

PLEASE TAKE NOTICE that MAPLETON INTERVENORS hereby appeal from the order dated August 26, 1971, of the Atomic Safety & Licensing Board denying intervenors' motion of August 3, 1971, to dismiss the application.

The grounds for the appeal are set forth in intervenors' motion of August 3, 1971, and are additionally as follows:

The order appealed from simply states in conclusory form that advance procurement of the reactor pressure vessel is not a violation of the Atomic Energy Act, is sanctioned

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by the Commission and is not inconsisten' with safe construction.

The memorandum served by applicant (8/9/71) and the answer of Staff (8/19/71) opposing Mapleton's motion to dismiss the subject application - both depended on a "Note" following AEC regulation 10 CFR 50.2(b).

We assume the Board below has adopted the position of applicant and Staff.

A Nuclear Reactor (and its Reactor Pressure Vessel) come within the definition "utilization facility"

To understand what the regulation and note really mean, we must examine them in the light of the Atomic Energy Act and its history.

The Act (42 U.S.C., S. 2014(cc)) gives the broadest statutory definition of the term "utilization facility" as meaning (paraphrased)

(1) any equipment or device (except an atomic weapon) determined by rule of the Commission to be capable of making use of special nuclear material or peculiarly adapted for making use of atomic energy in a manner significantly affecting or related to public health, safety and common defense and security;

(2) any important component part especially designed for such equipment or device as determined by the Commission.

The regulation states:

"b) 'utilization facility' means any nuclear reactor other than one designed or used primarily for the formation of plutonium or U-233."

The regulation defines "nuc.ear reactor" as meaning

"an apparatus, other than an atomic weapon, designed or used to sustain nuclear fission in a self supporting chain reactor." (10 CFR, S. 50.2(k)

These regulations, (10 CFR, S. 50.2(b) & (k), together constitute a rule of the Commission adopted pursuant to the Atomic Energy Act, 42 U.S.C., S. 2014(cc) determining that a nuclear reactor is a "utilization facility" within the statutory definition.

This Board may take administrative notice that a reactor pressure vessel is an important component part especially designed for a nuclear reactor, within S. 2014(cc)(2), and that such fact requires no new determination by the Commission to establish its existence.

Requirement of a Construction Permit Before Fabrication

We now come to the gut questions underlying the issues on this appeal.

- Does a "utilization facility" require a permit before it can be constructed?
- Does a nuclear reactor require a permit before it can be constructed?
- 3. Does a reactor pressure vessel require a permit before it can be constructed?

We submit that the answer to each question is in the affirmative, and that the "Note" relied on by applicant and Staff does not alter this conclusion one iota.

 42 U.S.C., S.2131 (License Required) provides that it is unlawful to manufacture any utilization facility without a license.

42 U.S.C., S.2235 (Construction Permit) in part provides that:

> "All applicants for licenses to construct utilization facilities shall, if the application is otherwise acceptable to the Commission, be initially granted a construction permit. The construction permit shall state the earliest and latest dates for the completion of the construction"

Read together, these sections clearly require that

a construction permit be issued before a utilization facility can be constructed.

S. 2235 additionally requires that the application estimate the earliest and latest dates for the completion of construction, thus establishing the Congressional intent that the permit precede fabrication.

The statute obviously contemplates construction after (not before) the issuance of the permit.

It peers at the time of the issuance of the construction permit, to future (not past) fabrication, and seeks a range of estimate for completion dates.

Were applicant and Staff to read the statute as authorizing fabrication prior to the issuance of a construction permit, the purpose of the statute would be frustrated if fabrication had been completed prion to the issuance of the construction permit.

Would the statute require the applicant to predict or forecast the completion date of the utilization facility if it were intended that the facility could be fabricated prior to the issuance of the construction permit?

We submit therefore that the statute requires that a construction permit be obtained before a utilization facility is constructed. 2. Since the Commission has declared that a nuclear reactor is a "utilization facility" (10 CFR, S.50.2(k)), it follows that a construction permit must be obtained before a nuclear reactor is built.

