UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: BRIEFING ON RESULTS OF MAINTENANCE TEAM INSPECTIONS

Location: ROCKVILLE, MARYLAND

Date: MAY 2, 1989

Pages: 68 PAGES

NEAL R. GROSS AND CO., INC.

COURT REPORTERS AND TRANSCRIBERS
1323 Rhode Island Avenue, Northwest
Washington, D.C. 20005
(202) 234-4433

DISCLAIMER

This is an unofficial transcript of a meeting of the United States Nuclear Regulatory Commission held on May 2, 1989 in the Commission's office at One White Flint North, Rockville, Maryland. The meeting was open to public attendance and observation. This transcript has not been reviewed, corrected or edited, and it may contain inaccuracies.

The transcript is intended solely for general informational purposes. As provided by 10 CFR 9.103, it is not part of the formal or informal record of decision of the matters discussed. Expressions of opinion in this transcript do not necessarily reflect final determination or beliefs. No pleading or other paper may be filed with the Commission in any proceeding as the result of, or addressed to, any statement or argument contained herein, except as the Commission may authorize.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

* * *

BRIEFING ON RESULTS OF MAINTENANCE

TEAM INSPECTIONS

* * *

PUBLIC MEETING

* * *

Nuclear Regulatory Commission

One White Flint North

Rockville, Maryland

Tuesday, May 2, 1989

The Commission met in open session, pursuant to notice, at 2:00 p.m., the Honorable LANDO W. ZECH, JR., Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

LANDO W. ZECH, JR., Chairman of the Commission

THOMAS M. ROBERTS, Member of the Commission

KENNETH C. ROGERS, Member of the Commission

JAMES R. CURTISS, Member of the Commission

1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2 SAMUEL J. CHILK, Secretary

3 WILLIAM C. PARLER, General Counsel

4 JAMES TAYLOR, Deputy Executive Director, Operations

5 FRANK MIRAGLIA, NRR

6 J. ROE, NRR

7 TONY GODY, NRR

8 JERRY BLAKE, Region II

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 P R O C E E D I N G S

2 (2:00 p.m.)

3 CHAIRMAN ZECH: Good afternoon, ladies and
4 gentlemen.

5 Commissioner Carr will not be with us this
6 afternoon.

7 Today, the Commission will be briefed by members
8 of the NRC's Office of Nuclear Reactor Regulation,
9 concerning the results of the maintenance team inspections
10 performed in various power reactor sites around the
11 country.

12 On March 23rd of 1988, the Commission published
13 its final policy statement on maintenance of nuclear power
14 plants. This was a first step by the Commission to
15 provide a greater focus and emphasis on the need for
16 effective maintenance programs for nuclear power plants.

17 The staff's program of maintenance team
18 inspections, which began in June of 1988, is an important
19 extension of our maintenance policy statement. I believe
20 that the importance our licensees place on effective
21 maintenance will determine, to a large extent, the safety,
22 reliability and availability of plant operations.

23 Proper maintenance programs that are vigorously
24 executed make a substantial contribution to safety and can
25 contribute significantly to plant life extension.

1 This meeting is an information briefing. Copies
2 of the slides are available at the entrance to the meeting
3 room.
4 Do any of my fellow Commissioners have any
5 opening comments before we begin?
6 (No response.)
7 If not, Mr. Taylor, you may proceed.
8 MR. TAYLOR: Good afternoon, sir. With me at
9 the table are Mr. Miraglia and Mr. Roe, Mr. Gody and Mr.
10 Blake, all from the Office of Nuclear Reactor Regulation.
11 Through the years, the staff has engaged in
12 various team-type inspections and, as you indicated, about
13 a year ago the staff ran some pilot inspections and began
14 this major maintenance team-type inspection and, to the
15 extent that, as you will see today, more than 20 of these
16 inspections have been done, I believe this type of
17 inspection has been very well organized by the staff, and
18 I believe the briefing will show that today.
19 I'll turn to Mr. Miraglia to continue the
20 briefing.
21 CHAIRMAN ZECH: Thank you very much. Proceed.
22 MR. MIRAGLIA: Thank you, Jim.
23 Jerry Blake is from Region II. He's a
24 maintenance -- from a programmatic point of view, they are
25 implementing NRR programs.

1 CHAIRMAN ZECH: Well, welcome to Region II.
2 We're happy to have you with us today.
3 MR. MIRAGLIA: Jerry is a team leader, and
4 you'll hear from him later in the presentation relative to
5 the planning and the conduct of these inspections.
6 CHAIRMAN ZECH: Fine. Thank you.
7 MR. MIRAGLIA: By way of background, maintenance
8 has been an area of focus for both the industry and the
9 Commission, since probably '85 and a little earlier.
10 NUREG 1212 was issued in June of 1986, and it
11 was the status of maintenance in the nuclear power
12 industry and it was conducted by the staff, and that was
13 based on surveys and site visits that were conducted in
14 the '80 to '85 time period and, about that same time, INPO
15 public guidelines on the conduct of maintenance
16 inspections at nuclear power plants, and maintenance has
17 been chosen as an area of emphasis in the new NRR
18 inspection program for Fiscal Year '89 and '90.
19 The objective, as the Chairman has stated, is to
20 provide a focus to determine whether component systems and
21 structures at the nuclear power plant are being maintained
22 adequately to perform their intended functions, and to
23 direct licensee attention to maintenance activities, to
24 generate improvement in the process.
25 The staff briefed the Commission earlier in the

1 year relative to the maintenance policy statement, and it
2 indicated that we were going to perform maintenance team
3 inspections in the forthcoming year, and the Commission
4 did ask to be briefed on the status of those inspections
5 and the findings of those inspections, after the program
6 is underway for a while, and that's the purpose of today's
7 meeting, is to indicate to you where we've been, how the
8 program has developed, and the results to-date.
9 With that, I'd like to turn the briefing over to
10 Mr. Gody, who will go over the development of the
11 maintenance team inspection.
12 COMMISSIONER ROGERS: Could I just ask a
13 question? On NUREG 1212, how many plants were involved in
14 that survey, or sites? How does it compare with what's
15 just been done right now, for instance?
16 MR. MIRAGLIA: I think it was a larger sample.
17 MR. ROE: A larger sample. The approach was
18 taken to get all the currently operating plants. There
19 may have been a few that we did not accomplish that --
20 MR. MIRAGLIA: I think they were asked to
21 voluntarily submit information, so --
22 MR. ROE: And, currently, in this particular
23 maintenance team inspection, we've accomplished about 20-
24 21 of the inspections, so we're about a third of the way
25 through on a site basis.

1 MR. MIRAGLIA: On a site basis.

2 COMMISSIONER ROGERS: Fine. Thank you.

3 CHAIRMAN ZECH: All right. Thank you. You may

4 proceed.

5 MR. GODY: Good afternoon.

6 CHAIRMAN ZECH: Good afternoon.

7 MR. GODY: As Mr. Miraglia stated, maintenance

8 was selected as the first area of interest in the

9 mandatory team inspections, in the NRC's fundamental

10 inspection program. Consequently, NRR, in conjunction

11 with the regional offices, developed a temporary

12 instruction, including inspection guidance and an

13 inspection tree.

14 This maintenance team inspection instruction was

15 developed from the Commission policy statement, existing

16 regulations and inspection procedures. The results of the

17 1985 maintenance survey were considered, and the INPO

18 guidelines on the conduct of maintenance.

19 I'd like to stress that this program, the

20 temporary instruction, really contains nothing new. It's

21 a combination of inspection activities that we've been

22 performing in the past, that we've put together in one

23 place and had a team look at it in a particular frame, at

24 a particular period of time.

25 Inspection trees have also been used in the

1 inspection process before. The health physics appraisal
2 teams used them during inspections in the early 1980s.
3 We contracted EG&G, or the Idaho National
4 Engineering Laboratory, to assist us in the development of
5 the temporary instruction. They had originally developed
6 the management oversight and risk tree concept, and also
7 had recently developed a program for maintenance, for the
8 Department of Energy.
9 There are two trees used in each inspection, a
10 working tree that the team can utilize during the
11 inspection and a presentation tree that the team may use
12 to brief licensee management at the exit interview.
13 After development of the temporary instruction,
14 we asked the regions to provide senior experienced
15 inspectors to lead the teams. Once the regions did that,
16 we assembled the teams in headquarters for one week of
17 training on the temporary instruction, the guidance and
18 utilization of the tree. We called the EG&G people in to
19 perform part of that training.
20 Then we conducted three pilot inspections, at
21 Peach Bottom, Oconee, and Diablo Canyon. They were led by
22 team leaders from those appropriate regions, and the teams
23 consisted of members of trained team leaders.
24 At the conclusion of those inspections, we
25 conducted a lessons learned meeting, and made necessary

1 revisions and adjustments to the temporary instruction.

2 Following the pilot inspection, we also

3 conducted a two-day training program for team members here

4 in headquarters -- again, this was in the temporary

5 instruction utilization of the tree -- and we conducted

6 case studies using the results from the pilot inspections.

7 COMMISSIONER CURTISS: Just out of curiosity,

8 how did you pick those three plants for the pilot?

9 MR. GODY: We pretty much left them up to the

10 regions. What we had wanted to do was get one that was

11 considered to have a good program, and two fair to

12 middling.

13 The inspection schedule itself involves a six-

14 week period, including one week of prep, one week of in-

15 office review, two weeks on-site time, and two weeks of

16 documentation. The two weeks' on-site time may be split

17 by the one week in-office effort, according to how the

18 region generally runs their team inspections.

19 Teams are generally made up of six members,

20 including the team leader. Headquarters personnel and/or

21 contractors are also on the team.

22 The maintenance team inspection program was

23 developed in order to inspect and assess the effectiveness

24 of the entire maintenance process at nuclear power plants.

25 In order to facilitate and standardize this assessment

1 process, we developed the temporary instructions and the
2 logic tree.
3 Forty-three individual elements may be evaluated
4 during the course of the inspection. As we get on a
5 little, we have a tree, we've provided one to you, and
6 we'll talk about those.
7 The instruction also provides detailed guidance
8 on the types of activities to evaluate, along with the
9 acceptance criteria. It's designed to focus the
10 inspection on performance. The tree is intended to
11 provide a systematic approach to the performance of the
12 inspections, and to ensure consistency between the
13 regions. As I said earlier, it also presents a tool--
14 provides a tool for presenting inspection results to the
15 licensee.
16 The program itself consists of three major
17 sections: The overall plant performance, management
18 support of maintenance, and maintenance implementation.
19 Those sections are further subdivided into eight
20 categories. These are direct measures; management
21 commitment and involvement; technical support; management
22 organization; work control; plant maintenance
23 organization; maintenance facilities, equipment and
24 materials control; and personnel control.
25 We have initiators that the team gathers to get

1 into the inspection. They consider them prior to the
2 inspection. The main one is recent component failures of
3 significant equipment. They inspect the maintenance
4 activities related to the schedule of repair and the
5 prevention of further failure of that equipment.
6 Other selective examinations of equipment
7 failures attributed to maintenance are examined to
8 determine the adequacy of licensee corrective actions and
9 root cause determinations.
10 AEOD studies reveal that topics of interest such
11 as air systems, check valves, motor operated valves, were
12 the cause of many events, so we also have the teams review
13 those.
14 Observation of maintenance activities in
15 progress are a major part of the inspection. Probablistic
16 risk assessment information is also used to prioritize the
17 equipment reviewed by the team. The teams use these
18 insights to ensure that high risk equipment is being
19 maintained.
20 The observation of plant activities include a
21 plant walkdown, to look at the plant material condition.
22 If they see numerous leaky valves, they'll look at valve
23 maintenance and that type of thing.
24 COMMISSIONER ROGERS: Do they actually look at a
25 maintenance procedure being carried out?

1 MR. GODY: They look at -- make observation of
2 work activities in progress.
3 Some of the teams have been scheduling
4 inspections during outages, so they would avail themselves
5 to that. That causes problems, in a sense, too, with the
6 licensee. However, the major gist of the inspection is to
7 focus on the performance of maintenance activities and the
8 support activities associated with them.
9 CHAIRMAN ZECH: But they watch them doing the
10 actual maintenance --
11 MR. GODY: Absolutely.
12 CHAIRMAN ZECH: -- as part of the inspection.
13 MR. GODY: Yes, as much as they possibly can.
14 We stress, in the temporary instruction, that that portion
15 of the inspection should consist of about 80 percent of
16 the total inspection.
17 COMMISSIONER CURTISS: Back on Roman numeral I
18 here, overall plant performance related to maintenance,
19 one of the two charts that we've got here lists two direct
20 measures that you get from the historic data and plant
21 walkdown inspection.
22 MR. GODY: Right.
23 COMMISSIONER CURTISS: At least insofar as
24 historic data is concerned, would that be a measure of how
25 good a maintenance program a utility has pretty much

1 independent of the actual inspection itself?

