ACRS - 1754

CERTIFIED
8/7/80

MEETING DATE: June 17-18, 1980
DATE ISSUED: July 21, 1980

MINUTES OF THE ACRS SUBCOMMITTEE MEETING ON METAL COMPONENTS JUNE 17-18, 1980

The ACRS Subcommittee on Metal Components met in Room 1046 at 1717 H Street N.W., Washington, DC at 8:30 a.m. on June 17 and 18, 1980 to review the materials, metallurgy and mechanical engineering portions of the NRC's research budget and to hear a status report on the cracking and failures observed in the low pressure turbine discs of some turbines manufactured by Westinghouse. Notice of this meeting was published in the Federal Register on May 15 and June 2, 1980 (Attachment A). A copy of the detailed schedule of presentation is attached (Attachment B). No written statements from the public were received nor were there any requests to make oral statements. The entire meeting was open to the public except the final hour and forty minutes which was closed to protect proprietary information relating to manufacturing of low pressure steam turbines (5 USC 552b(c)(4)).

No written reports were issued or approved by the Subcommittee at this meeting. A list of documents provided to the Subcommittee during this meeting is attached (Attachment C).

Attendees

ACRS

P. G. Shewmon, Chairman
H. Etherington
M. Bender
S. Bush, Consultant
R. Dillon, Consultant
M. Wechsler, Consultant
E. Rodabaugh, Consultant
H. Corten, Consultant
T. W. Pickel, Consultant
J. C. McKinley, ACRS Staff

NRC Staff

J. Musgara, RES
R. M. Kenneally, RES
M. Vagins, RES
P. Wu, RES
J. Strosnider, NRR
B. Turovlin, NRR
R. W. Klecker, NRR
J. Grant, NRR
C. Z. Serpan, RES
H. I. Gregg, SD

NRC Staff (cont'd)

H. A. Wilber, IE
F. C. Cherny, NRR
E. Hemmington, NRR
R. E. Johnson, NRR
R. M. Gamble, NRR
L. C. Shao, RSR
Vincent S. Noonan, EB
J. Richardson, RES
H. A. Wilber, I&E
R. Brosum, B&W
W. Hazelton, NRR
D. D. Reiff, RES
J. J. Burns, RES
J. O'Brien, RSR
Terry Milburn, RSR
S. Pawlicki, NRR
Ed Jordan, I&E
W. F. Anderson, SD
S. S. Kirslis, NRR

Other

Joanne Dann, McGraw-Hill
Mae Haley, Westinghouse
Jerry Schmeekrey, Westinghouse
Patrick Higgins, AIF
M. C. Simons, Alderson Inc.

NRC Consultants & Contractors

R. G. Brasfield, D.A.I.
L. L. Yeager, D.A.I.
Thomas S. Bulischeck, Brookhaven N.Lab.
S. Granapath, U. of Michigan
R. W. McClung, Oak Ridge N. Lab.
David O. Harris, Science Applications
W. J. Shaeic, Argonne N. Lab.
R. A. Clark, PNL
J. R. Weeks, Brookhaven N. Lab.
J. Jackson, S.W. Research Inc.
F. L. Becker, PNL
P. C. Paris, Washington U.
P. H. Hutton, PNL

Opening Statement

Dr. Shewmon, Subcommittee Chairman, opened the meeting at 8:30 a.m. with a statement regarding the conduct of the meeting in accordance with the provisions of the Federal Advisory Committee Act and the Government in the Sunshine Act. Mr. J. C. McKinley was the designated federal employee.

Meeting With NRC Office of Research, Metallurgy and Materials Research Branch

Mr. Charles Serpan described two areas of research supported by the Metallurgy and Materials Research Branch that have not previously been considered by an ACRS Subcommittee. These were non-destructive examination methods and steam generator degradation. He provided a brief overview of the entire Branch budget request for FY 82 as shown below:

Fracture Mechanics	$6.0 M
Operating Effects on Materials	7.6 M
Non-Destructive Examination	3.4 M
Total	$17.0 M

This budget proposal was related to the five year (FY 80 to FY 85) plan (see Figures 1-3) for plant operational support. Programs receiving major increases in funding are; Degraded Piping, HSST-Pressurized Thermal Shock, Environmentally Assisted Pipe Cracks, Examination of Retired Steam Generator, and the Reliability of Ultrasonic Flaw Detection Techniques (see Figure 4).

