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1 D I S C L A I M E R

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7 United States Nuclear Regulatory Commission held on

8 1/20/88 in the Commission's office at 1717 H Street,

9 N.W., Washington, D.C. The meeting was open to public

10 attendance and observation. This transcript has not been

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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 BRIEFING ON NRC TECHNICAL TRAINING PROGRAM

5 ***

6 PUBLIC MEETING

7 ***

8 Nuclear Regulatory Commission

9 Room 1130

10 1717 H Street, Northwest

11 Washington, D.C.

12

13 Wednesday, January 20, 1988

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15 The Commission met in open session, pursuant to

16 notice, at 2:00 o'clock, p.m., the Honorable LANDO W. ZECH,

17 Chairman of the Commission, presiding.

18 COMMISSIONERS PRESENT:

19 LANDO W. ZECH, Chairman of the Commission

20 THOMAS M. ROBERTS, Member of the Commission

21 FREDERICK M. BERNTHAL, Member of the Commission

22 KENNETH CARR, Member of the Commission

23 KENNETH ROGERS, Member of the Commission

24

25

1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2

3 S. CHILK

4 J. HOYLE

5 W. PARLER

6 V. STELLO

7 E. JORDAN

8 R. SPESSARD

9 K. RAGLIN

10 P. GOLDMAN

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

2 CHAIRMAN ZECH: Good afternoon, ladies and gentlemen.

3 The purpose of the meeting this afternoon is for the
4 Staff to brief the Commission concerning the NRC Technical
5 Training Program. We believe that the training of our people
6 is very important to achieving the mission of our agency and to
7 the pursuit of excellence in nuclear regulation.

8 In July of last year, I had the opportunity to visit
9 the Tactical Training Center in Chattanooga and saw firsthand
10 the facilities and the programs and the staff that they have
11 there, and I'm looking forward to hearing this afternoon about
12 our own training program.

13 During that visit, I was particularly interested in
14 the Staff's recent initiatives to obtain and use a full-scope
15 control room simulator and extend the formal technical training
16 program that was originally developed for our inspection
17 personnel to other job positions throughout the agency. These
18 initiatives recognize the changing needs of our agency and
19 provide excellent opportunities for our employees to understand
20 and form the fundamental basis for making decisions in our
21 agency.

22 I look forward to hearing more of these initiatives
23 during the Staff's briefing today. I understand that copies of
24 the slides to be used during the briefing are available in the
25 back of the room.

1 Do any of my fellow Commissioners have any opening
2 comments to make?
3 [No response.]
4 CHAIRMAN ZECH: If not, Mr. Stello, you may begin,
5 please.
6 MR. STELLO: Thank you, Mr. Chairman.
7 I'll ask Ed Jordan in a moment to introduce the
8 others at the table who will be doing the briefing. But I
9 thought before I did that, I'd at least give you a thumbnail
10 sketch of training in the NRC that spans at least the last ten
11 years or so.
12 If you look back ten years, we had a couple of rooms
13 over at East-West Towers that from time to time we'd give some
14 training, and we did it in a piecemeal fashion. We had to get
15 on airplanes and try to use a simulator here and there in the
16 country, and usually that was a backshift, and the training
17 overall, we were struggling with. And finally the Commission
18 agreed to allow us to move the training operation down to
19 Chattanooga, and the progress that's been made down there over
20 that span of eight years or so that it's been here -- I guess
21 it's several years -- has been remarkable. And since you have
22 been there, you have seen that we have a very good training
23 program now. We continue to make improvements, and we're
24 pretty proud of the kind of training that we can do for NRC
25 employees as well as people from states and the international