2 MR. GODY: We hoped that it would. We looked at

3 availability and LERs, that type of thing, in order to--

4 so I would say yes.

5 COMMISSIONER CURTISS: It looks to me like

6 that's kind of a calibrated category where you look at

7 plant performance from the standpoint -- or maintenance

8 from the standpoint of historic data --

9 MR. GODY: Right.

10 COMMISSIONER CURTISS: -- and it almost could

11 serve as a calibrating measure for the subjects that you

12 address under Roman numeral II and III.

13 MR. GODY: Yes. That would give them -- that,

14 along with the plant walkdown, would give them areas that

15 they would want to focus on during the inspection.

16 COMMISSIONER CURTISS: Okay.

17 MR. GODY: We have two -- have completed trees

18 from two inspections with me today. They won't show too

19 well on the monitors, so you've been provided copies of

20 them.

21 One tree shows a good program with satisfactory

22 implementation. As we go through the remainder of the

23 discussion, the briefing, you'll note that this is the

24 predominant findings we have found, this type of thing--

25 good program with satisfactory implementation.

1 CHAIRMAN ZECH: Green is good, yellow is not so
2 good, and --
3 COMMISSIONER ROBERTS: Yellow is satisfactory.
4 CHAIRMAN ZECH: -- red's bad, is that right?
5 MR. GODY: That's right.
6 CHAIRMAN ZECH: Yellow is satisfactory?
7 MR. GODY: Right.
8 CHAIRMAN ZECH: Okay.
9 MR. GODY: The second tree had satisfactory
10 programs with poor implementation. You'll notice there's
11 a considerable amount of red on this particular tree. The
12 guidance itself tells the inspectors, the inspection team,
13 how to -- what to look at, how to evaluate it, and how to
14 roll it up into the various elements.
15 Note that the boxes on the tree are divided.
16 The upper, left-hand -- left half of the box is used to
17 evaluate the program or the process adequacy, such that is
18 an adequate program or process documented and in place.
19 The lower, right half of the box indicates the
20 evaluation of the implementation of the program or the
21 process. Is the process functioning as advertised? Is it
22 functioning effectively?
23 The general criteria for determining the ratings
24 for the various elements are the good, satisfactory and
25 poor. We also have not applicable. That's the blue

1 blocks, and that's either not applicable or insufficient
2 data.
3 The criteria for providing the rating for each
4 individual element is, good is green. It's more than
5 minimal efforts have been expended. The area has
6 desirable quantities, and very few minor improvements are
7 required.
8 Satisfactory is the yellow. That means it's
9 been developed, documented and effectively implemented,
10 and needed improvements are offset by better areas within
11 a particular limb of the tree.
12 Poor, red, is inadequate or no effort has been
13 expended in this area. And, as I said, the blue is
14 insufficient data or not rated.
15 COMMISSIONER CURTISS: And as I look at these
16 charts, just the rough overview that you get here is that
17 -- more so on the BU-2 chart, that they've got better
18 programs than they do implementation.
19 MR. GODY: Yes.
20 COMMISSIONER CURTISS: The programs are good,
21 but implementation falls short.
22 MR. GODY: Right.
23 COMMISSIONER CURTISS: And a similar schematic
24 for BU-1.
25 MR. GODY: Yeah, and that's the prevalent thing.

1 Once Jerry's done with his conduct of inspection, I'll get
2 into some of the individual elements of the tree.
3 CHAIRMAN ZECH: Before you go on, I don't see
4 documentation in very many of those blocks. Tell us a
5 little bit about how you look into documentation.
6 MR. GODY: Well, documentation is the work
7 request, maintenance work request.
8 CHAIRMAN ZECH: Well, I want to know -- here's a
9 pump. When was it maintained? What did they do to it?
10 When did they do it? How much did they do to it?
11 COMMISSIONER ROBERTS: Five point three.
12 MR. GODY: I'm sorry.
13 CHAIRMAN ZECH: Have they got any real, solid
14 documentation?
15 MR. GODY: Yes. Work control aspects -- it's
16 section 5 -- establishing -- maintain equipment records
17 and history, work prioritization, job planning,
18 scheduling.
19 CHAIRMAN ZECH: I understand that, but--
20 scheduling, planning and all that kind of thing, but what
21 happened to the pump. I want to know what happened to the
22 pump. Do I have to look at all kinds of job orders and
23 try to figure out where they were, or do you have
24 something that shows the pump?
25 MR. GODY: Hopefully, the licensee has--

1 maintains equipment records and the history of that pump.

2 CHAIRMAN ZECH: But what if he doesn't, though.

3 MR. GODY: Well, if he doesn't, then he's not--

4 COMMISSIONER CURTISS: That would be a red box

5 then.

6 MR. GODY: Yes, that's true.

7 CHAIRMAN ZECH: Right.

8 MR. MIRAGLIA: It would be red.

9 CHAIRMAN ZECH: Okay. Well, I just mention it

10 because documentation is so important. You can have a

11 good program, and it can be very well maintained and the

12 plant run well and all that, but if you can't show what

13 you've done, it's not very smart, in my judgment, on the

14 part of the utility because, if he's got a good program,

15 he ought to be proud enough to have documented it to the

16 extent he could show what he did.

17 MR. GODY: Right.

18 CHAIRMAN ZECH: To me, that's going to be very

19 important to us when we eventually get into plant life

20 extension. If somebody can show where you've been

21 carefully maintaining the plant for a long time, and

22 you've replaced certain parts and you've got a good

23 documented system of maintenance, it's going to make a

24 difference, I would think, to our reviewing staff when you

25 look at maintenance programs.

1 Maintenance is not only important to plant
2 operations, but it's important to document it properly.
3 MR. GODY: True, and that's -- it's in the tree
4 in several places, the process.
5 CHAIRMAN ZECH: Okay. I saw it in a couple
6 places, but I just want to make sure that that's an
7 important part of your inspection, too.
8 If I were a utility executive, I'd want to make
9 sure my maintenance was documented. You know, 30 years
10 ago you didn't have much documentation and nobody -- you
11 know, it was not looked upon as something necessary. You
12 had a good mechanic. He stayed there forever. He could
13 run around, and he knew all the equipment. Pretty simple
14 equipment. He could handle it and do it, and you could
15 ask him what he did two years ago and he could probably
16 tell you.
17 Now our plants are so complicated, and
18 documentation has been looked upon as something very
19 important, and so I just hope that that's an important
20 part of your maintenance inspection because --
21 MR. MIRAGLIA: I think the tree forces, Mr.
22 Chairman -- the tree forces you to look at documentation
23 in the different ways --
24 CHAIRMAN ZECH: Good.
25 MR. MIRAGLIA: -- and this is different aspects

1 of it. In order to look at the work history, you would go
2 to the maintenance records. You would look at the work
3 history on the one limb of the tree, work control
4 processes, the testing procedures, whether there was
5 rework and retest, and so there has to be a conscious look
6 at documentation at various elements and boxes in that
7 tree.
8 MR. GODY: Right.
9 CHAIRMAN ZECH: Good.
10 MR. MIRAGLIA: And each licensee perhaps
11 maintains his records and documentation in a different
12 way, but the tree sort of indicates the team -- focuses
13 the team on -- focusing on the documentation, to pick the
14 path, and then also they check via the implementation, is
15 the documentation representative of the work that they're
16 actually performing. And perhaps Jerry Blake can get into
17 some of that at the time he talks about how the process is
18 put together.
19 MR. GODY: I'd like to add to that, at the
20 lower, right-hand corner of the tree is a legend and, in
21 there, green is the element is well documented. So, we do
22 look in each one of these elements, at the documentation
23 aspects.
24 CHAIRMAN ZECH: Fine.
25 COMMISSIONER ROGERS: And just a question on the

1 tree, the concept of the tree. Was any thought given one
2 way or the other, with respect to indicating the
3 importance, the relative importance of any of these
4 activities? And the Chairman's question brings, you know,
5 this to mind because it looks like an organizational
6 chart, in a sense, and in an organizational chart, you
7 sort of think of a hierarchy of individuals or functions.
8 This may not have the same significance, and I
9 wonder has any thought been given to being able to
10 identify the most critical elements of the tree, to its
11 importance?
12 MR. GODY: I think --
13 MR. MIRAGLIA: Well, let me take a crack at it,
14 and then Tony, who has been perhaps more actively
15 involved, can further out. I think with respect to the
16 tree that you have here, it's a representation of an
17 organizational way of saying we have defined maintenance
18 in a very broad context. It's not just working on a
19 particular component or pump. There's many elements of
20 it. There's the planning of it. You have the support
21 activities. What are the training and quality of your
22 craftsmen? Is engineering involved? Is operations
23 involved?
24 And, so, this here was a graphical
25 representation to focus the many elements that go into the

1 maintenance kind of activity. I think for the purposes of
2 the presentation display, it indicates the areas that one
3 would have to look at and one would focus on. I think the
4 prioritization and the importance of the areas goes to the
5 next level in the tree initiators, when you look at what
6 has been their equipment history? Has history been such
7 that this particular pump or equipment has been giving
8 them problems? From a PRA perspective, is that the
9 important kind of thing?
10 And I think the tree is a way of providing some
11 kind of uniform framework into examining the complex
12 subject of maintenance, and that from this depiction -- in
13 fact, from the results that you hear today -- we haven't
14 ascribed weights to any individual box, in that kind of
15 context.
16 Tony, you might want to add to that.
17 MR. GODY: Yes. Actually, during the
18 development of the concept, we did consider weighting the
19 various elements of the tree. Because of the many things
20 Frank said and the differences at different utilities and
21 the enormous number of areas to look at, and there are
22 some elements under each of these elements, we felt it
23 would be getting into -- be getting too detailed, being
24 too prescriptive for the team leaders.
25 We have experienced team leaders and team

1 members making -- forming their own judgments on these
2 areas. So, we did think of it. We didn't incorporate it
3 into it.
4 CHAIRMAN ZECH: Let's proceed.
5 MR. BLAKE: I'm going to be talking about the
6 conduct of inspections, and the first area shows that I'm
7 going to be talking about team composition, preparation
8 and what we do on-site.
9 For team composition, the TI, or temporary
10 instruction, has us with a team leader; two engineers,
11 reactor and project type engineers supplied by the region;
12 and one radiation specialist, and two engineer support
13 from headquarters. They're either NRR or contractor.
14 We found that the keys to the successful team
15 are with the experience and knowledge of the team leader,
16 along with the experience and the attitude of the
17 engineering inspectors and the radiation specialist, and
18 that's why we have preparation time to bring them together
19 as a team.
20 You know, the team leader -- we found that his
21 biggest job is to use the tree to keep the focus, keep the
22 inspection on track, and to keep it focused on what it's
23 there for, and that is the assessment of maintenance.
24 He's got to be aware of enforcement policy, but
25 not tied down to it. He's got to be prepared to take

1 ownership of all issues, and that's how we develop
2 anything -- our findings as issues that the team follows
3 up on. And he's got to be able to defend all the findings
4 of the team as if they were his own.
5 He's got to be able to conduct -- to have daily
6 team meetings and bring a group of people with varied
7 backgrounds together, and get the synergism that comes
8 from having different people looking at areas and building
9 on each other's findings. And he's also got to look at
10 the human factors side of the problems that are coming up,
11 and decide whether the problems are being -- the working
12 conditions and the physical layout are part of the
13 problem, or whether they are actually -- the utilities are
14 working on trying to make the conditions so that they are
15 not part of the problem.
16 Engineering inspectors. We try to have at least
17 one senior inspector from each of the three major
18 disciplines -- in the mechanical, electrical and
19 instrumentation and controls.
20 They have to take the lead in those particular
21 disciplines. We also like to have the fourth engineering
22 member be somebody with resident inspector type experience
23 where he can go interface with operations people in the
24 control room, and find out what maintenance's number one
25 customer thinks of the product, and how -- what kind of

