OCT 9 1985

MEMORANDUM FOR: C. J. Heltemes, Jr., Director Office for Analysis and Evaluation of Operational Data

FROM: Harold R. Denton, Director Office of Nuclear Reactor Regulation

SUBJECT: LESSONS FROM THE DAVIS-BESSE INVESTIGATION EFFORT

This is in response to your memorandum of August 22, 1985, soliciting our views and suggestions on how the Incident Investigation Program (IIP), as used for the Davis-Besse event, can be improved for future team efforts. I gave your memorandum wide distribution within NRR and members of my staff have discussed this effort with representatives of the team, the Office of Investigations, and Fred Hebdon of AEOD.

Our comments are provided in the enclosure and specifically address the questions raised in your memorandum as well as provide a few other suggestions. NRR will be glad to provide additional assistance to your staff as you develop procedures and instructions for the next team.

Please contact R. Wessman of ORAB (x28432) if you have any questions.

JTBeard ADeAgazio

19/1/85

Harold R. Denton, Director Office of Nuclear Reactor Regulation

Enclosure: As stated

cc: J. Taylor, IE J. Keppler, R-III E. Rossi, IE F. Hebdon, AEOD Central File w/incoming NRC PDR w/incoming NSIC w/incoming ORAB Rdg HDenton/DEisenhut PPAS GHolahan RWessman

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Original Signed My L R. Common Harold R. Denton, Director Office of Nuclear Reactor Regulation

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UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

OCT 9 1985

MEMORANDUM FOR:

C. J. Heltemes, Jr., Director Office for Analysis and Evaluation of Operational Data

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Our comments are provided in the enclosure and specifically address the questions raised in your memorandum as well as provide a few other suggestions. NRR will be glad to provide additional assistance to your staff as you develop procedures and instructions for the next team.

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Harold R. Denton, Director Office of Nuclear Reactor Regulation

Enclosure: As stated

cc: J. Taylor, IE J. Keppler, R-III E. Rossi, IE F. Hebdon, AEOD

ENCLOSURE

NRR COMMENTS ON INCIDENT INVESTIGATION PROGRAM (IIP)

I. QUESTIONS FROM AUGUST 22, 1985 MEMO

1. Scope, Character, Reporting

The team produced an excellent report of what happened and why. The level of detail, scope, and format of the report were excellent. Where a detailed technical analysis is deemed appropriate (such as an analysis of the SFRCS at Davis-Besse), appendices should be considered. We agree with E. Rossi's comment that the scope of effort should be limited to the event itself, the equipment malfunctions, operator performance, and the underlying causes. We think that assessments of safety significance, identification of generic issues, matters involving wrongdoing, and plant design or licensing issues are more appropriately handled by the responsible line organizations. As was done at Davis-Besse, we believe inspection of troubleshooting, enforcement, and monitoring of plant activities should be managed by the Regional Office.

2. Basic Practices of Interviewing Key Personnel, Developing a Detailed Sequence of Events, and Analyzing Root Causes

The use of formal interviews and transcribed records is fully supported by NRR. We suggest that using two stenographers and splitting up the team offers a couple of advantages. Interviews can proceed "in parallel" and be completed more rapidly. This is important as recollection of details may be lost or an individual may change his recollection of what happened with the passage of time. Also, splitting the team in two groups reduces the number of individuals confronting an interviewee. As pointed out by OI, there is an inevitable degree of tension in formal interviews between the regulator and those who are regulated. Reducing the number of participants, the setting of the room, and the attitude of the staff participants all affect the success of the interview process. Note that splitting up the team requires careful management of personnel and time to assure coordination of information between team members and adequate transcript review.

The transcripts of the interview should be prepared on an overnight basis.

Interview and investigative practices for the team should be clearly defined and consistent with policies of SECY 85-80, Investigation Policy and Rights of Licensee Employees Under Investigation, March 6, 1985, as modified by the Staff Requirements Memorandum of May 21, 1985. Also, the team should be able to acquire promptly the necessary staff support to obtain sworn statements, should the need arise. The development of a detailed sequence of events should be accomplished as expeditiously as possible and in a similar manner as was done at Davis-Besse. A prompt release of the "preliminary sequence" should be sought as management, members of the staff, and the public need timely information.

The scope of the team's effort in "root cause" determination should be limited to those items which can readily be dealt with in a few weeks time. Over half of the root causes to equipment failures identified on Table 5.1 of NUREG-1154 were not known at the time the team concluded its efforts. Most of the licensee's root cause reports were not available to the team. The team should make an effort to identify the "probable root cause" based on information available, as it did at Davis-Besse.