3. We now restate the third question.

Is a construction permit required before a reactor pressure vessel can be fabricated? If the pressure vessel is an important component part of the nuclear reactor (as it concededly is), then logically, a construction permit must be issued before it can be fabricated. To hold otherwise leads to the contradiction that a permit is required for the reactor (the whole) but not for the reactor pressure vessel (the part).

We now examine the "Note" which follows 10 CFR., S. 50.2(b) to determine whether it changes the clear meaning of the statute.

The regulation and note were issued in 1956 (21 Fed. Reg. 355 (Jan. 19, 1956)). The Note states:

"Pursuant to subsections llv and llcc, (42 U.S.C.,S. 2014 (cc)) respectively, of the Act, the Commission may from time to time add to, or otherwise alter, the foregoing definitions of production and utilization facility. It may also include as a facility an important component part especially designed for a facility, but has not at this time included any component parts in the definitions." (parenthetical matter added) Staff says (p. 13 - 8/19/71 Answer):

"Nor has the Commission independently made any determination that components of nuclear reactors are to be included within the definition of utilization facility."

Applicant states (p. 5 - 8/19/71 Memorandum in Opposition to Saginaw Intervenors' motion served 8/3/71):

> "The Commission has not determined that any component part of a utilization facility should be included within the definition of 'utilization facility'. Applicant is not engaged in the manufacture of a utilization facility as this term is defined in the Atomic Energy Act and Commission regulations."

Staff and applicant have missed the point that no new determination by the Commission is required to include a reactor pressure vessel within the definition of a "utilization facility".

Staff and applicant have thus lockstepped into the contradictory position noted earlier.

They would concede that a construction permit is required before a nuclear reactor can be built, but not before its component, the reactor pressure vessel, can be fabricated.

Applicant's misinterpretation of the note leads to the absurd claim that applicant is not engaged in the manufacture of a utilization facility. Since 10 CFR., S.50,2(k)

defines a nuclear reactor as a "utilization facility", applicant in effect argues that applicant is not constructing a nuclear reactor.

This will be news to those who believe that this is a nuclear reactor construction permit proceeding.

As interpreted by Staff and applicant, the "note" is inconsistent with the Atomic Energy Act and S. 50.2(b) & (k).

Staff and applicant are really arguing that nuclear reactors and reactor pressure vessels are not included in the definition of "utilization facility" until the Commission makes an independent determination to that effect.

But since the definition of "utilization facility" in the statute (S. 2014(cc) and the regulations 10 C.F.R. S. 50.2(b) & (k) already includes nuclear reactors and reactor pressure vessels, the Staff and applicant are really arguing that the Commission can remove nuclear reactors and reactor pressure vessels from the definition of "utilization facility".

But the AEC has no authority to exempt the manufacture of reactor pressure vessels from the requirement of a prior construction permit; and no determination of the Commission was necessary to classify reactors or reactor pressure vessels as coming within the definition of "utilization facility".

Then what is the purpose and meaning of the "Note"?

To be consistent with the statute, the "Note" explains the grant to the Commission of authority to expand the definitions of "utilization facility" to include new equipment or devices or important component parts designed for such equipment or devices, which arrive with the advancing nuclear energy technology and which are capable of, or adapted to, the uses prescribed by S. 2014 (cc).

If the "Note" is interpreted in this manner, it is consistent with the Act, evolving in accord with its purpose of encouraging the development and expansion of the atomic energy technology. (42 U.S.C., S. 2012, 2013)

If the statute, 10 CFR, S. 50.2(b), the "Note", and 10 CFR, S. 50.2(k) are interpreted as we have suggested, the Board must find invalid the regulation (10 CFR, S.50.10 (b)(2) which Staff and applicant rely on as exempting the manufacture of components of the utilization facility from the requirement of a construction permit.

10 CFR, S. 50.10 (b)(2), issued in 1960 (25 Fed. Reg. 8712 (Sept. 9, 1960) is on its face contrary to the statute (S. 2131 & S. 2235). It is also inconsistent with 10 CFR, S. 50.2(b), S. 50.10, and the "Note" which were adopted January 19, 1956 (21 F.R. 355).

The Pitfalls of Fabrication Without a Construction Permit

Applicant states (pp. 2-5) that the Commission has decided to control the manufacture of reactor pressure vessels, not by requiring the issuance of a construction permit for their manufacture, but through the activities of its Compliance Division, and principally through its requirement that the vessels be constructed in accordance with specified codes and standards, and its inspection of the vessel.