1 interface, what kind of interaction do we have between
2 operations and maintenance.
3 And then these fellows all have to be
4 comfortable dealing with all levels. They have to be able
5 to go out and talk with the craft on their level, and turn
6 around and go in and sit down with any site vice president
7 and discuss the same issue at his level.
8 Radiation specialist we look for is one that is
9 not only attuned to ALARA considerations and how you plan
10 for ALARA, but he's got to have the attitude to -- the
11 willingness to go look at personnel safety issues, along
12 with the ALARA because he's -- with a team this size, we
13 need people doing a little double-duty and take -- when
14 they're looking at radiation safety, it's very easy to
15 look at personnel safety at the same time.
16 The preparation part of the inspection starts
17 with a telephone call to the licensee where we announce
18 the inspection, and we tell him the number of things that
19 we need to prepare for the inspection -- that is, the
20 procedures, we identify a list of procedures and things
21 that we'd like to have copies of, and then we follow that
22 up with a letter.
23 And after we've given him time to gather the
24 information, the team leader -- from most regions, the
25 team leader will go to the site and meet with management,

1 establish an interface with the management, get to know
2 the layout, and pick up all the information we need to
3 bring back for preparation time.
4 The interfaces that are typically established
5 are the team leader meets with either the site manager or
6 the maintenance superintendent on a daily basis,
7 throughout the inspection, when we're on-site.
8 Key individual discipline members meet with the
9 discipline engineering specialists when there are issues
10 to be resolved, and the health physics manager typically
11 interfaces with the radiation specialist.
12 COMMISSIONER CURTISS: At this stage, and before
13 you get to the site and conduct your -- begin with your
14 detailed walkdown, just roughly how long a period is this
15 that we're talking about, is it a week, or a day, or a
16 couple of days?
17 MR. BLAKE: We generally announce the inspection
18 three to four weeks in advance, and the team leader will
19 go to the site either two or three weeks prior to the
20 inspection, and then the team itself is assembled and has
21 a week of preparation with the procedures and paperwork
22 that the team leader brings back.
23 And things that the team leader also uses in
24 preparation is, generally gets together with the regional
25 NPRDS coordinator and reviews NPRDS file for that

1 particular plant, and sometimes requests printouts of
2 typical -- we'd ask for a printout of the last 18 to 24
3 months' worth of inputs for a particular system, that
4 system's of interest.
5 We also get information from NRR and from people
6 that are doing the PRA work, and they give us our cut sets
7 or component and system list that we can use so that we
8 know, from a PRA standpoint, which we should consider to
9 be the most important components, and that way the team
10 can find out whether the utilities are considering these
11 systems and components as important as the PRA says they
12 should.
13 We also look at some of our NRC files, past
14 inspection reports. We find it useful to look at sign-it
15 data. Sign-it puts out a nice list that tells us every
16 time the plant changes power level from 100 percent power,
17 it generally has a reason. An awful lot of times the
18 plant doesn't come down all the way, but they'll come down
19 to 80 percent or they'll come down to 60 percent, and
20 there's a statement out to the side that says it's because
21 of maintenance, and so we can go back at that time frame
22 and find out what maintenance they were doing. Sometimes
23 it's just regular surveillance test, but a lot of times
24 there's a piece of equipment that caused them to reduce
25 power for a day or so, and these are useful in

1 preparation.

2 Team meetings are very important. We start team
3 meetings with the first day that the team gets together.
4 It's very important that they be organized and that the
5 team leader establish himself as that. And they start
6 with, like I say, the first day of preparation week, and
7 they continue right on through the early part of the
8 report preparation phase.

9 Now, on-site inspection, as you can see from the
10 slide -- (slide) -- starts with a detailed walkdown. As
11 soon as the team arrives on-site, and the team is fully
12 badged and has their proper dosimetry, they, either as a
13 group or individually, tour as much of the plant as is
14 accessible, looking for indicators of maintenance--
15 ongoing maintenance, or indications where -- of plant
16 conditions that may need maintenance. And that becomes
17 the subject of the first day's team meeting -- you know,
18 what areas look like they need work, and which areas we
19 ought to be emphasizing.

20 We're looking for such things as packing leaks,
21 oil and grease leaks, broken conduit connections, any type
22 of indicator that says that there's wear and tear on a
23 plant.

24 Use of the tree that we've been talking about--
25 we, in our region, tend to use the tree in preparation by

1 the team so they get familiar with the areas. We'll use
2 it again as a team, after the completion of the
3 inspection, when we're trying to pull our findings
4 together and make an assessment.
5 In the meantime, it's the team leader's job--
6 the inspectors are out looking at maintenance in the
7 field, dealing with engineers, dealing with the day-to-day
8 conduct of maintenance and the condition of the plant, and
9 they come in with their findings at the end of the day,
10 and have the team meeting, and that's when the team leader
11 uses the tree and asks them, well, you've got an issue
12 that's in this area, have you explored what are the
13 engineering -- what's engineering doing about it? What's
14 QC's involvement? What kind of parts are available for
15 this job? Is the store doing a good job of providing
16 parts? And that's where you start getting into the
17 different parts of the tree.
18 And that's how we maintain this 80-percent focus
19 on implementation. We keep the team out there looking at
20 what's going on, from observing, watching the mechanics.
21 Are the I&C technicians doing the jobs, following the
22 procedures, to looking at the equipment itself, inspecting
23 it, reviewing engineering analysis that had been out, the
24 root cause analysis, and do they make sense? Are they
25 well thought out? Do they really tell the story?

1 And then when we get back to the office, after
2 the final week on inspection, that's when we sit down with
3 the tree again, and analyze what does it mean, and where
4 are the strengths and weaknesses, and what does that mean
5 to the various parts of the chart.
6 Any questions?
7 CHAIRMAN ZECH: Not at this time, I don't think.
8 Let's proceed.
9 MR. BLAKE: I'll turn it over to Tony.
10 CHAIRMAN ZECH: Thank you.
11 MR. GODY: One point I'd like to make, these
12 team meetings are a very important aspect of these team
13 inspections, maintenance team inspection, any team
14 inspection, that's the interaction between the team
15 members in the evening, where they go over the areas that
16 they've looked. They may have been in separate areas.
17 They get together and find commonalities, as far as
18 problems go, or even strengths, but that's one of the
19 major points of a team inspection, is that interaction.
20 The inspection status -- the team inspections,
21 maintenance team inspections are currently planned to
22 cover all operating sites by the middle of Fiscal Year
23 1991. To-date, we've conducted 23 inspections and four
24 are currently in progress.
25 CHAIRMAN ZECH: Does that 24 mean 24 completed?

1 MR. GODY: Twenty-three have been completed, and
2 four are currently in progress.
3 CHAIRMAN ZECH: Okay. Thank you.
4 MR. GODY: We've received results from 21 of the
5 inspections, and those results have been used to formulate
6 the conclusions shown on the following slides.
7 The overall ratings, the findings overall,
8 indicate that all plants have at least a satisfactory
9 program in place, with nearly half of them evaluated as
10 good. The implementation of these programs, however, was
11 considerably weaker.
12 This same overall conclusion repeats in nearly
13 every branch of the tree. Sufficient programs were in
14 place, but they were not effectively implemented, or not
15 implemented as well.
16 COMMISSIONER CURTISS: Just so I understand the
17 numbers here, the 4.8 percent shows up throughout the pie
18 charts. Is that --
19 MR. GODY: That's one plant.
20 COMMISSIONER CURTISS: -- just for one plant?
21 MR. GODY: Yes.
22 COMMISSIONER CURTISS: Okay.
23 MR. GODY: And that's the plant here with the
24 poor implementation.
25 COMMISSIONER CURTISS: All right.

1 MR. GODY: The first element of the tree was
2 plant performance related to maintenance. These are the
3 areas where we review the operating data and the general
4 plant condition during walkdowns. The results in this
5 area indicated some need for improvement in housekeeping
6 and plant material condition but, as you can see, it's
7 about a 50-50 split again, with the one plant rated as
8 poor.
9 The next area was the management support of
10 maintenance. This reflected that the programs were 70
11 percent satisfactory and 30 percent good, with the
12 implementation 85 percent satisfactory, 10 percent good,
13 and about 5 percent poor. Again, programs in place,
14 implementation not as well conducted.
15 One area in particular that we had problems in
16 management support, was the engineering support area. That
17 area showed -- and that was the technical support area,
18 engineering support within technical support, clearly, the
19 weakest of all the categories in management support.
20 One of the most significant findings from the
21 maintenance team inspection is that engineering support to
22 maintenance was weak and required improvement, with
23 approximately 30 percent of the sites having poor
24 implementation.
25 Some of these problems were -- examples of these

1 problems, repetitive failures of equipment were not
2 identified as a basis for changes in the scope of the
3 preventive maintenance programs; inadequate root cause
4 analysis was performed for equipment failures; engineering
5 involvement in the resolution of problems was not clearly
6 evident, and despite vendor recommendations, some
7 preventive maintenance activities were not conducted, and
8 no technical evaluations were performed to support
9 exclusions.
10 The next area was maintenance implementation.
11 As I said earlier, this portion constitutes at least 80
12 percent of the inspection. And the maintenance
13 implementation is subdivided into four areas -- work
14 control, plant maintenance organization, maintenance
15 facilities, and personnel control.
16 The implementation area, the programs were about
17 an even split of 50-50 with the implementation lagging--
18 75 percent satisfactory, 20 percent good, and 5 percent
19 poor.
20 CHAIRMAN ZECH: Give us some examples of the
21 poor ones. What were specific areas where you saw poor
22 performance?
23 MR. GODY: Yes. On this one particular tree
24 with all the red, those were poor.
25 CHAIRMAN ZECH: First, how about looking at the

1 engineering support chart, first, and then tell me, in
2 that area, what in engineering support specifically did
3 you find poor.
4 MR. GODY: Engineering support?
5 CHAIRMAN ZECH: That's it. We've got it on the
6 screen now. That's the one I'm talking about, 4-2, 4.2.
7 (Slide)
8 MR. GODY: That's where the repetitive failures
9 of equipment were not identified as a basis for changes in
10 the scope of the preventive maintenance program.
11 Engineering did not perform adequate root cause analysis
12 for equipment failures. Engineering involvement in the
13 resolution of problems noted on work orders during the
14 performance of the job was not clearly evident. And
15 despite vendor recommendations, preventive maintenance
16 activities were not conducted, and engineering did no
17 technical evaluation to support these exclusions.
18 Engineering resolution of problems took a
19 considerable amount of time, some cases up to two years,
20 and no -- well, that's about the examples I have.
21 CHAIRMAN ZECH: You mentioned engineering
22 support earlier as weak, and I would say that is, indeed,
23 a key conclusion from what you've told us so far, that
24 that is something that is a vital factor in a good
25 maintenance program, that is good engineering support.

1 MR. GODY: Right.

2 CHAIRMAN ZECH: On the next chart, maintenance
3 implementation, it looks, really, pretty good. You do
4 have a few -- small number of poor implementation. Could
5 you give us any specifics in that area?

6 MR. MIRAGLIA: The next chart --

7 CHAIRMAN ZECH: The next chart --

8 MR. MIRAGLIA: -- would be an example of a weak
9 area in that limb of the tree.

10 MR. GODY: That was performance of maintenance
11 trending. Fifty percent of the programs were in place,
12 were satisfactory; 30 percent were good; 15 percent were
13 poor.

14 CHAIRMAN ZECH: But what -- in maintenance
15 trending, what specific areas of maintenance, do you
16 recall?

17 MR. GODY: They were keeping equipment
18 histories, but they were not evaluating those histories to
19 see if any trends were developing.

20 CHAIRMAN ZECH: I see.

21 COMMISSIONER CURTISS: They weren't doing
22 reliability trending on their equipment is what you're
23 finding here?

24 MR. MIRAGLIA: Some facilities had programs
25 which talked about a reliability-based type maintenance

1 program, but those programs weren't fully implemented.

2 COMMISSIONER CURTISS: They've got a stack of

3 documents that shows they're good employers, but they're

4 not looking for the trends in their equipment in those

5 areas.

6 MR. MIRAGLIA: And though there are indications

7 that people are perhaps tending in that direction, but the

8 implementation is severely lagging.

9 MR. GODY: Some other examples of problems in

10 the trending, programs were not capable of identifying

11 repetitive failures over a long period of time. They did

12 not identify subtle trends or individual component failure

13 trends.

14 Information documented on completed work

15 packages was not adequate to assist in root cause analysis

16 and failure trend analysis. Some programs were

17 fragmented. Reviews did not see all the available failure

18 information. System engineers only saw PM work packages

19 and not corrective maintenance work packages.