3. Record of Interviews

The use of cameras and recorders does not seem necessary. Transcribed interviews and control of transcripts, as was done at Davis-Besse, seems appropriate.

4. Quarantine of Equipment

We agree with the quarantine of equipment and troubleshooting concepts employed at Davis-Besse. However, it may not always be possible to conduct tests that duplicate malfunctions without creating hazardous conditions. Such tests should be considered on a case-by-case basis. We would expect that testing subsequent to making corrective actions will be rigorous, comprehensive and sufficient to eliminate any doubt concerning equipment reliability.

5. Disbanding of Team

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The team should be disbanded upon completion of the report and the pertinent briefings. We recognize, however, that some continued involvement by team members is inevitable as the normal organizational elements assume their responsibilities. Team members should receive appropriate compensation or leave for overtime committed to the investigative effort.

6. Improving Information Flow

There was relatively little information flow to staff elements in NRR involved in assessing this event and researching related licensing history. Daily Preliminary Notifications may help; however, these tend to focus on plant status rather than investigative findings. We believe our Project Manager should visit the team at the site several times during their on-site effort, as an aide to improving information flow. It is our understanding that the team leader held daily conference calls with AEOD and, on a less frequent basis, with other headquarters and Regional managers. Perhaps the minutes of these calls should receive wider distribution.

- 3 -

It also seems appropriate that the Region or investigative team have a designated individual to handle the questions raised by other staff elements. The rest of the team should be insulated from staff questions so they can complete their task. This appeared to be relatively effective at Davis-Besse.

7. Human Factors Experience on Team

We endorse Mr. Heltemes' suggestion that a human factors professional be a member of each team. Closely related to this activity, DHFS has proposed a new element entitled "Human Performance" to the Human Factors Program Plan (Revision 2). One objective of that effort is to develop a methodology for evaluating the root cause of human performance failures. One end product of the effort will be the development of a standardized data collection instrument designed to collect data necessary for evaluating human performance during operating events. We suggest that DHFS staff members familiar with the "Human Performance" effort contribute to the development of a standardized interview protocol. Using DHFS staff members on Incident Investigation Teams will benefit the teams by providing needed human factors expertise and a mechanism for identifying significant human error and performance issues.

We suggest that, to the extent practical, the team should include an individual with extensive operational experience such as a senior licensing examiner or ex-reactor operator.

8. Increasing Number of Court Reporters

See comments on item 2.

II. ADDITIONAL COMMENTS

1. Team Membership

We suggest that future teams include an experienced NRR Project Manager. This individual should have the seniority and knowledge to manage some of the technical and administrative liaison between the team and the utility, Region, NRR, contractors, etc.

We think that the Senior Resident Inspector and the Licensing Project Manager should not be part of the team, even though they are the most knowledgeable about the particular facility. These individuals will be heavily involved in inspection and licensing issues that ensue from a significant incident.

We think that the size of this team was a bit small for the task they faced. Clearly, they extended great personal effort to accomplish their mission in an admirable manner. Adding two or three individuals (with human factors, operations and administrative backgrounds) may have been beneficial.

2. Administrative Support

We must make additional efforts to improve administrative support when we send a team to the field on short notice. On at least one occasion, the NRR member of the team was put through unnecessary difficultly in obtaining travel funds because staff elements in Washington did not appreciate the importance of the team's mission.

3. Training in the Conduct of Interviews

We suggest that the subject of interview techniques be included as part of the training activities for potential team members. This type of training is regularly included in legal and paralegal courses and may not be too difficult to obtain. In addition, we suggest that greater use of OI experience and investigative techniques be considered. The technical staff would benefit from more experience in the tactics of interviewing and "do's" and "don'ts" of obtaining accurate information. Perhaps team members (if identified in advance of any event) could accompany OI investigators or routine interviews to gain the necessary field experience.

Technical Support

We suggest that when the cause of an equipment malfunction is not straightforward, the team should be able to request an individual with technical expertise on that specific equipment to support the team. Additionally, the program must provide for analytical support that may be needed to confirm the accuracy and completeness of the sequence of events via models of reactor transient response.

5. Identification of Generic Concerns

While the team may suggest items of generic concern, the normal line organization should be specifically charged with reviewing the event (after the team's report is issued) to systematically determine all generic concerns.