We will show, however, that as in the case of the Board, the Compliance Division also comes on the scene after the fact of substantial fabrication and that its inspection procedures and code enforcement are inadequate to control fabrication.

Our comments draw on the record in the Shoreham case (Docket 50-322) which dealt extensively with questions of quality control and included testimony and evidence concerning the fabrication of the Shoreham reactor pressure vessel, gathered as the result of a visit by the parties and a Board member to inspect the vessel and its associated documentation at the shops of Combustion Engineering in Chattanooga, Tennessee, where it is under fabrication.

We request the Board to take administrative note of the Shoreham record.

It is not realistic to assume that either the Board of Compliance Division can determine, after the reactor pressure vessel is built, whether it was built in a first class manner according to the best available design, quality control and inspection methods and that it can be updated to comply with the latest and best codes and standards.

Weaknesses of Codes

As now constituted, industry codes have a built-in weakness. They are prepared and controlled on a voluntary basis by the very people to which they are to be applied. $\frac{1}{2}$

Near unanimous agreement in the code committee must be obtained to set requirements or to change them. The code, which is then widely accepted and applied, represents a minimum level of requirements that is acceptable to the industry as a whole.

The code does not require the manufacturer to deliver a product free of unacceptable defects. The supposedly independent code inspector does not adequately represent the buyer's and the public's interest. $\frac{2}{}$

The codes do not set up adequate requirements for design , Q.A. and Q.C. and inspection in many areas important for assuring safety. $\frac{3}{}$ Important areas that directly affect safety are covered only by so-called "recommended" or "optional" practices and not by specific requirements, eg. qualification by "recommended practices" issued by the Society for Non-destructive Testing.

Failure of products manufactured under industry codes generally need not be reported to or investigated by an independent control agency.

Standard specification committees tend to be dominated by the manufacturers. This very often results in the tolerances being so broad that a user can't be sure that the material or equipment purchased under this specification is going to be suitable for his particular use.

The AEC is finding it increasingly necessary to develop and enforce supplementary safety requirements above and beyond industry codes for equipment, such as pressure vessels, heat exchangers, pumps and valves.

> Requirement of Construction Permit Prior to Fabrication Gives Board Power to Contribute Safety Input to Fabrication Process.

If a construction permit were required before procurement and fabrication were commenced, the Board could impose as conditions:

- the design quality control and inspection method to be employed,
- 2 the codes, standards and specific requirements to be complied with,
- 3 the warranties to be delivered,
- 4 the supplementary safety requirements above and beyond industry codes to be complied with,
- 5 the demonstration or proof of performance, surveys and inspections to be complied with by vendors and subcontractors.

If the utility is permitted to procure and fabricate without a permit, it may issue purchase orders for equipment constructed before AEC formalized Q.A. criteria were developed, or before the utility itself has a satisfactory Q.A. program. This may result in a significant amount of design, material procurement and manufacture without adequate Q.A. criteria and without a Q.A. program approved by the AEC.

If, however, the utility and AEC are required to satisfy the Board as to the Q.A. program before a permit is issued, the Board may prescribe in advance conditions relating to:

1 - Design control program, including design review, selection of codes and standards, with points of effectivity and application and dates, and designation of classification of criticality;

- 2 Quality documentation and pre-planning of inspection/verification actions by utility and AEC;
- 3 Requirements for and monitoring of Qualification Test Status;
- 4 Formal procedures (utility v. AEC) for Recurrence Control and the documentation, reporting, analysis, corrective action, and close-out of failures and deficiencies;
- 5 Use of Reliability Tools and Availability Analysis techniques;
- 6 Additional detailed criteria for implementation of a Q.A. program and supplementary ground rules or guidelines for the general criteria;
- 7 The manner of collection, correlation, retention and approval of quality data and records during the build-up of plant and during operation;
- 8 Qualification testing programs;
- 9 In-service inspection programs.

Shoreham - Case in Point (Docket 50-322)

The Shoreham case affords an example of the serious inadequacy of the current procedure which permits fabrication without a permit.