20 Sites where MPDS was being maintained but not

21 utilized to identify component failures, trends in those

22 components.

23 CHAIRMAN ZECH: All right.

24 MR. GODY: Okay.

25 MR. MIRAGLIA: That brings us to the summary of

1 where we are, based upon the inspections and --

2 CHAIRMAN ZECH: Before you get to the summary,

3 could you give us any particular noteworthy good

4 practices?

5 MR. GODY: Yes. Let me first tell you some

6 common findings we found throughout, and that was failure

7 to use or follow procedures, inadequate procedures, I&C

8 was generally weaker than the other areas, generally

9 weaker than electrical and mechanical maintenance. I

10 mentioned inadequate or a lack of training analysis.

11 Shallow or poor root cause analysis. Informal control or

12 lack of control of contractors. Difference in approach to

13 safety related as opposed to balance-of-plant equipment.

14 Inadequate spare part procurement and storage, resulting

15 from inadequate planning.

16 As far as the strengths go, in the work control

17 area, establish work control and maintenance work

18 scheduling were generally evaluated as good. Strengths

19 noted was a program capable of scheduling various -- and

20 controlling various types of activities simultaneously.

21 CHAIRMAN ZECH: Did you notice any programs that

22 were good enough that you should take special note of and

23 pass it along to others?

24 MR. GODY: Yes, I'm sure we have. I can't

25 provide you that information.

1 MR. BLAKE: I could comment on one, one of the
2 charts you've got here. The teamwork displayed between
3 operations, maintenance and the other people involved in
4 maintenance at Grand Gulf was exceptional.
5 The meetings having to do with maintenance were
6 conducted by operations, and everything was done as a
7 team. There was no attitude at that facility, of "that's
8 yours and this is mine". It was "This is our plant, let's
9 fix it", and that was -- we felt that was exceptional,
10 too.
11 CHAIRMAN ZECH: Very good.
12 MR. GODY: I have several other strengths that
13 were identified, too.
14 CHAIRMAN ZECH: Excuse me, but along the same
15 line, one of the strengths like that I've found, at least
16 it's been my observation, watching maintenance during my
17 plant visits and noting that the operations people and the
18 maintenance people are working together, which is the way
19 it ought to be -- one of the greatest strengths there is
20 communications, I've found, because if they're
21 communicating properly, and they all know -- especially
22 the question I like to ask them when I see some
23 maintenance going on, I say, "Who's in charge of this
24 program?" Well, of course, they're doing the maintenance,
25 they are in charge of that, but I say, "Well, who's in

1 charge of the plant?"

2 And if they know that the operators are in

3 charge, that's kind of the right answer, as far as I'm

4 concerned. Often, they're in communication directly with

5 the operators, and -- depending on the maintenance, of

6 course -- but if there's a good, tight system of

7 communications and there's a good working teamwork

8 relationship between the operators and the maintenance

9 organizations, and there's an understanding, clearly, that

10 the operators are in charge, especially if the plant is

11 operating -- even if it's not operating, they ought to

12 know the operator is in charge, but when the plant is

13 operating, as you know, that's the time when we have trips

14 occasionally, and not only maintenance but surveillance

15 going on, so the communications is vital.

16 Did you see any communications, specifically

17 good or bad, indications during your maintenance

18 inspections? Did you note that specifically, or do you

19 recall any particularly good or bad communication

20 interfaces?

21 MR. ROE: There has been one good example that

22 we have seen, not necessarily maintenance inspection, but

23 an outgrowth of other of our views associated with

24 operations and maintenance, and that is at some of the new

25 power plants, especially I remember the McGuire plant,

1 where the operations department and the maintenance
2 department are on the same shift, so they rotate together.
3 They see each other every day. They're part of a team.
4 In many plants, the operations department may
5 rotate on a different scheme than the maintenance
6 department, so there always is a different interface.
7 Duke has intentionally had that combination so that there
8 is a team that rotates consistently throughout the day.
9 CHAIRMAN ZECH: That would be a good --
10 MR. MIRAGLIA: I think also to point out --
11 CHAIRMAN ZECH: -- thing to point out, I think,
12 to perhaps others.
13 MR. MIRAGLIA: Mr. Chairman, I think the
14 maintenance team inspection reports indicate strengths
15 that are observed in the maintenance team inspection, as
16 well as the weaknesses.
17 CHAIRMAN ZECH: Well, it's important to point
18 out the strengths, and I just mention communications as an
19 example.
20 MR. GODY: I've got several other strengths.
21 The last area on the tree was personnel control, and this
22 area, the inspection stands out as the strongest.
23 Inspection to identify the ratio of experienced
24 maintenance personnel to apprentices was approximately 3-
25 to-1. The on-site experience at several sites was

1 considered a strength.

2 The licensee also had well-defined programs for
3 staffing and promotions, and with well-defined job
4 descriptions and attributes for new hires. Other
5 strengths, examples of strengths were use of the
6 centralized work control center with multi-disciplinary
7 review and assignment of an HP, a health physicist, to
8 help coordinate. That was identified at Arkansas.

9 Use of mock-ups for complex jobs reducing
10 potential for errors and ALARA considerations, given
11 radiation dose low at Wolf Creek. Use of a qualification
12 matrix by maintenance supervisors, for work scheduling and
13 planning, again, at Wolf Creek.

14 High quality maintenance facilities maintained
15 at Davis-Besse, and the use of predictive maintenance at
16 Davis-Besse. Those are some of the notables we found in
17 inspections.

18 CHAIRMAN ZECH: Well, let me give you a couple
19 observations that I've noticed, I think, in looking for
20 maintenance during my plant visits. The biggest thing
21 I've found, I think, is that -- does the organization
22 itself recognize the importance of maintenance?

23 In other words, we focus on the operators. Most
24 people appreciate the importance of the role of the
25 operators, but do they focus on the maintenance people?

1 And my feeling has been that that's not always the case.

2 The good examples, the good maintenance plants

3 that I think I've seen are the ones that have a

4 recognition of their maintenance people, the importance of

5 their role. And it's people and recognition of the

6 importance of maintenance.

7 If it's pointed out -- at the plants I go to,

8 they try to take me to the maintenance people, ask me to

9 talk to the maintenance people, or else emphasize

10 maintenance during the briefings. To me, the management

11 leadership involvement, acknowledgement, recognition of

12 the importance of maintenance starts to be -- at least

13 that's on the top of my list. And it's the people

14 themselves. Are they respected as much as the operators,

15 for example.

16 Do they view maintenance as truly important?

17 And those are some of the things that I think you can kind

18 of sense in a visit to the plant sometimes, and do the

19 maintenance people -- have they got a good professional

20 maintenance group? Do they have good maintenance

21 facilities?

22 Some plants, you know -- some have very fine

23 training facilities for maintenance as well as operation.

24 More plants are moving in that direction, I think, but the

25 maintenance training is important, and sometimes I've seen

1 some excellent maintenance training facilities. So, that,
2 to me, is a recognition of the importance of maintenance
3 on the part of plant management. So, that is kind of the
4 starting point.
5 Usually, when you see a plant that has that kind
6 of emphasis on maintenance, you find good maintenance in
7 the plant. So, I think it's important that you -- you
8 know, thinking about the contribution of maintenance to
9 safety and to our regulations, it's important, I think, to
10 try to identify those maintenance practices that are good
11 practices and contribute to safety and perhaps lend
12 themselves to better all around maintenance to the plant,
13 better all around operations, better all around
14 reliability and safety. So, it's important to look at the
15 good practices, too, because you have mentioned, you know,
16 inadequate procedures. That's pretty basic.
17 You've mentioned failure to follow procedures.
18 That's also pretty basic. So, if you see that frequently,
19 you know, it's not very impressive, but I think you must
20 look at the constructive side because there are good
21 maintenance practices out there that should be brought to
22 the attention of those who aren't making adequate
23 procedures and those who aren't making adequate
24 implementation of those procedures and who are not
25 following through on their procedures as they should

1 because the good practices in maintenance are not that
2 difficult, but they do require senior plant attention,
3 emphasis, and a belief that it's important.
4 MR. GODY: Yes. Well, maybe I didn't emphasize
5 that enough, but the report does, and the inspection does
6 stress strengths as well as weaknesses.
7 CHAIRMAN ZECH: Good, because it is important.
8 I think we're making a greater contribution to this
9 inspection effort, which is a rather sizable one, if we
10 mention the good practice as well as those who are not so
11 good.
12 So, I think that those utilities who will learn
13 most from your efforts, will recognize that if they want
14 to improve, perhaps that there are some ways that aren't
15 too difficult, that they can improve. And so I do think
16 that's worth emphasizing.
17 All right. Let's proceed.
18 MR. MIRAGLIA: Mr. Roe will give the summary.
19 MR. ROE: In summary, since early 1980s the
20 staff has had a focused interest on nuclear power plant
21 maintenance. Early in the '80s, the Salem anticipated
22 transient scram, in 1983. The Davis-Besse, San Onofre and
23 Rancho Seco events in 1985 highlighted the importance of
24 maintenance for nuclear safety.
25 The staff has taken many steps to ensure the

1 improvement of maintenance in the industry. These include
2 the survey of maintenance, which we published in NUREG
3 1212; close coordination with the INPO staff on
4 maintenance guidelines; the development of the policy
5 statement for the Commission; and, most recently, our
6 development and implementation of the maintenance team
7 inspection program.
8 We are now through approximately one-third of
9 the team inspections. We see the results to-date showing
10 that maintenance programs, the papers, the documents that
11 have been developed, are adequate or they are good.
12 However, we also see that the implementation of these
13 documented programs are lagging.
14 Based on the inspection results to-date, we see
15 a continued need for improvement in the maintenance
16 activities at the nuclear power plants. That's a summary
17 conclusion of our plan presentation. We're open for any
18 additional questions, sir.
19 CHAIRMAN ZECH: All right. Thank you very much.
20 Commissioner Roberts?
21 COMMISSIONER ROBERTS: On your tree, under 2, 2.0
22 management commitment and involvement. What are the
23 criteria used to evaluate 2.2 management vigor and
24 example?
25 MR. GODY: Management vigor and example is some
26 of the things that Chairman Zech said. If you see a

1 respect for the maintenance organization, provided good
2 tools, good working conditions, management gets out to the
3 plant --
4 COMMISSIONER ROBERTS: Can you quantify that?
5 MR. GODY: Yes. It's how much management is
6 involved in maintenance activities or the support of
7 maintenance activities, and how they demonstrate that to
8 the remainder of the staff. That's what we mean by
9 management vigor and example.
10 But what I'm looking for is the --
11 MR. TAYLOR: You really assess it. You don't
12 quantify it, as such. It's more --
13 MR. GODY: Right.
14 MR. TAYLOR: -- by talking to people --
15 MR. GODY: Judgmental evaluation of management's
16 involvement.
17 MR. TAYLOR: -- finding out is management paying
18 attention, and assessing that.
19 COMMISSIONER ROBERTS: So, it's a subjective
20 evaluation?
21 MR. TAYLOR: That's an assessment.
22 MR. GODY: Absolutely.
23 MR. TAYLOR: Yes, sir.
24 COMMISSIONER ROBERTS: All right. Next
25 question. In these maintenance inspection visits, have

1 violations been found that resulted in enforcement action?
2 MR. GODY: Oh, yes. Collected data on 16 sites
3 resulted in 39 violations. Twenty-five of those were
4 against Appendix B.
5 COMMISSIONER ROBERTS: So, you're telling me
6 that we have the existing regulatory mechanisms to address
7 problems in maintenance?
8 MR. GODY: Yes.
9 MR. MIRAGLIA: Clearly, in the safety --
10 MR. GODY: But not the balance-of-plant.
11 MR. MIRAGLIA: Clearly, in the safety --
12 COMMISSIONER ROBERTS: Ah, well, wait a minute
13 now, let's take one thing at a time.
14 MR. GODY: Yes, we do.
15 COMMISSIONER ROBERTS: Thank you. That's all I
16 have.
17 CHAIRMAN ZECH: Commissioner Rogers?
18 COMMISSIONER ROGERS: Well, just -- that,
19 really, was a question also that I wanted to ask, maybe in
20 a little bit different way, but the same idea, I think.
21 Did you find any evidence of unsatisfactory
22 maintenance practices, that it would be difficult for us
23 to cite the licensee for a violation?
24 MR. GODY: In the balance-of-plant, sometimes--
25 presents a difficulty. However, in these inspections, we

1 call for strengths and weaknesses. And when we identify
2 weaknesses in the transmittal letter to the licensee. We
3 ask them to address the weaknesses, to respond as to their
4 corrective action to the weaknesses. And though there may
5 not be a specific requirement associated with that
6 weakness, we still ask them to address it, but in other
7 areas --
8 MR. TAYLOR: So, not every deficiency represents
9 a violation --
10 COMMISSIONER ROGERS: A violation.
11 MR. GODY: No.
12 MR. TAYLOR: -- per se.
13 COMMISSIONER ROGERS: Well, I'd like to pursue
14 that a little bit. I mean, how serious would some of
15 these deficiencies be that would not, could not constitute
16 a violation?
17 MR. GODY: Well, depending on the seriousness,
18 you can make anything a violation. If it's really
19 serious, we'll find the regulatory basis to make it a
20 violation. It's as simple as that.
21 I have an example of one of the utilities.
22 There was an air system problem, water in the air system,
23 and it was balance-of-plant. So, what they cited them
24 against was air system configuration differed from the
25 FSAR, and the violation was issued against 10 CFR 50.71,

1 failure to update the FSAR.

