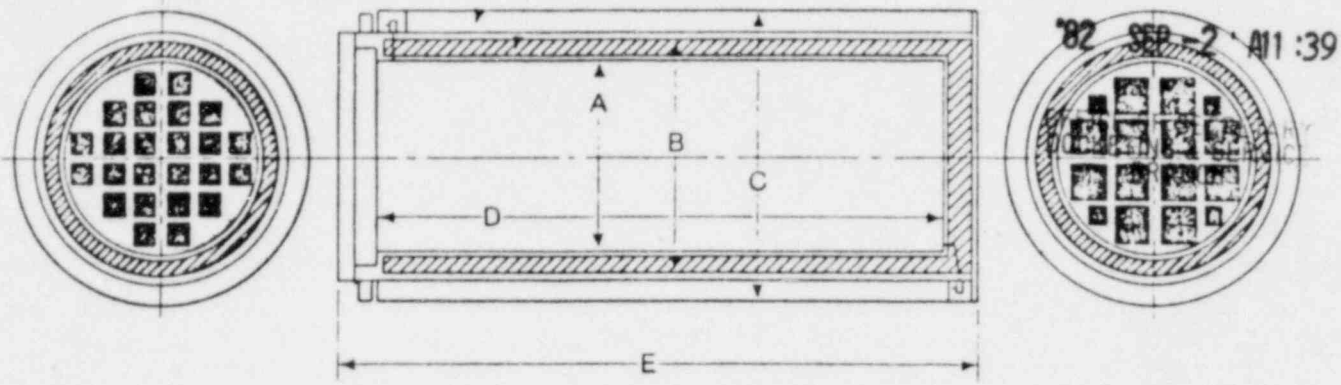
THE REA-2023 SPECIFICATIONS.



FUEL TYPE

	A IN	B IN	C IN	D IN	E IN	WT T	Intact Cap.	Consol Cap.	Neutron Shield	Gamma Shield
PWR	67	80	94	168	183	97	24	48	6 in.	4.5 in.
BWR	65	77.5	92.6	180	195	95	52	104	6 in.	4.5 in.

FUEL CHARACTERISTICS

	FUEL TYPE	
	BWR	PWR
ENRICHMENT	3.5% U235	3.5% U235
AGE-OUT-OF-REACTOR	5 YEAR	5 YEAR
MAX. WIDTH (INTACT-IN.)	5.75	8.75
MAX. LENGTH (INTACT-IN.)	176	165.5

TYPICAL TEMPERATURE PROFILE

	FUEL TYPE	
	BWR	PWR
DECAY HEAT (KW/ASSY.)	4	1.00
MAX FUEL CLAD	250°	250°

TYPICAL SHIELDING PROFILE

	FUEL TYPE	
	BWR	PWR
GAMMA SOURCE (PHOTONS/SEC-CASK)	9.0×10^{14}	9.5×10^{14}
NEUTRON SOURCE (NEUTRONS/SEC-CASK)	4.0×10^{9}	3.3×10^{9}
MAX SURFACE DOSE RATE (MREM/HR)	20	20

SHIPPING OPTION: The REA-2023 has been designed to accomodate three transportation alternatives which will allow a utility to choose the most economical option should the need arise. These options incorporate a special overpack which allows for full shipping without repacking. For more information, contact us.

Designed and manufactured in the U.S.A.

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Comments on Safety Evaluation by the

Office of Nuclear Reactor Regulation

Maine Yankee Atomic Power Station

Proposed License Modification

Spent Fuel Pool - Fuel Reracking and

Compaction. Doc.50-309 June 16, 1982

Prepared for Intervenor:
Sensible Maine Power
Boothbay Harbor, Maine
By Raymond Shadis
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The comments herein are based on Maine Yankee submittals, S.E.R. and F.S.A.R. As well as the June 16, 1982 N.R.C. O.N.R.R. Safety Evaluation itself.

2.1.2. (General) Evaluation

No mention has been made of the effective multiplication factor for Plutonium in the spent fuel under various conditions included in the report and not included in the report (eg. localized boiling).