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UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

August 22, 1985

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MEMORANDUM FOR:

Harold R. Denton, Director, NRR James M. Taylor, Director, IE Robert B. Minogue, Director, RES John G. Davis, Director, NMSS Regional Administrators

FROM:

C. J. Heltemes, Jr., Director Office for Analysis and Evaluation of Operational Data

SUBJECT:

LESSONS FROM THE DAVIS-BESSE INVESTIGATION EFFORT

The purpose of this memo is to solicit your views and suggestions on how the Incident Investigation Program (IIP), as used for the Davis-Besse event, can be improved for future Team efforts. In this regard, the leader of the NRC Team on the Davis-Besse event, Ernie Rossi, recently identified to the EDO a number of comments for consideration in developing procedures for future Team efforts (see enclosure). These comments also include a number of comments and considerations by Steve Burns, the ELD advisor to the Team.

The NRC Davis-Besse Team served a valuable function in helping to structure and define the investigative process, approach and methodology. Thus, I request your comments on whether the next Team should:

- 1. Have basically the same scope and charter, and the resulting report be similar in terms of schedule, coverage, and depth.
- Follow the same basic practices of: (a) interviewing key personnel;
 (b) developing a detailed sequence of events; and (c) analyzing and evaluating what happened to identify root cause hypotheses.
- Develop a record of the Team's activities through transcribed interviews and meetings and by use of cameras and recorders. The control and correction of transcripts could follow the same procedures.

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- 4. Agree on the quarantine equipment that malfunctioned during the event and monitor licensee activities on troubleshooting this equipment using similar guidelines to those developed for the Davis-Besse event.
- Disband following completion of the report and pertinent briefings. Follow-on actions would be defined in a similar manner used for Davis-Besse, and implementation would be by the normal responsible NRC organizations using standard procedures.

Other actions which you may want to consider in addition to those noted by Ernie Rossi include such items as:

- Improving the information flow by asking the NRC Team to issue a daily PN and by holding periodic conference calls.
- Providing an individual trained in human factors to each Team in addition to individuals skilled in operations, systems, and components.
- Increasing the number of court reporters to two in order to allow parallel interviews and to complete this phase more quickly. The sequence of events could then be issued more quickly.

Your comments and suggestions on the strengths and weaknesses of the process for fact-finding, as used at Davis-Besse, will be factored into the instructions and procedures for the next Team.

Please let me know if I can provide any additional information or assistance.

G. Director e for Analysis and Evaluation of Operational Data

Enclosure: As Stated



UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

AUG 20 1985

- MEMORANDUM FOR: William J. Dircks Executive Director for Operations
- FROM: Charles E. Rossi Leader of the NRC Team on the Davis-Besse Event

SUBJECT: NRC DAVIS-BESSE TEAM COMMENTS ON EVENT FACT FINDING METHODOLOGY

The team for the Davis-Besse event of June 9, 1985 was the first incident investigation under the staff-proposed Incident Investigation Program. This memorandum provides comments on the fact finding methodology for consideration in developing procedures for future team efforts.

The most important aspect of team fact finding efforts is that of collecting the information systematically with the development of a record of the team activities. In this regard, two techniques used by the team were particularly important and should be used for at least the more significant events by future teams. These are:

- 1. Formal interviews and meetings with transcribed records prepared by stenographers.
- Quarantining of equipment that malfunctioned during the event with troubleshooting performed in accordance with guidelines similar to those in Appendix B of the team's report (NUREG-1154).

The use of stenographers for all interviews and meetings, in the team's judgment, improved the quality of information obtained and minimized the probability of later misunderstandings concerning information provided to the team. It also ensured a permanent record of information essential to a proper understanding of what happened and how equipment and personnel performed.

The troubleshooting guidelines ensured that the licensee would review and document pertinent past history with each piece of equipment that malfunctioned. Furthermore, the guidelines required analysis of the operation of the equipment during the event and the development of failure hypotheses before beginning any troubleshooting on the equipment. The preparation of an individual "action plan" for each piece of equipment that malfunctioned, as done during the Davis-Besse fact finding effort, ensured good documentation of information on the equipment which malfunctioned and, thus, provided permanent records on this aspect of the team efforts. The team further believes that tests to duplicate malfunctions and tests to demonstrate the effectiveness of corrective actions are critical in verifying root-causes. Documentation of the results of these activities is considered to be a good practice.

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William J. Dircks

The most significant problem experienced by the team was defining (and limiting) the scope of the fact finding efforts. For future teams, the scope of effort should be specifically limited to the event, the equipment which malfunctioned during the event, the operator performance related to the event, and the underlying cause or causes of the event. Plant design or licensee problems not related to the event should not be within the team's scope but, rather, should be handled by the responsible normal NRC organizations - the Region, NRR, IE, etc. Where troubleshooting efforts to determine root-causes of equipment malfunctions are going to extend over a time period of more than approximately two weeks, the team's scope should include only a review of the licensee's troubleshooting plans and root-cause hypotheses. The followup of licensee work to perform the troubleshooting and ultimately to identify the root-causes should be handled by the normal responsible NRC organizations. For events such as Davis-Besse, the goal should be to complete a report on a time scale of one to two months. The procedures to be prepared for future team efforts should clearly address these points.