2 So, with some innovative thinking and planning

3 by the inspection teams, you can generally tie something

4 that's serious enough, to a regulation.

5 MR. MIRAGLIA: The other thing, in the context

6 of balance-of-plant where you have to perhaps be

7 innovative in that kind of context, maintenance and good

8 maintenance will perhaps keep you out of trouble, and that

9 there is balance-of-plant equipment, if not properly

10 maintained, leads to challenges to operators, and that

11 kind of thing.

12 CHAIRMAN ZECH: It leads to safety concerns --

13 MR. MIRAGLIA: That's right.

14 CHAIRMAN ZECH: -- and to safety challenges of

15 the steam supply system.

16 MR. MIRAGLIA: And if you look historically at

17 trip reductions, we've come a long way. Our data

18 indicates that, the industry data indicates that, and

19 major improvements were made by looking at feedwater

20 control systems, for the most part, are not safety-related

21 systems. And it's the maintenance and the care and

22 feeding of feedwater control systems that have led in that

23 reduction of trips, challenges to operators, and the like.

24 Similarly, if you just look at that improvement

25 and saying there is still a number of trips out there,

1 it's in the electronic hydraulic systems under turbine.
2 Again, not a safety-related system. However, it leads to
3 trips; trips lead to challenges to operators, and there is
4 that link there. And, clearly --
5 COMMISSIONER ROGERS: When you use that term,
6 safety-related system, I just think you should -- you
7 could -- you ought to make sure we all understand what it
8 is you're -- that's a technical term that you're using,
9 you know, that's not an evaluation term.
10 It is safety-related, that's what we're finding,
11 but you're using a technical--
12 MR. MIRAGLIA: In the context and in the --
13 COMMISSIONER ROGERS: -- NRC term here when you
14 say that, and I think it's wise to make sure that you're
15 putting quotes around that --
16 MR. MIRAGLIA: Yes, sir.
17 MR. TAYLOR: That is in quotation marks, yes,
18 sir.
19 COMMISSIONER ROGERS: -- and that's a point that
20 I think we all have to appreciate, that technical
21 definition is --
22 MR. MIRAGLIA: Yes, sir. Our arcane jargon
23 that's grown with time.
24 COMMISSIONER ROGERS: Well, I think we should be
25 careful about it, though, because we are learning that

1 that was not the full answer in how to define a safety-
2 related system.
3 MR. MIRAGLIA: Yes, sir.
4 MR. TAYLOR: We agree.
5 COMMISSIONER ROGERS: Yes. Have you seen any
6 correlations between the results of your inspections, that
7 might relate to any of the other indicators of
8 maintenance? In other words, did you see anything that
9 might, for instance, provide some useful correlation with
10 the AEOD in maintenance-effectiveness indicators, based on
11 the NPRDS component failures? Have you had a chance to do
12 that?
13 MR. GODY: We haven't studied that yet. What we
14 have studied was the correlation with the existing
15 performance indicators, and we found none.
16 COMMISSIONER ROGERS: You found none.
17 MR. GODY: Right, no correlation with the--
18 that's over the period, you know, the one-third of the
19 plants being inspected.
20 COMMISSIONER ROGERS: Yes, right.
21 MR. GODY: As far as the NPRDS performance
22 indicator that's being proposed and worked on now, no, we
23 haven't.
24 COMMISSIONER ROGERS: I'd be interested in --
25 MR. MIRAGLIA: I think we would agree with the

1 AEOD basic findings that the NPRDS is out there and it's
2 being used in different ways and to different degrees,
3 within the industry and, clearly, that maintenance
4 trending is consistent with the report that AEOD gave you,
5 as how various utilities trend maintenance information is
6 quite different, but there's that kind of consistency in
7 observations.
8 COMMISSIONER ROGERS: There's a question whether
9 this gave a little additional insights into the utility of
10 that indicator that AEOD is developing, though.
11 MR. MIRAGLIA: I think our observations are
12 basically consistent, but I don't think we've sat down and
13 compared notes to that kind of detail.
14 COMMISSIONER ROGERS: When do you expect to do
15 that?
16 MR. GODY: Well, shortly -- as a matter of fact,
17 in June -- we're going to have completed almost half of
18 the inspections. We're all going to get together, the
19 regions and us, go over the program to-date, and see if we
20 have to make any adjustments, and that would be a good
21 time to discuss it.
22 MR. TAYLOR: We could go today to AEOD and have
23 them part of that review, mid-point review.
24 MR. GODY: Yes, have AEOD involved in it. Yes.
25 And that would be a good time to discuss it.

1 COMMISSIONER ROGERS: Well, we certainly are
2 very interested in those results of that comparison. You
3 found that about 28 -- 5 percent of the 28 plants were
4 rated as poor, but then you had 29 percent were poor in
5 implementation or engineering support, 25 percent in
6 implementation of maintenance trending.
7 Now, what was the overlap of those two, roughly,
8 25 to 30 percent of the plants, were they common --
9 MR. MIRAGLIA: They're common.
10 COMMISSIONER ROGERS: Was the overlap
11 essentially the 5 percent, when you're all said and done?
12 How do they fit together?
13 MR. MIRAGLIA: I don't know if we can answer
14 that now --
15 MR. GODY: I don't think we know that answer
16 right away.
17 MR. MIRAGLIA: -- but that's something we could
18 provide to you. I don't know if you broke it down that
19 way.
20 MR. GODY: No, I didn't, but --
21 COMMISSIONER ROGERS: Well, I'm sort of curious
22 because those are rather large numbers, rather large
23 percentages, and yet the overall statement is that we've
24 only got about 5 percent of those plants that were rated
25 poor and, yet, in implementation of engineering support,

1 nearly 30 percent --

2 MR. TAYLOR: A higher number. A higher number

3 in trend maintenance.

4 MR. MIRAGLIA: Yes, you understand that's

5 because it rolls up into the overall, and each limb of the

6 tree rolls up to an overall, and then there's an overall

7 on the three basic limbs.

8 MR. TAYLOR: Well, I think that's certainly a

9 significant indication that that many are weak in that

10 area, and those are important --

11 COMMISSIONER ROGERS: Well, I guess -- how bad

12 do they have to be to be rated poor in your -- I think

13 that's what it comes down to because I would think a lack

14 of implementation of engineering support to a maintenance

15 program -- you know, that's pretty poor right there. You

16 don't have to --

17 MR. MIRAGLIA: Mr. Gody went over some of the

18 examples, and I think some of those examples would be

19 enough to say that that's -- you know, poor root cause

20 analysis more than once, no support, or not doing what the

21 vendor recommends with no evaluation, those kinds of

22 things would clearly influence the judgment of the team

23 and pushing them down into a poor rating.

24 MR. GODY: That's where the weighting goes in,

25 with their judgment.

1 COMMISSIONER ROGERS: Well, I think it's
2 important to try to understand how you come to that
3 conclusion of 5 percent because that's -- if this is a
4 representative sample of the whole industry, and we're
5 talking about only 5 percent are poor, that's relatively a
6 small number.
7 COMMISSIONER ROBERTS: Isn't the 5 percent one
8 plant?
9 MR. GODY: Yes, one plant.
10 MR. MIRAGLIA: It's the results to-date. The
11 overall is the results to-date. Now, whether that
12 maintains itself over the next two-thirds of the
13 inspections we're to do, remains to be seen.
14 MR. TAYLOR: But I think even those plants that
15 are satisfactory have numbers of areas of weakness and --
16 MR. MIRAGLIA: Weakness.
17 MR. TAYLOR: -- vulnerability and, you know,
18 you'd like to see everybody be in shape.
19 COMMISSIONER ROGERS: Well, I think we should be
20 cautious about --
21 MR. TAYLOR: They're not.
22 COMMISSIONER ROGERS: -- landing on that 5
23 percent number as representative of what the industry is
24 at the moment because --
25 MR. MIRAGLIA: Absolutely. It is --

1 COMMISSIONER ROGERS: -- it is only one plant,
2 and --
3 MR. MIRAGLIA: And it's the saddest to-date.
4 COMMISSIONER ROGERS: Yes -- and the fluctuation
5 in that, the statistical fluctuation in that number is 100
6 percent.
7 MR. TAYLOR: Well, let me draw an example. In
8 the chart you have, maintenance inspection tree for a
9 plant that was good, with lots of green, is ignoring the
10 role of PRA in the maintenance process.
11 Now, we all believe that PRA with its dominant
12 sequences, is sending us messages, and one would think
13 that the, you know, the dominant sequence equipment would
14 stand out in the worry of all in the plant, including the
15 people who are responsible for maintenance. So, they know
16 that that particular series of equipnment may, indeed,
17 contribute to the dominant sequence to potential core
18 effect, and, you know, that's the -- if you have the PRA,
19 you ought to use it.
20 COMMISSIONER ROGERS: Well, that sort of leads
21 into my next question, which is of those 28 plants, how
22 many did use the PRA in their maintenance prioritization
23 process?
24 MR. ROE: Well, maybe we can answer the question
25 a little bit differently than a quantitative one. We

1 found out that even those plants that do have a PRA, are
2 not effectively using it. And we do have a certain sample
3 of the plants that do have either a plant reference or
4 something close enough to be able to utilize it, and they
5 weren't all effectively utilizing it.
6 MR. TAYLOR: And that may link engineering
7 involvement to maintenance because the engineering -- the
8 system engineers and so forth, are going to be, and --
9 MR. MIRAGLIA: That's usually where the PRAs and
10 dominant maintain --
11 MR. TAYLOR: -- that's where the dominant memory
12 of PRA should be.
13 MR. BLAKE: Well, I think one of the problems
14 you have is that the planners are a lot of times setting
15 priorities, and they're not linked to the PRA. The
16 engineers may be, but the planners have an idea of what
17 things are important. If they don't know that it comes
18 from PRA, if some of them know that it comes from
19 engineering, but there's no link, no direct link, and
20 that's why it comes out red.
21 COMMISSIONER ROGERS: Well, it sounds to me that
22 you're finding that there are some rather serious
23 deficiencies in the programs, even those that more or less
24 are okay, they still have some rather serious deficiencies
25 in them, and I think we want to keep that very much in

1 mind as we look at this whole picture.

2 CHAIRMAN ZECH: Thank you.

3 Commissioner Curtiss?

4 COMMISSIONER CURTISS: Just a couple of

5 questions on the tree. As I looked at this, I was

6 intrigued not to see a box on preventive maintenance. Is

7 that because PM is infused throughout all of this, and

8 this is looking at both corrected and preventive?

9 MR. GODY: Yes, preventive maintenance is

10 addressed in the temporary instruction.

11 COMMISSIONER CURTISS: So, there's nothing here

12 that you would look at in a chart that would jump out at

13 you --

14 MR. MIRAGLIA: These same activities would be

15 involved on the conduct of a preventive maintenance

16 program or another maintenance program.

17 COMMISSIONER CURTISS: I wanted to isolate

18 preventive maintenance and look at one of these charts or

19 look at one of the reports and evaluate how effective a

20 utility was on PM. It doesn't look like it would jump out

21 from the chart. Would it jump out from the report?