Of the several areas of responsibility of the Metallurgy and Materials Research Branch, only those related to flaw detection and evaluation and corrosion-environment effects were considered at this meeting. The others had been addressed at an earlier meeting at Oak Ridge National Laboratory. Mr. Serpan briefly described each program and then representatives from the contractors described them in greater detail.

Pacific Northwest Laboratory is working on integration of non-destructive examination reliability and fracture mechanics in an attempt to update the ASME Code requirements and improve them over what is now being used. Work is being done by two contractors on synthetic aperture focusing technique for ultrasonic testing (SAFT-UT). The University of Michigan is doing the technology development while Southwest Research is trying to transfer the technology to field application. SAFT-UT is interesting in that it can provide a three dimensional computer image of a flaw. The technique appears to have promise but will require further development in order for it to be used outside the laboratory. Overseas interest has been expressed on this program. Pacific Northwest Laboratory is working on a system of continuous

acoustic emission monitoring for crack detection (detect crack growth during hydrostatic testing and detect the sound of leaking fluid through a crack during normal operation). Daedalean Associates is working on another continuous monitoring technique based on the internal friction of material at the tip of a flaw before it becomes a crack. This appeared to be accomplished by measuring the acoustic damping of an imposed signal. The Subcommittee appeared to feel that this technique was not very promising. Oak Ridge National Laboratory is working on a multiple frequency eddy current detection device for inspecting steam generator tubes. They hope to field test the device in the near future.

There was some discussion as to why the NRC should fund some of this research instead of industry and in some cases it appeared that the NRC was subsidizing the development of new commercial equipment. At Dr. Shewmon's request, the ACRS office has been provided with a copy of the user's request for each project.

Argonne National Laboratory continues to work on environmental effects on stress corrosion and cracking in both BWR and PWR systems. This project is slated for a budget increase of about $1.8M from FY 80 to FY 81 and another increase of about $0.7M from FY 81 to FY 82. The NRC Staff is looking for ACRS guidance in this particular area. Brookhaven National Laboratory (BNL) and Pacific Northwest Laboratory (PNL) are both working on the problem of steam generator tube integrity. In addition to those two labs, Oak Ridge National Laboratory (ORNL) is working on the assessment of steam generator degradation; this includes a combined effort in the examination of the retired Surry steam generator currently being examined at PNL.

There was some discussion of the need for a LOM facility to test full scale (20") piping configurations to destruction.

Mr. Richardson described the programs that come under the cognizance of Mechanical Engineering Research Branch. The branch is recently created and its budget request for FY 82 is:

Seismic Safety Margin Research	$ 2.5 M
Mechanical Reliability & Performance	3.6 M
Structural Reliability & Performance	3.1 M
General Reliability & Performance	0.8 M
	$10.0 M

The objectives of the seismic safety margins research program are to estimate the conservatisms in the standard review plan seismic safety requirements, develop improved requirements, and develop methods that realistically estimate the behavior of nuclear power plants during an earthquake. Part of the program is to develop the necessary fragility descriptions (probability of failure as a function of seismic input) for components, systems, and structures. The major effort under Mechanical Reliability and Performance of Systems and Components is evaluation of pressurizer relief and safety valves (~$2.0 M). This is in addition to the EPRI test programs for both PWR and BWR safety and relief valves which were also described. The next most significant program was pump and valve qualification which is aimed at developing acceptance criteria and methods of qualification.($0.6 M). The objective of the Structural Reliability programs is to insure that strength, stability, and resistance requirements under adverse accident and environmental conditions are met. Major programs under this heading include Load Combination ($1.0 M), computer

codes ($0.65 $\bar{M}$), and advanced seismic designs ($0.5 $\bar{M}$). The General Reliability program is to provide technical support for systems and component reliability and performance. The major elements include foreign liaison, seismic qualification testing, and the influence of in-service inspection on probabilistic risk assessment.