- 2 -

Administrative support for the team's efforts was adequate. However, an administrative assistant or project manager assigned full-time to the team would have been valuable. Work space available for future teams should include a relatively separate work place for each team member with a telephone. Difficulty in promptly obtaining additional travel advance money when it became evident that the initial site visit would be longer than originally planned was a significant problem for two members of the team.

Enclosure 1 contains a suggested list of topics which should be covered by procedures for incident investigation teams. Where appropriate, comments have been provided. Enclosure 2 contains a list of items provided by Jim Lieberman and Steve Burns of OELD which should be considered when procedures for future teams are developed.

I would like to note that Region III personnel were very cooperative throughout the team effort. They participated in meetings with the team and licensee, kept the team informed of their activities, and provided the team with clerical support.

Charles E. Rossi

Charles E. Rossi Leader of the NRC Team on the Davis-Besse Event

Enclosures: As stated

cc: H. Denton, NRR J. Taylor, IE C. Heltemes, Jr., AEOD Regional Administrators

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Topics Which Should Be Covered by Procedures For Incident Investigation Teams

- 1. Guidelines for determining those events which warrant dispatching a team.
- 2. Selection of team members.

In general, team members should have a broad understanding of reactor safety and reactor transient behavior. The procedure for selection of team members should, however, address the need for expertise in areas such as human factors and specific equipment hardware design. The advantages of including a member on the team having direct reactor operating experience as a licensed operator should be considered.

Scope of investigation.

4. Handling of quarantined equipment.

5. Handling of transcripts.

The procedures should include provisions for overnight transcript preparation and cover access, review and release of transcripts. The procedures developed for the transcripts related to the Davis-Besse event (see Enclosure 2) appeared to work well and should be considered for use by future teams.

Team interface with normal NRC organizational elements.

Information feedback from the team to the normal NRC organizational elements should be from the Team Leader to one single point of contact within headquarters senior management and one single point of contact within the Region. The Region contact should be an individual selected by the Region who is available at the site for liaison with the team.

A preliminary sequence of events should be developed and made available to other NRC organizational elements within the first week of team effort.

7. Report Format.

The level of detail to be included in the report should be defined.

8. Collection and listing of pertinent documentation.

The need for working copies of documents for team members as well as the maintenance of a record copy should be addressed.

9. Responsibilities of Team Leader.

10. Administrative Matters.

The need for an experienced administrative assistant assigned full-time to the team should be addressed. Secretarial, public affairs, legal, and editorial support should be addressed.

11. Provisions for rapidly obtaining contract technical assistance support.

Analysis support as well as on-site equipment expertise should be addressed.

12. Training.

Team members need training on interviewing techniques and evaluating information obtained from interviews.

13. Information Release Regarding an Event.

The source of factual information related directly to an event should be the team. Presentations that are not made by the team on the specifics of an event should be limited to only that information provided by the team. Such information should include the sequence of events and periodic progress reports on the team's efforts.

Enclosure 2

July 25, 1985

Note to Ernie Rossi; IE!

LESSONS LEARNED FROM DAVIS-BESSE INVESTIGATION

As I mentioned yesterday, Steve Burns and I have discussed lessons learned from Steve's involvement with your team. I have enclosed a note to files that we have prepared on this issue which may be of assistance to you.

Please call me if I can provide any further assistance.

Jin Lieberman

Enclosure: as stated

cc: J. Heltemes



Note to files

DAVIS-BESSE INCIDENT INVESTIGATION - "LESSONS LEARNED"

The following list is meant to highlight some of the legal procedural, and administrative problems that occurred during the NRC Fact Finding Team's inquiry into the June 1985 Davis-Besse loss-of-feedwater transient. These issues do not necessarily reflect matters that actually arose during the Term's efforts from my vantage point, but represent issues that arose or I saw as potentially arising during similar task force efforts. Some of the issues may require the establishment of specific policy guidance and implementing procedures; others may require training of Team members; others may just need to be planned for to support the Team's efforts:

- 1. Transcription of interviews and meetings
 - whether to take transcripts (the D-B Team found it useful)
 - availability of transcripts to interviewees, licensee, and the public (note attached procedure developed for the D-B effort)
 - handling of transcript corrections
 - turnaround time from reporting service for transcripts (whether to order overnight vs. 2-day service)
 - should individuals be permitted to tape record interviews or meetings?