On September 26, 1968, the Staff requested applicant (Long Island Lighting Company) to review a set of 34 tentative criteria which the Staff had, and to tabulate whether the vessel design was complete, the stage of fabrication, and the extent to which the vessel would comply with each of the 34 criteria.

One of the criteria called for 100% in-service inspection capability. LILCO didn't submit its in-service inspection program until January 1971 - 2 years and 4 months after the September 1968 meeting - and it called for only 50% availability.

Page 1 of LILCO's in-service inspection program stated:

"The effective date of the Shoreham nuclear steam supply system contract was 12/10/68 which is approximately 1 year prior to the initial publication of the draft ASME code for in-service inspection of nuclear reactor coolant systems. The design was far advanced at the time of publication; therefore it could not be changed without significant redesign of the plant."

LILCO's statement was in error. The original draft of the in-service inspection code was published October 1968 prior to LILCO's 12/10/68 nuclear steam supply system contract - and not one year later as claimed by LILCO.

Thus the Shoreham licensing board was presented with a fait accompli - a 60% fabricated vessel with only 50% in-

sarvice inspectability.

If a permit had been required prior to fabrication:

- the Board could have insisted that LILCO comply with the latest code requirement of 100% inservice capability - a requirement which was already known in October 1968, prior to LILCO's contract of 12/10/68 to purchase the nuclear steam supply system;
- 2) the basic design of the Shoreham BWR could not have been finalized prior to adoption of the code requirement requiring 100% access to the reactor vessel surfaces.

These facts are documented in the Shoreham transcript (pp. 9862, 9868, 9877, 5652, 5653, 5655).

Lack of Adequate Regulatory Scheme to Control Manufacture of Reactor Pressure Vessels.

The evidence in the Shoreham case revealed that AEC Compliance Division inspection capability is a slender reed to rely on.

Division of Compliance has only 83 professional inspectors available to inspect all plants in operation or under construction. (Shoreham Tr. 5803, 5743, 5744). No AEC inspections were made of the Shoreham reactor pressure vessel. The AEC simply placed its faith in the GE Quality Assurance Plan. (Shoreham Tr. 5543, 5544, 5546, 5547, 5548)

According to testimony of AEC witnesses, inspection starts when construction permit is issued. (Shoreham Tr. p. 5753) Division of Compliance has no set points at which inspection occurs. (Shoreham Tr. 5754, 5755) Inspection is a hit or miss type of operation that normally occurs about once every three months, and there are no AEC resident inspectors on the job. (Shoreham Tr. 5756, 5768)

The Division of Compliance did not know how the 19 requirements for the reactor pressure vessel listed in the Shoreham PSAR are conveyed to the manufacturer. They did not know if the boundaries of code jurisdiction of the RPV complied with the requirements in the code. They did not know if the materials of the RPV met code requirements. There was no stress analysis of the RPV (Shoreham Tr. 5808-5816)

Most of the equipment was ordered in 1968 and 1969, but the RPV was fabricated to winter 1966 addenda, although the code was subsequently revised in winter '68, summer '68, summer '69. (Shoreham Tr. 702-718)

Obviously, neither the Board nor Compliance is really controlling the manufacture of reactor pressure vessels.

There is no adequate regulatory control of the manufacture of reactor pressure vessels. It is really left to the vendors of the vessels. This is self policing - not regulation.

The AEC has publicly admitted this fact in testimony before the Joint Committee on Atomic Energy.

"Representative Holifield: You inspect the item after it is fabricated in the contractor's plant and certified by the contractor and his inspectors that it meets the specifications?

Mr. Shaw: No sir, we do not. We do not have such a system set up in our reactor program right now." 4/

The only way to restore regulatory control of the manufacture of RPV's, as was intended by the Congress, is to require that a construction permit issue before the process of fabrication can commence.