22 MR. MIRAGLIA: I think within the context of the

23 TI, there's some discussion of preventive maintenance, and

24 we can give you a -- there's a judgment as to how much are

25 they doing relative to corrective maintenance, and we do

1 get a feel for their PM program as opposed to their
2 corrective maintenance.
3 MR. TAYLOR: Yes. Some of the planned
4 maintenance in the outage, for example, when you're in
5 there and look at it, is strictly preventive -- you know,
6 taking the pump down because it's time is preventive
7 maintenance. Isn't that right, Tony?
8 MR. GODY: Yes.
9 MR. TAYLOR: So, you would pick that up with
10 corrective maintenance.
11 COMMISSIONER CURTISS: If a utility were doing
12 absolutely no preventive maintenance, though, when you go
13 through your walkdown, and you look at the PRAs, and you
14 look at the SALPs, and the information that you gather,
15 the equipment reliability, it wouldn't necessarily jump
16 out at you, it wouldn't be a finding of some sort that a
17 utility had no preventive maintenance program.
18 Is there a way to get at that, or is there
19 something in this process that permits us to say, or to
20 conclude in looking at one of these, that a utility either
21 is placing the right amount of emphasis, or not enough, on
22 preventive maintenance?
23 MR. GODY: The amount of emphasis we don't get
24 into, but the temporary instruction itself directs the
25 inspection team toward preventive maintenance and

1 corrective maintenance.

2 COMMISSIONER CURTISS: Okay.

3 MR. BLAKE: One of the things that utilities
4 like to plot is the ratio of preventive maintenance to
5 corrective maintenance, and they always come right up to
6 the team and tell us what that is, and where it used to
7 be, and how they're improving and, of course, that's one
8 of the things we try to look at, is to see, are these
9 numbers real because we see -- you know, we've seen some
10 indications where planners are sending people out to
11 correct things with a preventive maintenance on their work
12 order.

13 MR. TAYLOR: There's been a lot of dialogue
14 among the utilities about what is the right ratio of
15 preventive maintenance to corrective maintenance. That
16 number has been mentioned in many utility forums. It's
17 not -- some people believe it ought to be 50 to 60
18 percent, but that number has been -- it's kind of like a
19 judgment, a balance, depending on the equipment.

20 COMMISSIONER CURTISS: Two other questions on
21 the chart here, on -- I guess on the BU-2, there's one
22 box that I didn't understand -- 6.5 there at the very
23 bottom. Do I understand -- the one that's blue-slash-
24 yellow. Blue means you didn't look at a program?

25 MR. GODY: Yes. Not enough information on the

1 program.

2 COMMISSIONER CURTISS: You come up with a box

3 that, on the program side, you did look at, but on the

4 implementation side has a conclusion. I wasn't sure I

5 knew what that kind of color coding meant.

6 MR. BLAKE: Well, can I answer that because that

7 came from our region.

8 COMMISSIONER CURTISS: Are they listening?

9 MR. BLAKE: Probably. The reason for that is,

10 if we got into an area and this happened to be a

11 peripheral area of -- if we got indications that something

12 was working, but we had problems in another area, then we

13 didn't bother to -- or didn't take the time to go look for

14 the written program that established how things were

15 supposed to work in that area, we just made note of the

16 fact that there were interfaces and they seemed to be

17 working on a satisfactory level, nothing to write home

18 about, but we didn't take the -- use the manpower to go

19 read the written program.

20 MR. MIRAGLIA: This is -- 80 percent of the

21 material is being done and watched in the field, and they

22 were able, based on their observation, to make the

23 judgment about the implementation, yet they didn't perhaps

24 --

25 COMMISSIONER CURTISS: There may not be any

1 formal procedure, but they --

2 MR. MIRAGLIA: Or if there was, they didn't go

3 back and look enough to come to a judgment relative to the

4 documentation, and that's all that's indicating. Based on

5 their observations of what they saw, they would say that

6 whatever is out there appears to be working, whether there

7 was a written program or not, and they didn't spend the

8 resources to document the program.

9 COMMISSIONER CURTISS: One other question on the

10 chart. The criteria rating that you've got down at the

11 very bottom, where you put an X in, is there some reason

12 on these two charts, that the X'es weren't put in, or

13 would a completed chart have the X'es entered?

14 MR. GODY: No, that -- some regions do use it,

15 some don't.

16 COMMISSIONER CURTISS: It's an option.

17 MR. GODY: Yes, it's up to them.

18 MR. BLAKE: We took that as an option, and we

19 did not roll that one up that way.

20 MR. GODY: That's just a mark good,

21 satisfactory.

22 COMMISSIONER CURTISS: I guess I have one other

23 question, picking up on the point that Commissioner Rogers

24 made about how this approach calibrates with other things

25 that we've been doing.

1 Do you have a feel, based upon the 21 that
2 you've done to-date, the 28 plants that you've done so
3 far, whether the findings that you've seen square with
4 SALP ratings that we've had on maintenance?
5 MR. GODY: There's a good correlation with the
6 SALP. The one plant that was poor had a SALP 3 in
7 maintenance.
8 MR. ROE: If you were to take and distribute the
9 findings of the plants we've done so far, against the SALP
10 ratings, you'd find a very, very close correlation. Maybe
11 not plant by plant, but overall you'll find a very close
12 correlation. We've looked at it. There is some change.
13 The SALP sometimes captures an historical period that
14 could be as much as 18 months old, so there could be some
15 improvement, but overall there's a very close correlation.
16 COMMISSIONER CURTISS: One other quick question.
17 How would you, just major points, compare and contrast
18 what you do here with the INPO team inspections? What do
19 you cover that they don't? What do they cover that you
20 don't? And what are the differences that you see in terms
21 of -- not the mechanism for taking enforcement action, I
22 realize that's a separate question, but in terms of what
23 you cover, and your focus and approach, are there major
24 differences?
25 MR. GODY: I think this has been developed, we

1 look at pretty much the same areas that INPO looks at in
2 their evaluations. There's just so much you can do in
3 maintenance and its related activities. It closely
4 parallels the INPO guideline areas.
5 COMMISSIONER CURTISS: Okay.
6 CHAIRMAN ZECH: In the area of predictive
7 maintenance, can you talk to us just a little bit about
8 that? Did that come out much in your inspections, the
9 subject of predictive maintenance? You mentioned
10 corrective maintenance a few minutes ago, and you
11 mentioned maintenance that may be planned. How about
12 predictive maintenance?
13 MR. GODY: Well, based on the reports we've
14 reviewed so far, the ones that have come in, slightly more
15 than half of the utilities have a formal predictive
16 maintenance program, and it varies --
17 CHAIRMAN ZECH: You may recall our policy
18 statement that we have in effect now suggests that they
19 should consider predictive maintenance. So, about half of
20 them have it, huh?
21 MR. GODY: Yes, programs in all varying degrees.
22 CHAIRMAN ZECH: How does it look to you? How
23 does the predictive maintenance program look? Is it an
24 aggressive program, or is it just on the books?
25 MR. GODY: No. In some cases, it's just on the

1 books. They implement it to various degrees. I think
2 Davis-Besse and -- what's the other one? One plant in
3 Region II have strong programs, and strong implementation
4 of those programs.
5 CHAIRMAN ZECH: But they do have corrective
6 maintenance programs as well as predictive maintenance
7 programs, huh?
8 MR. GODY: Oh, absolutely, yes.
9 CHAIRMAN ZECH: The corrective maintenance, but
10 not so much in the predictive area. In other words,
11 they're not looking ahead. They're looking corrective,
12 which is kind of looking ahead, rather than just
13 preventive maintenance?
14 MR. GODY: It's like a new concept, and they're
15 just getting into it, yes.
16 CHAIRMAN ZECH: That's what I mean, and there're
17 not too many of them getting into that, is that what
18 you're saying?
19 MR. GODY: Half of them have programs that we've
20 looked at. It's a little early to decide, but it is new,
21 so --
22 CHAIRMAN ZECH: All right. Well, I'm sorry
23 Commissioner Carr is not here today because I know he has
24 a particular interest in this subject, but I'm sure his
25 staff will brief him on it, and he'll read the transcript,

1 too. I know he has a keen interest in the subject of
2 maintenance. Also, I think he shares my view about the
3 importance of balance-of-plant as it impacts on safety
4 and, to me, that is our responsibility.
5 I think that you can look at some of the
6 significant events we've had, not only the Salem event
7 which was mentioned earlier, but other events that
8 certainly indicate that maintenance certainly could well
9 have been a key contributor to a significant problem. So,
10 whether it's in the balance-of-plant or the primary plant
11 itself, the steam supply system, it seems to me that
12 maintenance is a safety factor that should be our
13 business.
14 As far as quantifying management efforts, it's
15 always very difficult to do that, but it seems to me you
16 can at least look at the number of resources, that is
17 people, how many maintenance people are involved; what
18 quality are they; what training do they have; what
19 background do they have; also, are they site people
20 employed by the facility, or are they contractors; what
21 percent is contractors; what percent is -- you know, not
22 that contractors can't do an excellent job in maintenance,
23 but what kind of a commitment does the facility have?
24 Those are things you can quantify, I think.
25 Also, the maintenance facilities at the site,

1 how much maintenance can they do at the site? Sometimes
2 you can do a fair amount. I've found others don't do
3 much. They have to send most of it out somewhere. And,
4 also, you can quantify the training facilities. Do they
5 have good training facilities? Some of them have very
6 fine training facilities. Others don't have as good as
7 perhaps they should.
8 Those are things you can look at, and I think
9 those are real indicators of how at least to attempt to
10 quantify management efforts towards supporting maintenance
11 but, as far as I'm concerned, maintenance has a
12 significant contribution to safety of plant operations and
13 should be a continuing program that we view very
14 carefully, and I would hope that the industry continues
15 their improvements and their emphasis on maintenance,
16 which I think we've all seen in recent months and years.
17 Well, let me thank you all for a very fine
18 discussion here today. This maintenance team inspection
19 effort that we're undertaking is a very important one. I
20 know you've only looked at, I guess, roughly something
21 like 30 percent of the plants, but still that's a pretty
22 good indication.
23 You have identified some areas that need
24 attention. Are you going to continue these inspections?
25 MR. MIRAGLIA: Yes, sir.

1 MR. GODY: Yes, sir.

2 CHAIRMAN ZECH: You didn't emphasize that today.

3 Do you intend to inspect all the plants?

4 MR. MIRAGLIA: Yes, sir, this fiscal year and

5 next fiscal year we hope to --

6 CHAIRMAN ZECH: Finish when?

7 MR. MIRAGLIA: Yes, sir.

8 MR. GODY: Mid FY91.

9 CHAIRMAN ZECH: Mid --

10 MR. MIRAGLIA: Fiscal Year '91.

11 CHAIRMAN ZECH: Fiscal Year '91.

12 MR. MIRAGLIA: Yes, sir.

13 CHAIRMAN ZECH: It's a big effort, but I think

14 it's a worthwhile one. Clearly, you're gaining a great

15 deal of experience and knowledge, and I would think, from

16 your visits, the utilities are benefitting also.

17 I think the attention, again, that you're

18 placing on it, we're placing on it, and the utilities and

19 the industry across-the-board is placing on maintenance is

20 very appropriate and important.

21 I'd certainly continue to keep up this

22 inspection program and, Mr. Taylor, I know you and the

23 senior people will continue the staff's emphasis in the

24 area of maintenance.

25 Are there any other questions from my fellow

1 Commissioners?

2 (No response.)

3 If not, thank you very much.

4 We stand adjourned.

5 (Whereupon, at 3:23 p.m., the meeting was

6 adjourned.)

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the United States Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON RESULTS OF MAINTENANCE TEAM INSPECTIONS

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: MAY 2, 1989

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.