There was an apparent feeling by the Subcommittee that there was too much emphasis on the seismic aspects in the projects being undertaken by the Mechanical Engineering Research Branch.

In addition to the work being sponsored by Research there are a number of technical assistance contracts under NRR control. Mr. Cherny summarized those sponsored by the Mechanical Engineering Branch (not to be confused with the Mechanical Engineering Research Branch), these fall in two broad categories, casework assistance and technical projects. Other Divisions and branches also sponsor technical assistance contracts and those related to materials and systems performance were described.

The Office of Inspection and Enforcement has also sponsored a technical assistance contract to, as needed, independently validate licensee reports, provide engineering analyses of licensee actions, and provide expert testimony at public hearings.

Meeting With NRC Division of Engineering on Fracture Toughness Criteria

The Subcommittee discussed with Mr. Hazelton the genesis of the minimum fracture toughness requirement of 50 ft-lbs for reactor pressure vessel material.

The precise derivation and basis is lost in history but the value was a compromise that permitted all of those involved in the decision to feel confident that, if a material failure were to occur, it would be of the "leak before break" type rather than a catastrophic brittle rupture. The 50 ft-lb value was used as a point of good fracture toughness and the temperature associated with this value was a good indication of the shift (embrittlement) of the fracture toughness curve as a result of neutron fluence. The concern now is that some irradiated materials may not be able to absorb 50 ft-lb at any temperature and how do we determine that they have adequate fracture toughness. The conclusion was that 50 ft-lb was not absolute and 45 or 40 might have been just as good. The only plant to currently fall below 50 ft-lb is Yankee, Rowe. If the value falls below 50 ft-lb then the licensee must make a 100% volumetric exam of his vessel (really only that portion below 50 ft-lb), calculate or determine fracture toughness by some means other than the Charpy V-notch test, and make a fracture analysis to assure continued safe operation.

Meeting With NRC Division of Engineering on Turbine Disc Cracking (Closed Session 1 hour 40 minutes)

DELETED -6

DELETION -6

discount coupon constitutes a promise by the manufacturer to pay the consumer a fixed amount. It does not relate to the carrier's relationship to the shipper and therefore would not be a rebate as that term is used in § 11904(b)(1), nor does it appear to violate the intent of the tariff publication provisions of section 10761(a). The plan is available equally to all household goods movers and, thus, to all their customers. Accordingly, we do not believe 49 CFR 1004.2(d) is applicable. The carrier here would act merely as a conduit between MCA and the consumer.

Interested persons are invited to comment. While we do not believe this is a significant action affecting adversely the quality of the human environment or conservation of energy resources, comments on this issue are also welcome.

This notice of declaratory order is issued under the authority of 5 U.S.C. section 554(e), and 40 U.S.C. sections 10101, 10321, and 10521.

Decided: May 22, 1980.

By the Commission, Chairman Gaskins, Vice Chairman Gresham, Commissioners Stafford, Clapp, Trantum, Alexis and Gilliam.

Agatha L. Mergenovich,

Secretary.

[FR Doc. 80-16363 Filed 5-30-80; 8:45 am]
BILLING CODE 7035-01-M

DEPARTMENT OF JUSTICE

Office of the Attorney General

United States Circuit Judge Nominating Commission Seventh Circuit Panel; Meeting

The Seventh Circuit Panel of the United States Circuit Judge Nominating Commission (Chairman: Justin A. Stanley) will hold its next meeting on Wednesday, June 18, 1980, in Room 2781 of the Federal Building, 219 South Dearborn Street, Chicago, Illinois at 10:30 AM. The meeting will be devoted to a discussion of applicants and will be closed to the public pursuant to P.L. 92-463, Section 10(d) as amended. [CF 5 U.S.C. 552b(c)(6)].

Phillip B. Cover,

Committee Management Control Officer.