The Mangelsdorf Report

The requirement of a permit before fabrication will increase the certainty and stability of regulatory requirements. One of the key recommendations of the so-called Mangelsdorf report $\frac{5}{}$ called for

> "A phasing of regulatory design and construction approvals to correspond as closely as possible to the normal industrial plant design and construction phases." 6/

It was in part based on these observations:

"There were indications, however, that uncertainty and instability in regulatory requirements have been a problem to industry. For example, utilities have not been certain of ultimate licensing requirements at the time plants were contracted for and there have been increases in costs and changes in scheduling and manpower requirements resulting from added safety requirements for reactors of increased size and power density." <u>7</u>/

The Study Group suggested that the Commission "explore the possibilities for revising the present regulatory review process to provide a closer correlation between the timing of industrial and regulatory decisions." Several alternatives for improving this timing were proposed, including changes in the scope and time of the construction permit hearing and on an earlier regulatory determination of site suitability. $\frac{8}{}$

The requirement of a construction permit before fabrication would implement the objective of more closely correlating the timing of industrial decisions, such as procurement and manufacture of the reactor pressure vessel and the regulatory decision.

It would give utilities more certainty of ultimate licensing requirements at the time plants were contracted for, and would help avoid increases in costs and changes in scheduling and manpower requirements resulting from added safety requirements. It would better enable utilities, at the time of contract, to provide for the safety requirements imposed by the regulatory groups, and to reduce costly backfitting due to imposition of additional safety requirements after issuance of a construction permit.

The filing of the construction permit marks the first AEC official involvement in central station nuclear power plants (AEC Authorizing Legislation, Fiscal Year 1968, Hearings before Joint Committee on Atomic Energy, 90th Congress, 1st Session, March 14 & 15, 1967, Part 2 (Milton Shaw) p.697)

The AEC clearly relies on the nuclear industry to police itself.

"The utilities have to start exercising their responsibility to assure quality out of the reactor manufacturers. The reactor manufacturers, such as GE and Combustion Engineering, that are buying from other subcontractors, must exercise this control themselves."

(Shaw, ibid - p. 763) (Ramey, ibid - p. 1288)

In its November 24, 1965 letter to the AEC, the ACRS advised:

"To reduce further the already small probability of pressure vessel failure, the Committee suggests that the industry and the AEC give still further attention to methods and details of stress analysis to the development and implementation of improved methods of inspection during fabrication . . ." (id - p. 1327)

Again, in its October 12, 1966 letter to the AEC, the ACRS said:

"Development of practical, effective methods for extensive periodic inspection of pressure vessels is of great importance. The current program in AEC and industry should be augmented, as necessary, to assure this. One or more practical systems for such inspection should be developed as soon as possible." (id - p. 1328)

If a permit were required before fabrication of the pressure vessel, the ASLB could require as a condition of the issuance of the permit, the performance of a stress analysis, the provision of suitable methods of inspection during fabrication, and the incorporation, in the reactor, of necessary design approaches.

The AEC's views on the critical importance of quality assurance in civilian reactors have been stated by Commissioner Ramey (id - p. 1287) and Milton Shaw, Director, Division of Reactor Development & Technology. (id - p.1296)

The requirement of a construction permit before fabrication provides an excellent means for insuring that:

- Quality assurance is factored into the overall design, plans and specifications, including individual parts and components;
- Adequate inspections of the facility are conducted by the Division of Compliance during construction;

- 3) the design is adequate to meet requirements;
- 4) construction is carried out in accordance with the design;
- 5) tests confirm the design;
- the plant is operated in a safe manner within limits established in the design.

It gives the ASLB the opportunity of stipulation that the purchaser of a central station nuclear power plant consider advice, such as that furnished by Admiral H. G. Rickover. (Id - p. 1493 - see Exhibit 1 attached).

Unless the AEC enforces the requirement of a construction permit before fabrication, it disobeys its mandate to carry out

> "the development and utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public."

Dated: September 2, 1971.