2.2.1. / 2.2.6. System Description

Possible plugging or failure of the spent fuel cooling system heat exchanger is not addressed. Calculations were not included for maximum sustainable pool temperatures at a time when freshly discharged fuel is in the pool (normal 154g) with 750 gpm pumps coupled to heat exchanger 22×10^6 BTU/Hr.) and cooling must be done by makeup systems total 360 gpm max capacity and limited heat exchanger capacity. No mention is made of circulation when using emergency back up systems. If water is not circulated, the result will logically follow one of two courses - (1) water will be replaced only as it boils off

(2) temperatures will be maintained below boiling but water flow will be maintained resulting in pool overflow presumably to sumps, leaving the question: " At what point do sumps overflow?"

In the first instance (1) A. Temperatures within the spent fuel building would be sauna temperatures; B. In winter condensate would rain from the ceilings of the spent fuel building.C. An increase in S.F.P.B. radiation and radioactive contamination levels would occur. The principle considerations here are two fold. Building vacuum could not be maintained resulting in releases of gaseous and water vapor borne radioactive material to the atmosphere.

Secondly, maintainence of emergency backup systems in a steamy atmosphere and a wet contaminated area with increased "shine" from the spent fuel pool would be difficult at best.

In the second instance overflow from the spent fuel pool and/or sumps would

be expected to carry radioactive contaminants including Co60 crud from the spent fuel pool to the land and waters surrounding the pool. It is doubtful that this discharge would be kept within regulatory limits.

2.2.2. Spent Fuel Pool Cooling

2.2.2. describes a period of 13 to 19 days in which spent fuel is to be cooled before loading into the spent fuel pool. This "cooling off" period should be written into tech. specs.

A targeted maximum pool temperature of 154 degrees is described under a 'put some (fuel) take some' scheme which would necessitate increased worker exposure and the likelihood of a fuel handling accident.

Spent Fuel Pool crane operators working just a few feet over the surface of the pool and other S.F.P. workers will be sweltering in their plastic suits and breathing apparatus. It is a situation definitely not conducive to the attentiveness and precision required for the delicate handling of fresh spent fuel bundles. Further, it is believed that continued work under such conditions is in violation of O.S.H.A. regulations.

Note. Under normal operating conditions Maine Yankee experience includes bending and twisting spent fuel assemblies.

No mention is made of coolant loss characteristics of a dropped fuel rack (10,800 pounds to 21,000 pounds) which punctures or tears the pool liner.

2.2.3. Pin Cooling Analysis

"Maximum outlet temperature of the fuel assemblies and consolidated fuel bundles are well below (22 degrees F. and 13 degrees F. respectively) the saturation temperature at the cell outlet." This analysis presumes even flow of cooling water to all portions of the spent fuel with a given circulation and temperature (thermal upwelling). It seems to be a fairly precise nugget in

contrast to the proposed clumsy juggling of fresh assemblies to keep bulk pool temperatures at, around, or below 154 degrees F. Inability to determine gross measurements undermines the credibility of staff and staff's confidence in such exact predictions for particulars.

2.3.2. Removal and Installation of Storage Racks

2.3.2. states that "prior to commencing rereacking operations, the Fuel Building Overhead Crane will be given a complete visual inspection by a factory representative. It does not state that the temporary crane should be inspected also. It should.

Staff may wish to address the application of ANSI B30.2-1967 on load handling operations as to conditions where to operator is required to function over water with a 154 degree temperature.

2.3.3. Light Loads

M.Y.A.P.C. states, "There are no items which exceed 100 pounds which normally pass over the liner from crane height." Although staff finds their concerns adequately addressed, staff should inquire as to what "normally" means in this case. Also are loads handled which feature sharp ends or projections?

2.3.4.

Staff does not appear to have analyzed the load drop consequences of an oblique blow delivered via planing action or richocett of a dropped object, either bundle or rack.

2.4. Structural Design

2.4.3. Seismic and Impact Loads and

2.4.6. Conclusion

Staff conclusions ignore the possibility that new seismic criteria should be considered for Maine Yankee due to:

(1) increased seismic activity in the region and recent seismic activity in the region not anticipated by Class I seismic design criteria for the Maine Yankee Plant.