[FR Doc. 80-16607 Filed 5-30-80; 8:45 am]
BILLING CODE 4410-01-M

NATIONAL FOUNDATION ON THE ARTS AND THE HUMANITIES

Museum Panel; Meeting

Pursuant to Section 10 (a) (2) of the Federal Advisory Committee Act (Public Law 92-463), as amended, notice is hereby given that a meeting of the Museum Panel to the National Council on the Arts will be held June 17, 1980 from 9:00 a.m.-5:30 p.m. and June 18, 1980 from 9:00 a.m.-5:30 p.m., in Room 1422, Columbia Plaza Office Complex, 2401 E St., N.W., Washington, D.C.

A portion of this meeting will be open to the public on June 17, 1980 from 9:00 a.m.-5:30 p.m. for the discussion of Policy.

The remaining sessions of this meeting on June 18, 1980 from 9:00 a.m.-5:30 p.m., are for the purpose of Panel review, discussion, evaluation, and recommendation on applications for financial assistance under the National Foundation on the Arts and the Humanities Act of 1965, as amended, including discussion of information given in confidence to the agency by grant applicants. In accordance with the determination of the Chairman published in the Federal Register of February 13, 1980, these sessions will be closed to the public pursuant to subsections (c) (4), (6) and 9(b) of section 522b of Title 5, United States Code.

Further information with reference to this meeting can be obtained from Mr. John H. Clark, Advisory Committee Management Officer, National Endowment for the Arts, Washington, D.C. 20506, or call (202) 634-6070.

Dated: May 22, 1980.

John H. Clark,

Director, Office of Council and Panel Operations National Endowment for the Arts.

[FR Doc. 80-16609 Filed 5-30-80; 8:45 am]
BILLING CODE 7537-01-M

Media Arts Panel (AFI); Meeting

Pursuant to Section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92-463), as amended, notice is hereby given that a meeting of the Media Arts Panel (AFI) to the National Council on the Arts will be held June 2, 1980 from 9:00 a.m.-5:30 p.m. and June 3, 1980 from 9:00 a.m.-5:30 p.m., in the 12th Floor Screening Room of the Columbia Plaza Office Building, 2401 E St., NW., Washington, D.C.

This meeting is for the purpose of Panel review, discussion, evaluation, and recommendation on applications for financial assistance under the National Foundation on the Arts and the Humanities Act of 1965, as amended, including discussion of information given in confidence to the agency by grant applicants. In accordance with the determination of the Chairman published in the Federal Register of February 13, 1980, these sessions will be closed to the public pursuant to subsections (c)(4), (6) and 9(b) of section 552b of Title 5, United States Code.

Further information with reference to this meeting can be obtained from Mr. John H. Clark, Advisory Committee Management Officer, National Endowment for the Arts, Washington, D.C. 20506, or call (202) 634-6070.

John H. Clark,

Director, Office of Council and Panel Operations, National Endowment for the Arts.

[FR Doc. 80-16302 Filed 5-30-80; 8:45 am]
BILLING CODE 7537-01-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Metal Components; Meeting

The ACRS Subcommittee on Metal Components will hold a meeting on June 17-18, 1980 in room 1046, 1717 H St. NW, Washington, DC 20555. Notice of this meeting was published May 15, 1980.

In accordance with the procedures outlined in the Federal Register on October 1, 1979 (44 FR 56408), oral or written statements may be presented by members of the public, recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify the Designated Federal Employee as far in advance as practicable so that appropriate arrangements can be made to allow the necessary time during the meeting for such statements.

The agenda for subject meeting shall be as follows:

Tuesday and Wednesday, June 17-18, 1980, 8:30 a.m. until the conclusion of business each day.

The Subcommittee may meet in Executive Session, with any of its consultants who may be present, to explore and exchange their preliminary opinions regarding matters which should be considered during the meeting.

At the conclusion of the Executive Session, the Subcommittee will hear presentations by and hold discussions with representatives of the NRC Staff, their consultants and other interested persons regarding pertinent portions of the NRC research program for the ACRS annual reports to NRC and Congress.