Respectfully submitted

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by:

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FOOTNOTES

- 1 AEC Authorizing Legislation 1968 Hearings before Joint Committee on Atomic Energy, 90th Congress, 1st Session, March 14 & 15, 1967 (Part 2), p. 762
- 2 "Who Protects the Public?" Vice Admiral H. G. Rickover, published December 1968 (presented at 50th Materials Engineering Congress & Exposition of the American Society for Metals
- 3 id
- 4 AEC Authorizing Legislation 1968, etc. p. 762
- 5 AEC release No, M-149 6/25/69 (a report of an Internal Study Group, which conducted a technically oriented review of the AEC reactor licensing program
- 6 id p. 12
- 7 ie p. 2

8 - id - p. 2

AEC AUTHORIZING LEGISLATION-1968

APPENDIX 25

ADVICE FURNISHED BY ADM. H. G. RICKOVER TO PROSPECTIVE PUR-CHASERS OF CENTRAL STATION NUCLEAR POWER PLANTS

In purchasing a central station nuclear power plant consideration should be given to the following suggestions:

General

1. Have one company (the "seller") responsible for design, construction and test of the entire plant so that the "purchaser" does not have to coordinate technical, schedule and cost items among several organizations. 2. Require the "seller" to guarantee :

. That the plant will perform reliably. Specifically, it should be available for unrestricted full power operation at least 05% of the time for at least two years after initial full power operation and completion of the test program agreed to by the "seller" and "purchaser".

b. Minimum power and energy outputs.

e. That the fuel elements will perform satisfactorily throughout the full life of the reactor core.

d. Satisfactory equipment performance for a period of at least one year after initial full power operation of the plant, and completion, of the test program agreed to b; the "seller" and "purchaser".

D. sign and Construction

EXHIBIT 1

1. Require that all aspects of the job including the design, manufacture, construction and test be subject to the "purchaser's" approval and that the "Pur-chaser's" representatives have full and free access to all plans and reports and to all factories in which equipment or parts for the plant are manufactured.

2. Require that the standards to be used in all aspects of the job (design, materials, fabrication, etc.) are defined by the "seller" in writing before placing the order. All deviations from these standards should be documented and approved by the "purchaser"

3. The "purchaser" should retain an independent organization to check and audit all phases of design and construction. This organization should, for ex-ample, review design calculations and verify non-destructive tests for conformance to standards.

4. The "purchaser" should perform audits of manufacturing and construction operations. The right to do this should be specified in the contract and required to be included in all subcontracts.

5. Require that detailed written procedures be provided by the "seller" for installation, operation and maintenance of all equipment and that these procedures be verified by use during plant construction and testing and corrected as Beccssary.

6. Require that detailed written procedures be provided by the "seiler" for all aspects of plant operation. These procedures should be verified by the "seller" during the plant test program and corrected as necessary.

7. Require that technical manuals be provided by the "seller" for all equipment and for the plant. These manuals should describe the equipment, discuss its function, performance and limits, and provide the basis for these limits.

8. Require that all equipment and operations require to replace nuclear fuel be checked out by the "seller" before the plant is radioactive. 9. Require the "seller" to provide a complete set of plans showing the equipment

and plant as actually delivered, i.e., including all changes made during fabrication, installation and test.

10. The "seller" should have full time representatives at the plant during construction and test.

11. The "purchaser" should have full time representatives at the plant site during construction and test. These representatives should have authority to stop the work if there is reason to believe it is not in accordance with all approved requirements.

12. The plant and equipment should be designed and constructed in accordance with the latest safety requirements of the "seller's" country in addition to any rately requirements specified by the "purchaser".

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12. Adequate spare equipment and parts should be provided by the "seller". The number and type to be provided should be approved by the "purchase" 14. Sufficient information should be provided by the "seller" to permit the "purchaser" to procure additional equipment and parts.

Operation

1. All plant operations including tests, normul operation, refueling and maintenance should be carried out in strict compliance with detailed written procedures provided by the "seller" and approved by the "purchaser".

2. Detailed records should be kept of all changes to the plant or machinery and the drawings and manuals should be modified to show the current situation.

3. All difficulties or unusual situations encountered should be documented and the disposition (i.e., changes in design or operating procedure) approved by the "purchaser" and "seller". 4. Formal qualification should be required for all plant operators. This should include written and oral examinations and periodic re-examinations.

6. The "purchaser" should have full time qualified representatives at the plant at all times with the authority to stop operations if there is reason to believe they are unsafe or not in accordance with all approved requirements.

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CERTIFICATION

I certify that a copy of the foregoing document was mailed September 3, 1971, postage prepaid and properly addressed, to the members of the Atomic Safety and Licensing Board, the Secretary of the Commission, and all counsel of record.

Irving Like

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Attorney for Mapleton Intervenors