(2) N.R.C.s current action requesting a reanalysis of M.Y.A.P.S. earthquake resistance capabilities based on recent seismic events in the area

(3) the N.R.C.'s meeting of May 6, 1979 which concluded (before the earthquakes of 1982) that the odds of an earthquake meeting design specs. for the plant during its license lifetime had changed from 1 in 10,000 to 1 in 100 per year.

(4) the discovery of a geologic anomalie (1976-the Robin Hood Fault) previously undetected and running to within a few hundred yards of the plant.

Staff states "license must be preconditioned to preclude lifting a spent fuel shipping cask over the pool until a cask drop analysis is submitted by the licensee and approved by the staff". Neither staff nor licensee has addressed the question of how fuel will be moved (when and if) should licensee be unable to meet staffs criteria for shipping casks over the spent fuel pool. It is more reasonable to resolve this matter before, not after, loading the spent fuel pool.

2.5.2. Chemical Compatibility

P.15-2 Boral Neutron Poison Material in Stainless Steel in Borated-Water

Staff has stated that materials surveillance prógram at Salem and Zion Nuclear Stations will lead operation at Maine Yankee providing, in the event of adverse service experience, time to initiate corrective action at M.Y.A.P.S. Potential "adverse service experience" conditions have not been identified nor have "corrective actions" been suggested. What would the environmental, cost effectiveness, practicality, and safety considerations of such conditions or actions be?

References to unidentified "corrective actions" do not satisfy the purpose of a safety evaluation.

Galvanic Attack - Staff refers to " passivating oxide films" which cause similar potentials between an assortment of disimilar metals negating signifcant galvanic attack.

This is true only if oxide coatings are: (1) non-conductive, (2) impermeable, (3) not "scrubbed" away by motion / contact between any of the installed components, borated water circulation including suspended but not dissolved particles (erosion) or contact with any materials (litter) accidentally dropped into the pool but not easily retrievable due to close tolerance packing, (4) not affected by vibration introduced through maintainence operations, crane operation or pumps (circulating water), (5) not affected by localized blockage and extreme temperatures.

Localized failure due to galvanic attack is not only possible but probable unless (1) ph negative conditions are scrupulously maintained, (2) tolerance (gaps) between disimilar metals are increased (3) contact between metals of potential difference is eliminated.

Should the outer skins of two (interfacing) adjacent fuel canisters bow due to gas buildup and impinge upon one another, the inner wall (structural member) may then bend wedging the fuel bundle and possibly causing mislocation of Boral. The use of blow out plugs on the outer skin if properly spaced could prevent this. The inclusion of dye in the sealed cannisters should be required to identify leakers. A plan should be required for replacing identified leakers.

No evidence is offered that deterioration of the Boral plates would be limited to edge attack by general corrosion and pitting corrosion. There are no time considerations that relate to any period beyond current experience time frames or that extend to license limits.

All considerations of "adverse service experience", galvanic action, etc., should identify time frames of anticipated service or exposure. Failing to provide time frames within the parameters of the plant license, effects should be benchmarked against the half lives of the full-spectrum of radioactive elements expected to be contained. If brief, if not then, when?

It is unlikely that an assortment of "oxides" sufficiently thick to reduce galvanic action to negligible levels would not also reduce cooling efficiency due to insulative properties. In addition, consideration should be given to the possibility of corrosion (oxide) build-up immobilizing spacer grid springs and eventually compressing (to the point of failure) fuel pins at the point of contact between the fuel pins and the immobilized spacer grid springs. Consideration should also be given to the occurence of a similar interaction at the juncture of fuel pins and end-plate (cap) assemblies.

2.6 Spent Fuel Cleanup System

Staff states that the " greatest increase in radioactivities and impurities in spent fuel water occurs during refueling and spend fuel handeling" and yet those very procedures are the ones most poorly (and lightly) outlined in the application and the O.N.R.R. Safety Evaluation. The limit of 154 degrees F. to be maintained during the introduction of fresh fuel is to be accomplished by juggling fuel assemblies back and forth but no one can say how much. The pin compaction scheme requires shielded, remote handling of thousands of fuel pins, some of them leaking and damaged, within extremely close tolerances (.04 inch) but the applicant has deferred describing the process by which this will be accomplished.