The ACRS is required by Section 5 of the 1978 NRC Authorization Act to review the NRC research program and

budget and to report the results of the review to Congress. In order to perform this review, the ACRS must be able to engage in frank discussions with members of the NRC Staff and such discussions would not be possible if held in public sessions. In addition, it may be necessary for the Subcommittee to hold one or more closed sessions for the purpose of exploring matters involving proprietary information. I have determined, therefore, in accordance with Subsection 10(d) of the Federal Advisory Committee Act (Public Law 92-463), that, should such sessions be required, it is necessary to close portions of this meeting to prevent frustration of the above stated aspect of the ACRS' statutory responsibilities and to protect proprietary information. See 5 U.S.C. 552b(c)(9)(B) and 552b(c)(4).

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the cognizant Designated Federal Employee, Mr. John C. McKinley (telephone 202/634-3265) between 8:15 a.m. and 5:00 p.m., EDT.

May 23, 1980.

John C. Hoyle,

Advisory Committee Management Officer.

[FR Doc. 80-16288 Filed 5-30-80; 10:02 am]

BILLING CODE 7590-01-M

[Docket Nos. 50-295, 50-304]

Commonwealth Edison Co. (Zion Station, Units 1 and 2); Argument Order

May 23, 1980.

This Board will hear oral argument in this case at *10:00 a.m. on Tuesday, July 1, 1980*, in the *NRC Public Hearing Room, Fifth Floor, East-West Towers Building, 4350 East West Highway, Bethesda, Maryland*. Each side will be allowed one hour for agrument. Intervenor-appellant, the State of Illinois, may reserve a portion of its allotted time for rebuttal. The applicant and staff shall divide their time equally unless we are advised that they have agreed on some other arrangement.

It is so ordered.

For the Appeal Board.

C. Jean Bishop,

Secretary to the Appeal Board.

[FR Doc. 80-16590 Filed 5-30-80; 8:45 am]

BILLING CODE 7590-01-M

[Docket No. 50-409 (FTOL Proceeding)]

Dairyland Power Cooperative (La Crosse Boiling Water Reactor); Order

May 23, 1980.

The prehearing conference announced in our Memorandum and Order Setting Prehearing Conference, dated May 21, 1980, will commence at 8:30 a.m. on Thursday, June 19, 1980, in Room 308, Cartwright Center, University of Wisconsin at La Crosse, La Crosse, Wisconsin 54601. The conference will consider various matters covered by 10 CFR § 2.752, as well as the manner in which the parties propose to respond to the questions or areas of inquiry set forth in the May 21, 1980 Memorandum and Order. No oral limited appearance statements will be taken. The Board will endeavor to adjourn the conference by 3:00 p.m. on June 19.

It is so ordered.

Dated at Bethesda, Maryland this 23rd day of May 1980.

For the Atomic Safety and Licensing Board.

Charles Bechhoefer,

Chairman.

[FR Doc. 80-16588 Filed 5-30-80; 8:45 am]

BILLING CODE 7590-01-M

[Docket Nos. 50-448, 50-449]

Potomac Electric Power Co., (Douglas Point Nuclear Generating Station, Units 1 and 2); Order Terminating the Proceeding

On May 8, 1980, Potomac Electric Power Company notified the Director of Nuclear Reactor Regulation that it's application for an early site review is withdrawn.

On May 14, 1980, counsel for the utility requested the Licensing Board to issue an order terminating the proceeding. The proceeding is terminated.

It is so ordered.

Dated at Bethesda, Maryland this 27th day of May 1980.

For the Atomic Safety and Licensing Board.

Elizabeth S. Bowers,

Chairman.

[FR Doc. 80-16591 Filed 5-30-80; 8:45 am]

BILLING CODE 7590-01-M

[Docket No. 50-338]

Virginia Electric & Power Co.; Issuance of Amendment to Facility Operating License

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 18 to Facility Operating License No. NPF-4 issued to the Virginia Electric and Power Company (the licensee) for operation of the North Anna Power Station, Unit No. 1 (the facility) located in Louisa County, Virginia. The amendment is effective as of its date of issuance.