1 community that ask from time to time for help in training. So
2 we're pleased that we've gotten this program to truly being a
3 first class program, and I think you will hear this afternoon
4 the fact that we now have a fairly good program.
5 While we're going to be concentrating on the
6 Technical Training Center as part of our training, I wanted to
7 recognize that Pete Goldman is sitting here, and we also have a
8 variety of other training programs of which the Commission is
9 aware that are run out of our Office of Personnel, that cover
10 quite a few other activities, and the program is fully and
11 totally coordinated, and during the briefing from time to time,
12 we'll be citing some of those examples.
13 So to do the introduction, Ed, let me get you started
14 and do the introductions first and get on with it.
15 MR. JORDAN: Very good. This is an information
16 briefing. I would first like to introduce Lee Spessard, who is
17 the Director of the Division of Operations Assessment, who has
18 the overall responsibility for technical training in AEOD, and
19 then Ken Raglin, who is the Director of the Training Center and
20 manages directly the technical training programs for AEOD down
21 in Chattanooga.
22 And I appreciate the remarks you've made. The Staff
23 is, I think, justifiably proud of the accomplishments and the
24 capability in our technical training areas. We feel that it is
25 an investment in the future of the agency, and it's necessary

1 for our Staff to have a high level of technical training.

2 The upgrades that we're planning and that we have

3 initiated are as a result of a great deal of coordination

4 between the Office of Personnel and the technical training

5 staff and with the program offices, so the program offices are

6 identifying needs. We are responding to them and trying to

7 converge the needs, so that where needs are common, we can

8 provide one course that handles it.

9 These needs were initiated in order to respond to the

10 identified needs in the five-year plan, so we're in congruence

11 with that effort to improve our non-reactor training, to change

12 to operations for the reactor staff that has previously had

13 training qualifications, extend our qualification programs

14 within the agency.

15 Ken has a structured presentation to go through, and

16 so I'll turn to him and let him begin.

17 MR. RAGLIN: Okay. Thank you very much.

18 Could we have the slide for page 2, please.

19 [Slide.]

20 The first major topic I'd like to discuss is the

21 scope of technical training within the NRC, and it certainly

22 does include other initiatives besides the ones directly at the

23 Technical Training Center.

24 Formal training is done either in house through TTC

25 instructors, other NRC Staff serving as instructors, or through

1 contracted instructors for a number of formal programs which
2 are shown on the slide. Those include the programs
3 specifically at the Technical Training Center, which can be
4 broken down into two broad categories: reactor technology
5 curricula, and there are really four separate curricula there,
6 one for each of the major four vendor designs, and then a
7 specialized technical training curriculum. I will expand on
8 those topics a little bit later.
9 Besides the formal Technical Training Center
10 programs, there are a number of other formal technical training
11 programs within our agency. Next on the list would be those
12 associated with the Office of Personnel. They include the
13 overall management of the probablistic risk assessment
14 technology transfer curriculum. That curriculum presently
15 consists of seven courses, two of which are directly supported
16 by the TTC staff, others of which are supported by combinations
17 of selected NRC Staff and contractors.
18 Additionally, within the Office of Personnel, there
19 is the formal program for end-user training for automated data
20 processing, and there is a separate curriculum along that line
21 also, including training in word processing, et cetera.
22 Next we have the curriculum that is within the Office
23 of Government and Public Affairs, particularly for the state
24 programs people. That is another technical training curriculum
25 which consists of about eight different courses ranging from

1 health physics to well logging to introduction to licensing and
2 inspection procedures. These are courses created for the
3 training of state personnel, but which we are expanding a bit
4 to allow some of the NRC Staff working in the materials area to
5 take advantage of some courses that already exist. So I'd just
6 like to recognize that initiative also.
7 And then finally there have been and continue to be
8 intermittent formal training courses based on initiatives
9 started with the Regions or within the program offices. What
10 I'm talking about here are situations where training is needed
11 in a given area, formal training. There hasn't been a specific
12 mechanism to make it happen. The program offices still needed
13 it, and it has been done.
14 An example would be degraded core training a year or
15 so ago. Another example would be site access training that's
16 ongoing at the present time through contracting.
17 The next major thing I would like to recognize is the
18 existing inspector qualification process. This is a very
19 comprehensive program which requires a great deal of training
20 on the part of the individual inspectors. There are existing
21 regional qualification cards which are established to handle
22 groups of similar positions, such as radiological safety
23 inspectors, reactor engineering support inspectors, resident or
24 reactor operations inspectors. Each of those major groups has
25 its own regional qualification card, which contains a number of

1 formal requirements.

2 These requirements involve self-study and the taking
3 of self-study quizzes on a number of different items, formally
4 required seminars on different parts of the Code of Federal
5 Regulations, checklists and practical factors which cover
6 topics such as regional or program office orientation,
7 regulatory guides, NRC and inspection manual factors, industry
8 codes and standards.