Phyllis Young

Reporter's name: PHYLLIS YOUNG

MAINTENANCE TEAM INSPECTIONS

COMMISSION BRIEFING

MAY 2, 1989

F. MIRAGLIA

J. ROE

T. GODY

J. BLAKE

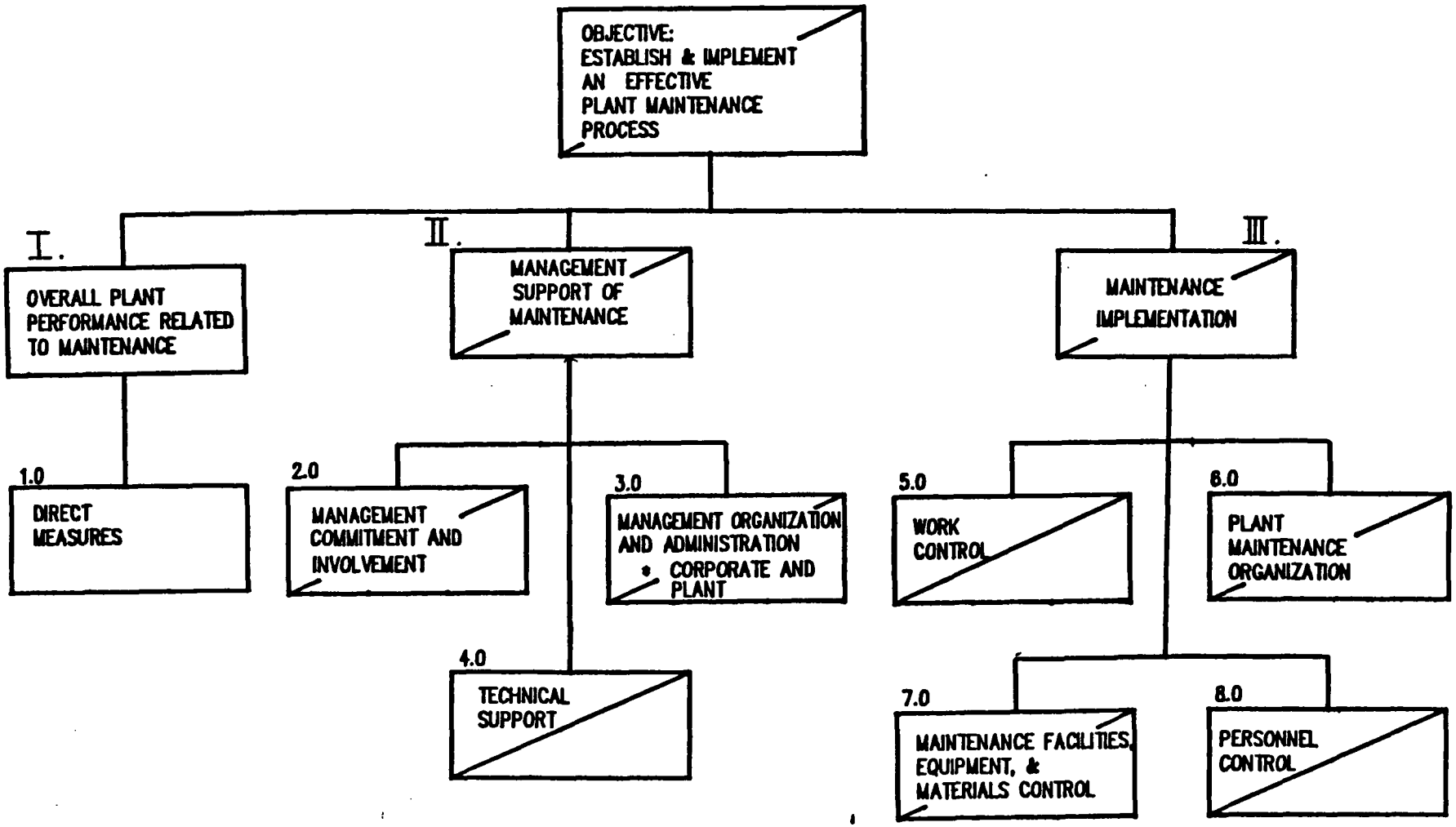
BACKGROUND

- NUREG-1212 - JUNE 1986
- INPO'S "GUIDELINES ON CONDUCT OF MAINTENANCE AT NUCLEAR POWER PLANTS", 1985
- NUREG-1333 - NOVEMBER 1988
- MAINTENANCE IS CHOSEN AS AREA OF EMPHASIS IN THE INSPECTION PROGRAM FOR FY89 AND FY90

DEVELOPMENT

- TEMPORARY INSTRUCTION
- CONDUCTED PILOT INSPECTIONS, JULY 1988
  - OCONEE
  - PEACH BOTTOM
  - DIABLO CANYON
- LESSONS LEARNED MEETING
- ADJUSTED INSPECTION GUIDANCE AND TREE

MAINTENANCE INSPECTION TREE



TREE INITIATORS

- RECENT COMPONENT FAILURES
- PRA INSIGHTS
- TOPICS OF INTEREST (MOV'S, CHECK VALVES, AIR SYSTEMS)
- PREVIOUS INSPECTION FINDINGS
- OBSERVATION OF PLANT ACTIVITIES

CRITERIA

GOOD (GREEN) - MORE THAN MINIMAL EFFORTS, AREA HAS DESIRABLE QUALITIES, FEW MINOR IMPROVEMENTS NEEDED

SATISFACTORY (YELLOW) - DEVELOPED, DOCUMENTED AND EFFECTIVELY IMPLEMENTED. NEEDED IMPROVEMENTS ARE OFFSET BY BETTER AREAS

POOR (RED) - INADEQUATE OR NO EFFORT IN THIS AREA

N/A (BLUE) - NOT RATED OR INSUFFICIENT DATA

CONDUCT OF INSPECTION

- TEAM COMPOSITION
- PREPARATION
- ONSITE INSPECTION

TEAM COMPOSITION

TEAM LEADER (REGION)

TWO REACTOR/PROJECT
ENGINEERS (REGION)

ONE RADIATION SPECIALIST
(REGION)

TWO ENGINEERS (HQ)

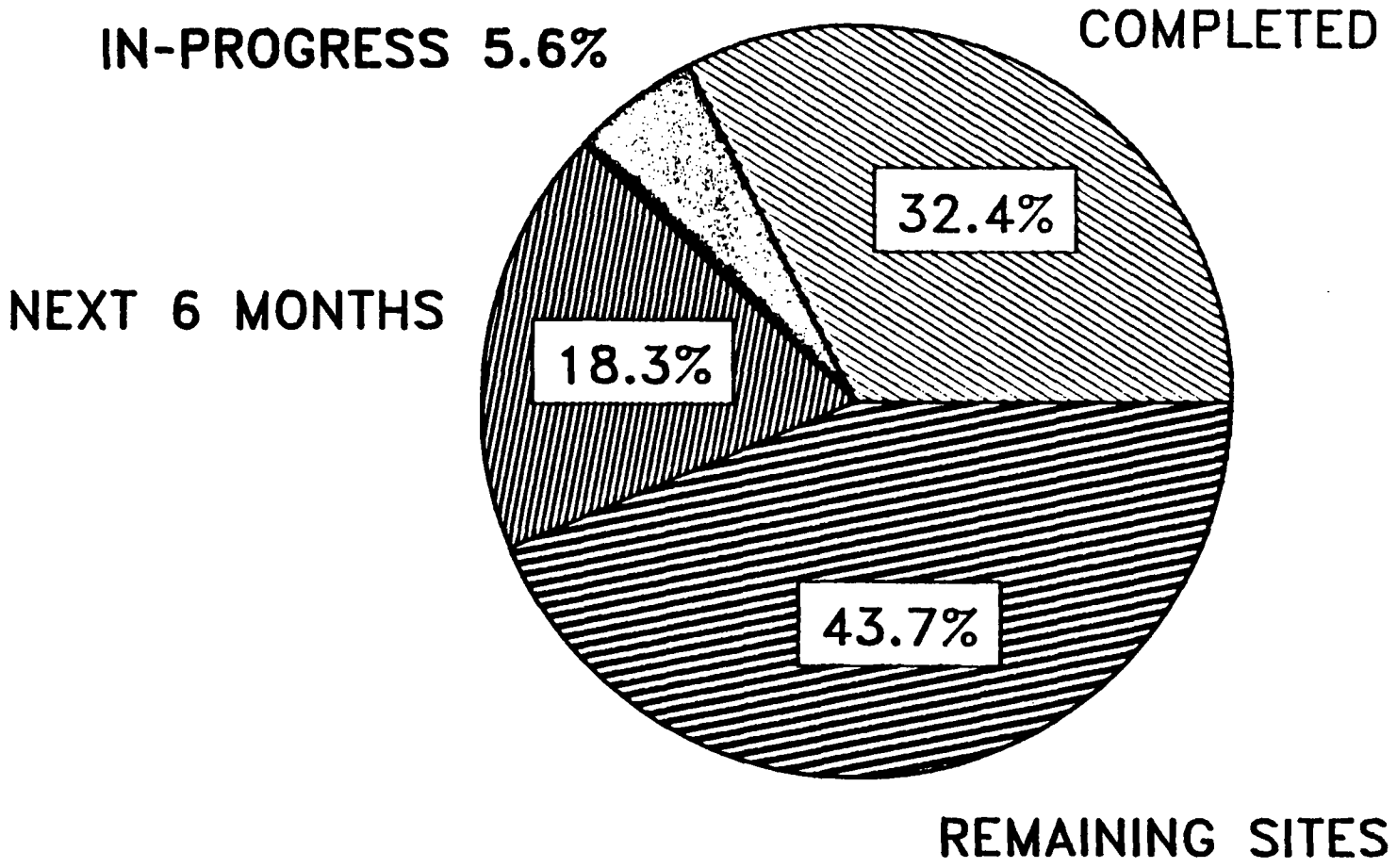
PREPARATION

- PRE-INSPECTION CONFERENCE TRIP
- INTERFACE WITH LICENSEE
- REVIEW OF NPRDS
- REVIEW OF PRA INSIGHTS
- TEAM MEETINGS

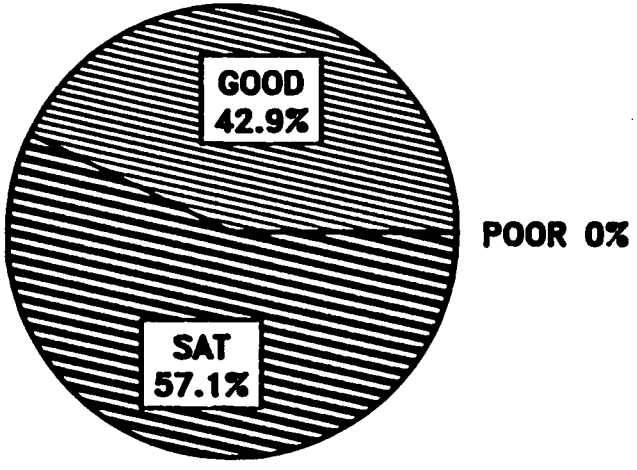
ONSITE INSPECTION

- DETAILED WALKDOWN
- USE OF TREE AS A TOOL
- 80% FOCUS ON IMPLEMENTATION, INCLUDING DIRECT OBSERVATION
- ANALYZE PERFORMANCE