The amendment corrects an administrative error presently existing in the Technical Specifications regarding the maximum response time expected from the onset of a detected degraded offsite power system until the emergency diesel generator is supplying power to the emergency buses.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR Section 51.5(d)(4) an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

For further details with respect to this action see (1) the application for the amendment dated January 8, 1980; (2) Amendment No. 18 to Facility Operating License No. NPF-4; and (3) the Commission's related Safety Evaluation. These items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555 and at the Board of Supervisor's Office, Louisa County Courthouse, Louisa, Virginia 23093 and at the Alderman Library, Manuscripts Department, University of Virginia, Charlottesville, Virginia 22901. A copy of items (2) and (3) may be obtained upon request to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland this 18th day of May, 1980.

For the Nuclear Regulatory Commission.

Robert A. Clark,

Chief, Operating Reactors Branch #3, Division of Licensing.

[FR Doc. 80-16589 Filed 5-30-80; 8:45 am]

BILLING CODE 7590-01-M

REVISED 6/12/80

ACRS SUBCOMMITTEE MEETING ON METAL COMPONENTS
JUNE 17 & 18, 1980
WASHINGTON, DC

TENTATIVE SCHEDULE

JUNE 17, 1980

APPROXIMATE TIME		SPEAKER
8:30 a.m.	Chairman's Opening Statement	Shewmon
8:40 a.m.	Overview	Serpan, Muscara (NRC)
9:00 a.m.	Reliability of Piping	Harris (SAI)
9:30 a.m.	Steam Generator Integrity	Clark (PNL)
10:30 a.m.	********* BREAK ********	
10:45 a.m.	Steam Generator Tube Corrosion	vanRooyen (BNL)
11:15 p.m.	Eddy Current ISI	McClung (ORNL)*
11:30 a.m.	Pipe Cracking and Environmental Effects	Shack (ANL)
12:45 p.m.	******** LUNCH ********	
1:45 p.m.	Qualification Tests of Safety Relief Valves, PORV, etc.	Noonan (NRC)
2:45 p.m.	Continuous Acoustic Emmission Monitoring	Hutton (PNL)
3:15 p.m.	Incipient Crack Monitoring	Yeager (Daedalean)
3:45 p.m.	Reliability of NDE	Becker (PNL)
4:15 p.m.	******** BREAK ********	
4:45 p.m.	SAFT-UT Development	Ganapathy (U. of Michigan)
5:15 p.m.	Adaptation of SAFT-UT to ISI	Jackson (SwRI)
5:45 p.m.	Low Shelf Energy Concerns (Pressure Vessels, Basis for Operating below 50 ft.lb., eg., Yankee Rowe)	Hazelton (NRC)
6:30 p.m.	Caucus by Subcommittee	
6:45 p.m.	Adjournment	

Rev.

*Early plane out

JUNE 18, 1980

APPROXIMATE TIME		SPEAKER
8:30 a.m.	Chairman's Remarks	Shewmon
8:40 a.m.	Overview	Richardson, O'Brien (NRC)
9:00 a.m.	SSMRP Mechanical Engineering Portion	
9:45 a.m.	Mechanical Safety and Performance of Systems and Components	
10:30 a.m.	******** BREAK ********	
10:45 a.m.	Structural Safety and Performance of Systems and Components	
11:15 a.m.	General Safety and Performance of Systems and Components	
12:30 p.m.	******** LUNCH ********	
1:30 p.m.	NRC Technical Assistance Programs	
	- Engineering	Bosnak/Noonan
	- Safety Technology	Johnson
	- Standards	Anderson
	- Inspection & Enforcement	Jordan
3:00 p.m.	******** BREAK ********	
3:15 p.m.	Turbine Disc Failures	Hazelton (NRC)
4:15 p.m.	Safety Aspects of Turbine Disc Failures	(NRC)
4:45 p.m.	Probability of Turbine Disc Failures	(NRC)
5:15 p.m.	Caucus by Subcommittee	
5:30 p.m.	Adjournment	

NOTES:

1. Budgetary discussions are proprietary.
2. Turbine Disc Failures Presentation by W. Hazelton is expected to be proprietary.
3. Safety Aspects and Probability of Failure of Turbine Disc presentations are being negotiated with the Staff at the present time.