It is impossible to calculate the load on the Spent Fuel Clean-up System or the consequent load on the environment or workers without knowing how many times and under what conditions fuel will be shuffled and what procedures

tools, H P parameters etc. will be used in pin compaction(see 2.7.1, 2.7.2.,2,7.3.)

2.7 Occupational Radiation Exposure

2.7.1. Description

N.R.C. staff notes that "licensee is not specific in the manner in which the modification sequence will be performed' and yet relies on licensee's analysis of the various tasks to be performed. This does not make sense. N.R.C. states, "We have evaluated a worst case plan", one involving replacement entirely with high density racks. This is not worst case, worst case is a work plan involving procedures which scrape radioactive crud from the fuel pins and have a high risk of rupturing or crushing fuel pins. The Maine Yankee Spent Fuel Pool as of 1974 contains partially irradiated and leaky fuel. N.R.C. has failed to mention this detail.

2.7.2. N.R.C. O.N.R.R. correctly states but does not quantify the contributing relationship of various radiation sources at pool side. It is true that, "the major contribution to dose rate... comes from the introduction of reactor coolant into the pool area during refueling". What is not said is that the exchange will increase with the "minuet" of fuel assemblies proposed as a means of maintaining a maximum 154 degree F. temperature in a packed pool. Surely, a thorough flushing is to be expected.

2.7.2./2.7.3./2.7.4. N.R.C. also lists "dislodging of crud (activation products) from the surface of an assembly"during handling" and leaking fuel as contributing radiation sources (not quantified). The exact procedure for handling spent fuel and pin packing will determine how much "crud" is dislodged; how much leaking fuel is agitated; how long each step of the process may take and, of a consequence, what radiation doses will be.

N.R.C. O.N.R.R. and licensee have demonstrated no evidence to support conclusions

about collective - cummulative doses.

2.7.2. Conclusion

N.R.C. O.N.R.R. refers to ALARA and economics without a mention of alternatives such as dry cask storage.

2.9 Radiological Consequences of Cask Drop and Fuel Handling Accidents

2.9.1. Cask Drop Accidents

Cask Drop Accidents analysis are done too late if a sufficient area of the spent Fuel Pool cannot be cleared to preclude any possibility of a 100 ton cask crushing a rack or two full of assemblies.

2.9.2. Fuel Handling Accidents

In the event that spent fuel pool temperatures exceed 154 degrees, thirteen to nineteen day old assemblies will be removed from the pool, adding to the likelihood of fuel handling accidents.

N.R.C. O.N.R.R. is correct that an increase in the number of pins per assembly would be offset by radio-decay in terms of gross radiation. However, no statement is made regarding increased release of long-lived radio-decay products and their effect including bio-accumulation over extended periods of time.

In fact, it is a fault of N.R.C. accident analysis generally that they do not provide adequate (if any) consideration of long term contamination.

3, 4, and 5 Open Items, Summary, and Conclusions

(1) No License Amendment for Spent Fuel Handling and Storage should be granted until Cask Drop analysis is completed.

(2) Technical Specifications should include a 13-19 day cooling off period for spent fuel prior to introduction to spent fuel pool.

(3) No License Amendment should be granted until the licensee identifies materials

tools, and procedures for what it proposes (pin compaction)

(4) Meeting ALARA objectives should reasonably include investigation of alternative storage methods.

(5) New seismic activity or the discovery of geological anomalies exceeding that of pre-license record should require establishment and meeting of new criteria.

(6) Redundancy should be established throughout the spent fuel cooling system. In particular, dependency on a single heat exchanger is ill advised if its failure means near boiling temperatures in, or flooding of, the spent fuel pool.

July 10, 1982

Comments on an

Environmental Impact Appraisal

by the Office of Nuclear Reactor Regulation

Maine Yankee Atomic Power Station

50 - 309

June 16, 1982

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1.0 Introduction

Although alternative spent fuel storage methods are discussed in the Final Generic Environmental Impact Statement on Handling and Storage of Spent Light Water Power Reactor Fuel (NUREG - 0575) no evidence is presented to indicate that alternative storage methods have been considered site-specific at Maine Yankee. Since the Maine Yankee License Amendment Proposal involves fuel pin compaction by as yet unspecified methods it would seem that ALARA objectives require some consideration of alternatives.