2. Attendance of third parties at interviews

- what policy should be followed? Is the new OI policy a good starting point?
- what steps should be taken to deal with a multiple representation issue (i.e., company counsel who also purports to represent individual operators)?
- what steps should be taken to dissuade individuals from having company counsel or company management accompany them in an interview?
- what should be established "on the record" about the presence of third parties at an interview?
- the representational relation between the third party and the interviewee should be established

3. Collection of documents

- procedures for tracking and "logging in" data and documents should be established
- instructions should be developed to assist Team members in identifying documents "on the record" during the transcribed interviews and including them as "exhibits" to the interview
- guidance should be developed on sharing documentation with the licensee (i.e., whether to follow the policy guidance on draft inspection reports or whether to permit sharing of working documents so long as they are preserved.)

4. Powers of the IIT

- should the IIT be given subpoena power, power to administrator oaths and affirmations, confirmatory action letters, or orders and, if so, should form documents be prepared in advance?
- a freeze on plant equipment and documentation should be established as well as the rules for its relaxation
- if the Team does not have such powers, what standing arrangements should be made to ensure the prompt availability of compulsory process such as identified above?

5. Interface with other NRC organizations

- arrangements for dealing with press inquiries need to be made; the responsibility shifted in D-B from the Region to headquarters
- interface with headquarters program offices need to be established a single point of contact would appear preferable
- interface with regional inspectors efforts needs to be established as well as the guidelines as to the extent to which the Team will share information with the Region or rely on the Region for its development
- provisions need to be made for additional technical and administrative assistance for the Team. The job of assimilating information and reaching conclusions about its significance may be too much for the four Team members to accomplish by themselves in a week or two. Administrative support was provided to D-B through the Region; and administrative assistant to handle clerical and administrative matters would be useful.

- what legal support should be provided on-site? Until Team members feel comfortable with handling the formal interview process, the procedural and legal ramifications concerning the handling of the interviews, and the like, legal support at the site may be useful.
- arrangements to inform OI and obtain OI support should be established.
- Interface With the Licensee and Other Industry Organizations 6.
 - a main point of contact with the Licensee should be established for arranging meeting times and obtaining ocuments, etc.
 - contacts with vendor representatives and INPO

Juin Kinken for Steve Burns

Attachment: Review and Availability of Transcripts

REVIEW AND AVAILABILITY OF TRANSCRIPTS

The NRC Fact Finding Team has had interviews and meetings transcribed to assist the Team in conducting its review of the June 9, 1985, transient at the Davis-Besse Nuclear Power Station. The Team intends to make transcripts of interviews and meetings available for review under the following guidelines:

- A copy of the transcript will be made available initially for review only to individuals who have been interviewed. Individuals may read only their transcript, make notes, and consult with others while reviewing the transcript. However, they may not make copies of the transcript and will not be permitted to keep the transcript until a later time.
- 2. Individuals may make corrections or suggest clarifications to ... their answers which will be attached to the official transcript. Corrections or clarifications should be made on the correction sheets that will be provided rather than on the transcript itself. If anyone wishes to speak further with the Fact Finding Team, the Team will be available to conduct further interviews. Further interviews will also be transcribed.
- 3. The Fact Finding Team intends to give each individual interviewed a copy of the transcript of his interview for his personal retention and use after the conclusion of all the interviews and after each individual has had an opportunity to correct his transcript.
- 4. At the same time that those interviewed are provided a copy of their transcripts, the Team intends to make the transcript available to the public and steps will be taken to transmit the transcripts to the NRC's Public Document Rooms.
- 5. Transcripts of meetings between the Fact Finding Team and Toledo Edison Company will be available to NRC personnel (including Region III) and Toledo Edison Company personnel for review. Toledo Edison Company may suggest corrections or clarifications, if appropriate, which will be included with the official transcript. Corrections or clarifications should be made on the correction sheets that will be provided rather than on the transcript itself.
- 6. Copies of the meeting transcripts will be released to Toledo Edison Company for its retention after the Team has substantially concluded its efforts at the site. The transcripts will be made available to the public unless the licensee has made a request for protection of proprietary information in the transcripts in accordance with NRC regulations.

NRC Fact Finding Team 06/17/85

DIRECTIONS FOR MAKING CORRECTIONS

If you have any corrections that you wish to make on your transcript, please do so on the following page in the following fashion:

> Indicate the page of the correction, the line number, and then the change to be made and the reason for making the change. Date and sign all correction pages that correspond with your transcript.

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