9 And then on-the-job training involves onsite training
10 for resident inspectors, inspection accompaniments and
11 inspection activities on the part of the qualifying inspectors,
12 and finally oral checkouts and in many cases oral qualification
13 boards.

14 This is all part of an existing formal program which
15 takes a typical inspector the better part of a year to
16 complete. The formal part that the Technical Training Center
17 is directly involved with is only one part of the overall
18 process.

19 Page 3, please?

20 [Slide.]

21 Still working with the scope of technical training,
22 I'd like at this time to recognize other informal training that
23 is occurring within the agency. This is typically in-house
24 training, typically in the form of seminars within a given
25 Region or program office. These are scheduled in local

1 training plans, scheduled for counterpart meetings for resident
2 inspectors or other inspection disciplines. The purpose for
3 all of these seminars is to maintain or enhance the knowledge
4 of the individual employees.
5 The salient point here is that all of this effort is
6 beyond the formal qualification requirements which are already
7 formidable.
8 COMMISSIONER BERNTHAL: This isn't really training.
9 This is, I would think, a distinction between training and
10 education. I assume what you're telling us here is that from
11 time to time when a subject becomes current or "hot," so to
12 speak, you provide educational seminars for many of our
13 technical people. Isn't that really what we're looking at
14 here?
15 MR. RAGLIN: For the most part, it's resources within
16 the Region or the program office that's providing it, and it's
17 typically a one or two-hour seminar, sometimes a little bit
18 longer, as opposed to a formal course.
19 COMMISSIONER BERNTHAL: Yes. I'm just trying to make
20 the distinction between training and education, because that's
21 a very important distinction that we will have to make at some
22 point in another context.
23 MR. GOLDMAN: I would say in the counterpart
24 meetings, they use that a great deal for actually formal
25 training. Particularly one of the things they've asked for

1 recently is management, management systems.

2 COMMISSIONER BERNTHAL: That's a different matter,

3 yes.

4 MR. GOLDMAN: And we bring people out there to

5 conduct training in that, because the inspectors say, "How am I

6 supposed to tell what type of management practices I'm looking

7 at?" They don't have very much background.

8 MR. RAGLIN: It's fair to say that there's a mixture,

9 and I just pulled the examples that are listed up there off

10 several of the regional training plans that were sent to the

11 Technical Training Center just for information, and that is

12 just a sample. The list is much longer.

13 The slide for page 4, please.

14 [Slide.]

15 A lot of the other training that was just mentioned

16 is not quantified in the numbers that I'll be displaying and

17 discussing at this time. These numbers are associated directly

18 with the Technical Training Center programs for Fiscal Year

19 1987.

20 A number of different courses, in this case 115, were

21 either presented or controlled by the Technical Training Center

22 staff. Now that number does represent the courses which we

23 have done in-house with our staff, as well as the contracted

24 courses and courses for which we have been able to provide

25 individual employee slots into a given course, as opposed to

1 buying a complete course. That's the total.

2 Of that total, 1162 students were processed, and that
3 number indicates the count irrespective of prior attendance;
4 that is, any given inspector who was going through the pipeline
5 might be counted two or three or maybe four times in that
6 total.

7 The Technical Training Center capacity factor was 86
8 percent overall for the year, and by "the capacity factor" in
9 this sense, I mean the total number of available slots that
10 were actually used divided by the total number of slots that
11 were available. That capacity factor also includes attrition,
12 which is a factor in courses of a course series. For stand-
13 alone courses, it wouldn't be much of a factor. 86 percent
14 seems pretty good. The courses are normally filled.
15 Occasionally there are last minute priority shifts, but by and
16 large attendance has been very good.

17 Of the courses that were presented, that equates to
18 162 course weeks. "Course week" is the term that can usually
19 be correlated either to staff effort on the part of the TTC
20 staff or to contracting dollars, as opposed to any other
21 measurement, and the 162 course weeks were given in reactor
22 technology, as indicated: coverage within the GE vendor
23 design, Westinghouse, less coverage in Combustion Engineering,
24 and some coverage in the Babcock & Wilcox design, some coverage
25 in some generic or other areas which are listed on a follow-up

1 slide.