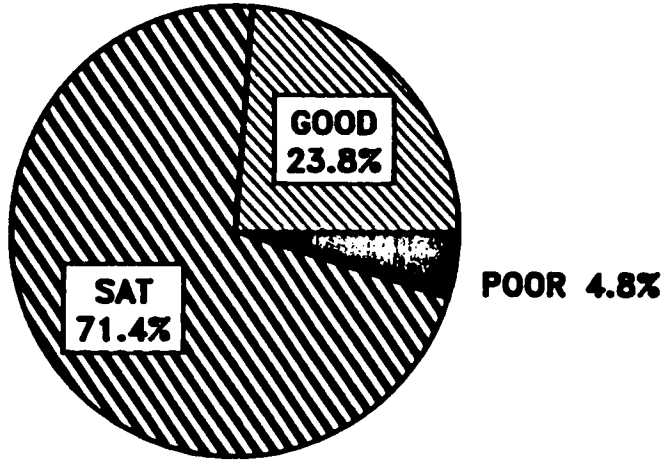
INSPECTION STATUS



OVERALL RATINGS



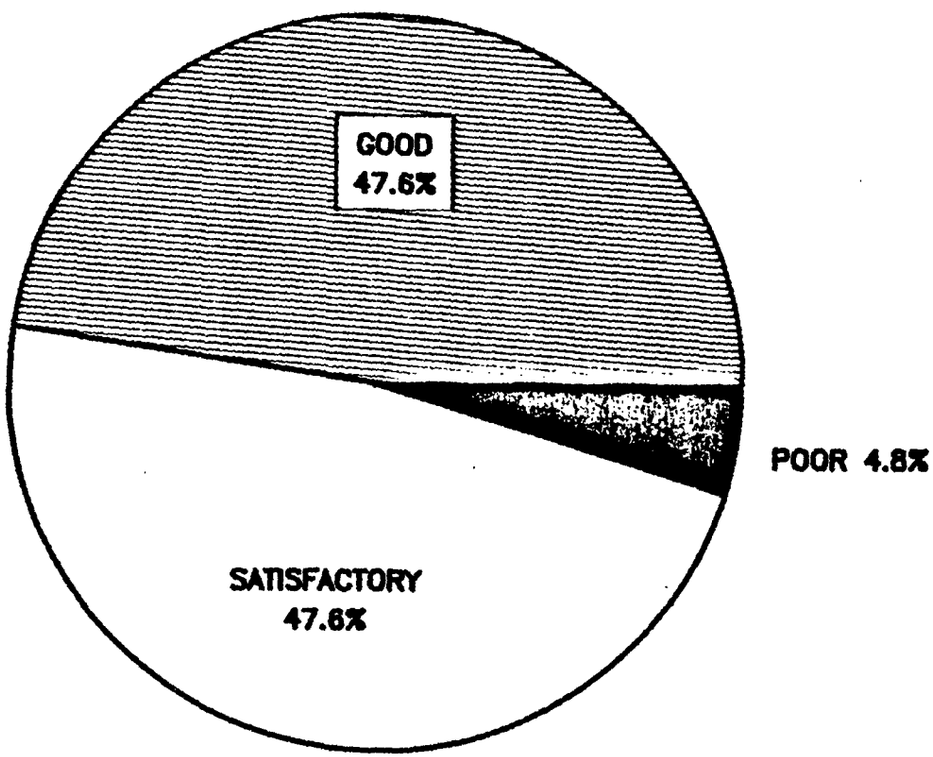
PROGRAM



IMPLEMENTATION

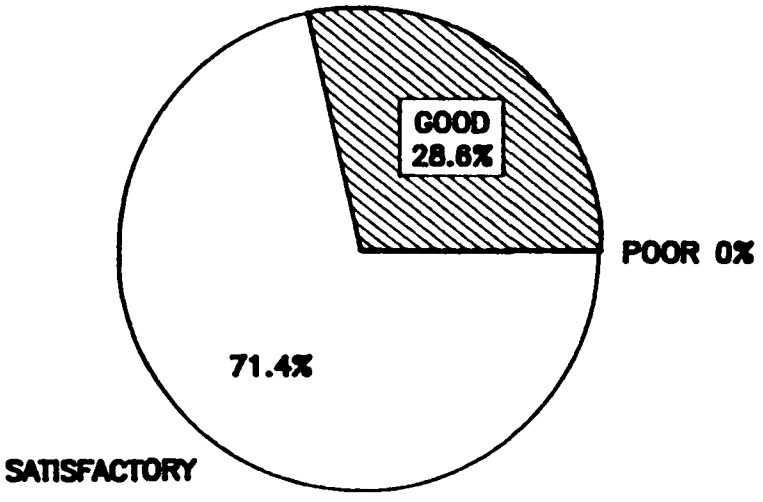
MAINTENANCE TEAM INSPECTIONS

I. PLANT PERFORMANCE RELATED TO MAINTENANCE

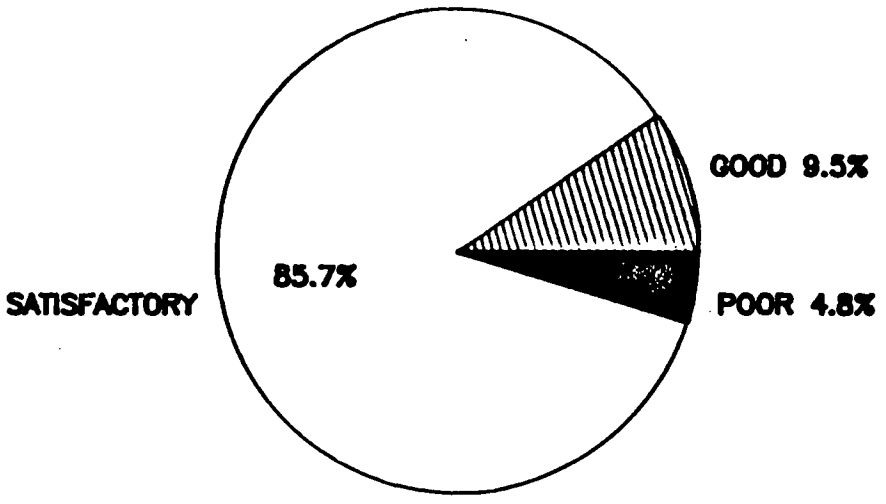


MAINTENANCE TEAM INSPECTIONS

II. MANAGEMENT SUPPORT OF MAINTENANCE



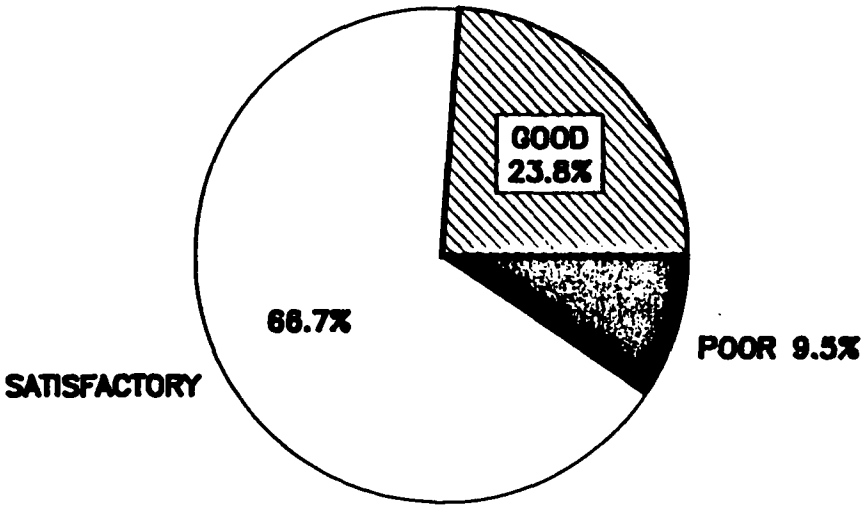
PROGRAM



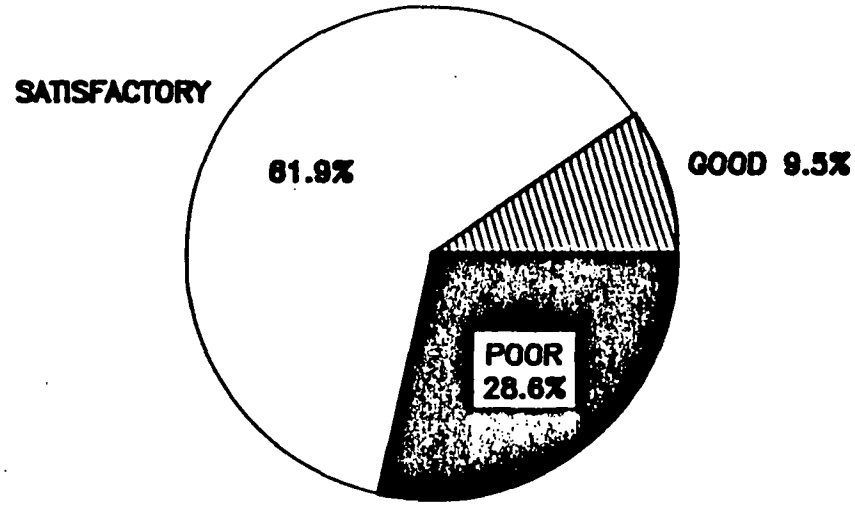
IMPLEMENTATION

MAINTENANCE TEAM INSPECTIONS

4.2 ENGINEERING SUPPORT



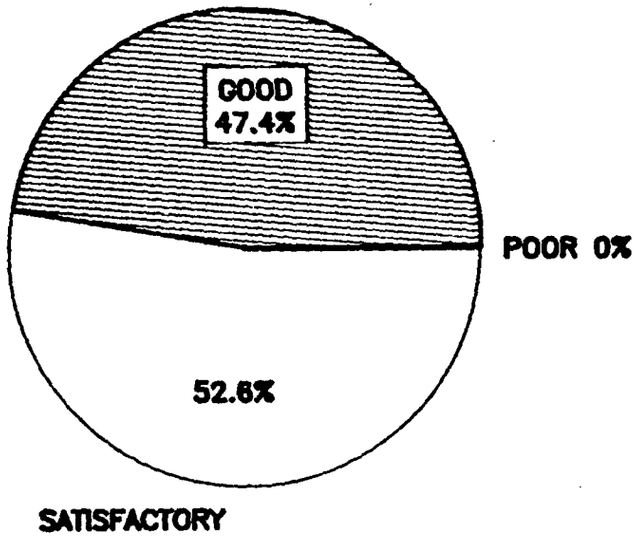
PROGRAM



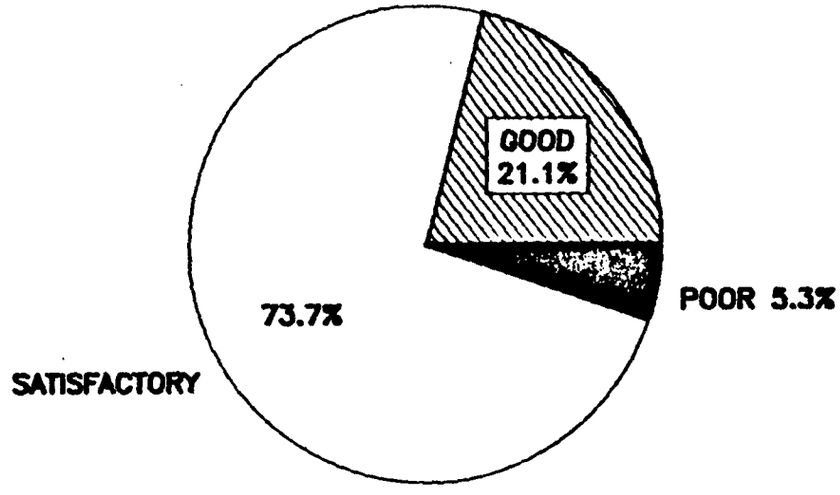
IMPLEMENTATION

MAINTENANCE TEAM INSPECTIONS

III. MAINTENANCE IMPLEMENTATION



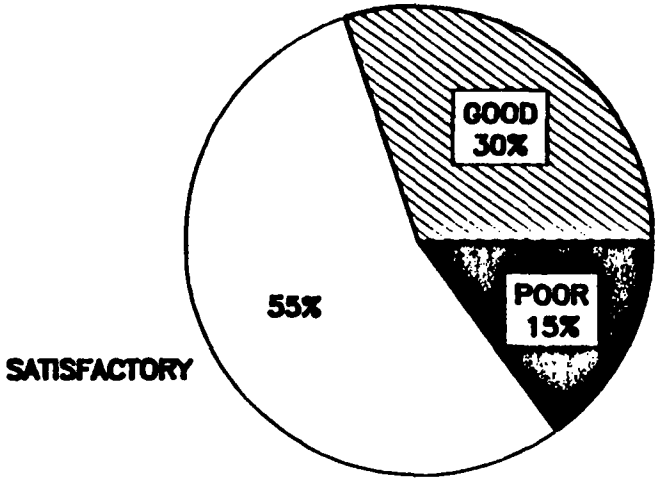
PROGRAM



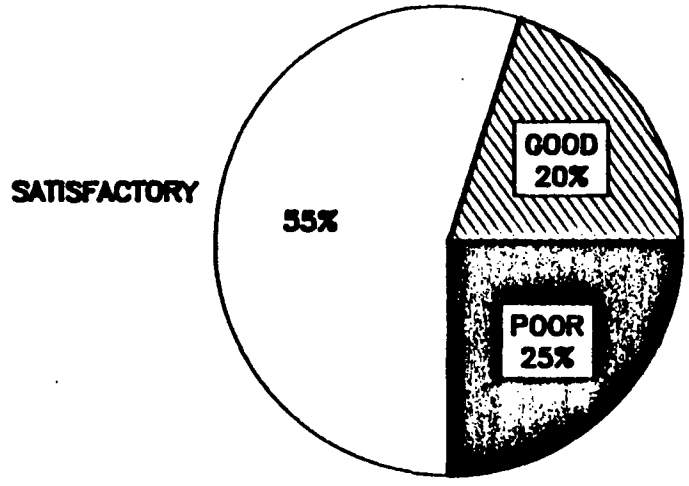
IMPLEMENTATION

MAINTENANCE TEAM INSPECTIONS

6.4 PERFORM MAINTENANCE TRENDING



PROGRAM



IMPLEMENTATION

SUMMARY

- MAINTENANCE PROGRAMS DOCUMENTED; ALL ARE ADEQUATE; MANY ARE GOOD

- IMPLEMENTATION OF MAINTENANCE PROGRAMS AND ACTIVITIES IS LAGGING

- NEED FOR CONTINUED IMPROVEMENT IN MAINTENANCE ACTIVITIES