1.1 Description

The pin compaction scheme at (a rate of 200 (old) fuel assemblies per year) would involve scraping the entire length of 35,200 fuel pins (rods) over eight sets of retaining springs (grids) coming and going. If no measure of how much radioactive "crud" would be dislodged by this operation has been done, it should be before estimates of dosage are accepted.

4.0 Radiological Environmental Impacts of Proposed Actions

4.1/4.2

As of this date the licensee has not specified the methods for pin compaction or the number of workers to be involved. The licensee cannot therefore predict or substantiate the time required, or the exposure levels for the proposed pin compaction. In turn, any man-rem estimates are based on non-specific information or mere speculation.

Any estimate of radiological environmental impacts must likewise depend on a number of factors not discussed in the Environmental Impact Appraisal.

Basic considerations should include:

(1) Methods for pin compaction (unspecified)

(2) Length of storage (unspecified)

(3) Inventory of radionuclides released from fuel assemblies scaled over the period of anticipated storage (not done)

(4) A survey of environmental contamination pathways and % increase for various radionuclides released under the proposed reracking compaction scheme (not done).

(5) A survey of predictable system flaws and failures based on a history of licensee's experience with system's integrity, fuel handling incidents, inadvertant worker exposures and releases to the environment including anomalies in offsite monitoring. (not included).

(6) Identification of, and a survey of the disposition and condition of leaky partially-burned fuel elements stored in the pool since 1974 (not included).

(7) Oxy-Acetylene cutting operations - Under 4.2 Radioactive Material Released to the Atmosphere irradiated fuel cages are to be cut up under water. It is common practice at Maine Yankee to open vents while welding and cutting (to prevent fumes (and particulates) from clogging up filters) thereby releasing directly to the atmosphere. The E.I.A. makes no mention of radio-contaminants as a by-product of torch-cutting racks and cages.

(9) Radiological Environmental Impact of Postulated Accidents (4.6). More than one accident scenario should be discussed as well as mitigating procedures.

There are anecdotal reports by workers of foreign objects being introduced to the S.F.P. including birds, glossy magazines, and human beings. No analysis has been done either in the S.E.R. or the E.I.A. on a scenario in which cooling of a fresh spent fuel bundle is blocked by foreign material (litter) or what methods would be used to clear it; under what time constraints before significant releases occured.

It should be noted here that spaces around and under the cluster of new racks would be limited to three or four inch channels. Any tool used to retrieve material dropped into the pool would have to operate within the three inch side space and extend 38 feet to the S.F.P. floor to reach under a four inch bottom plenum. This would be difficult at best. The resulting question is what releases could be expected from localized boiling or clad rupture in this circumstance?

In a second example, should S.F.P. make-up water be required because of overheating, no measures have been identified to assure that the S.F.P. will not be flooded and flushed - after exceeding the sump's limited capacities - to the surrounding environs.

No mention has been made of increased gaseous or water-vapor borne contaminants released in an overheating scenario. Even at 154 degrees F., the maximum fresh spent fuel loading temperature, no mention is made of containing condensation and run-off likely to occur during winter operations when temperatures outside the metal spent fuel building are often below zero degrees F. .

The E.I.A. gives no indication other accident scenarios have been discussed.

Summary Comments

The E.I.A. has failed to take into consideration a number of factors of environmental consequence. Quantification has been poor or non existent. It appears that the E.I.A. has been based solely upon incomplete submittals by the licensee with little or no substantiation of estimates by N.R.C. staff.

Although a good deal seems to be based on a good working relationship between N.R.C. staff and licensee due to a continuing personnel turnover at both N.R.C. and Maine Yankee, that relationship does not provide adequate

assurance for public safety in an operation of the magnitude proposed.

In sum, reliance on the incomplete plans of the licensee is insufficient to the purpose of an E.I.A. Unanswered concerns should be resolved before, not after, the operation begins. Therefore it is strongly urged that if these concerns do not fall within the scope of an E.I.A., a complete Environmental Impact Statement is in order.