2 Within a specialized technical training curriculum,
3 the course weeks were in support of engineering support
4 courses, health physics courses, and courses that are
5 associated with inspection or examining techniques.

6 Slide 5, please.

7 [Slide.]

8 This slide shows the overall distribution of slots
9 that were used by the NRC Staff for Technical Training Center
10 programs during the last fiscal year. The data is associated
11 with all courses which were presented or controlled, which
12 means that we have both in-house and contracted courses worked
13 in here.

14 The distribution shows that our biggest clients
15 continue to be the five Regions in direct support of the
16 inspection programs. Other offices have taken either more or
17 less advantage, depending on the particular needs.

18 We've provided training to a number of different
19 types of students. We, of course, have the resident inspectors
20 and the reactor operations inspectors from the Regions,
21 engineering support inspectors also from the Regions, operator
22 license examiners, operations center duty officers, technical
23 managers within the agency, and several other technical
24 positions in the agency to one degree or another.

25 COMMISSIONER ROBERTS: May I ask a question?

1 MR. RAGLIN: Certainly.

2 COMMISSIONER ROBERTS: I appreciate the Regions are
3 not uniform in size, but why is there such a difference between
4 Region V and Region II, for instance?

5 CHAIRMAN ZECH: They're too far away.

6 COMMISSIONER ROBERTS: Is that it?

7 MR. JORDAN: It's a combination of size and
8 recruiting. Region II had a substantial recruiting effort, and
9 so they had a number of new people cycling through that they
10 got priority in the Training Center to get those people trained
11 on the front end.

12 COMMISSIONER ROBERTS: Okay.

13 COMMISSIONER BERNTHAL: I'll bet the Chairman's
14 comment, though, is a good practical reason.

15 MR. JORDAN: No, sir, because there is a
16 qualification program, and those personnel, in order to be
17 qualified in their respective inspection programs, must go
18 through the course series. So that should not affect them.

19 COMMISSIONER CARR: There is not much turnover in
20 California.

21 MR. JORDAN: Yes. I believe that that's part of it.

22 COMMISSIONER BERNTHAL: I have a related question.
23 Why is it so heavily skewed toward the Regions?

24 MR. JORDAN: That's because of the origin of the
25 program, that the technical training program was designed

1 initially to support the regional inspection efforts, and so we
2 are in the process now of responding to the changing needs and
3 responding to the agency. So that's clearly a problem that the
4 statistics bear out, and for '89 we have planned the budget to
5 be able to respond much further to NMSS, Research, and NRR in
6 terms of their other inspection skills.
7 COMMISSIONER BERNTHAL: Yes. I'm glad you mentioned
8 Research, because I note the complete absence of Research here.
9 CHAIRMAN ZECH: They're 1 percent.
10 MR. RAGLIN: There's two relatively small pieces of
11 the pie.
12 COMMISSIONER BERNTHAL: Oh, I've got an older slide.
13 I'm sorry. I guess I need the most recent version of it.
14 All right, 1 percent, a token. Have you go an extra
15 one there?
16 CHAIRMAN ZECH: Go ahead.
17 MR. RAGLIN: In addition to the training that has
18 been provided for the NRC Staff, a certain percentage of the
19 slots are taken up by other people. This is roughly 7 percent
20 of the total slots, and it has included a little over 2 percent
21 for contractors. These are typically contractors for jobs like
22 operator licensing assistants. They have come through the
23 training pipeline.
24 Training for state and local people, this number
25 might be a little higher than its overall impact, because we

1 counted by numbers, and it's taking into account some news
2 media seminars that were given in some of the different
3 geographical locations.
4 And then finally foreign training is included. Now
5 this represents foreign students who have gone through our
6 courses. For this fiscal year, there was no technical training
7 course in a foreign country, although one is planned for FY '88
8 in Mexico.
9 COMMISSIONER CARR: Let me ask you, are you quota
10 limited? I mean, could you train more than you're training
11 now, or how many people do you have to turn down, I guess, is
12 what I'm asking, when they apply to come to the school and you
13 say, "We've got no room?" Are you oversubscribed?
14 MR. RAGLIN: We typically are oversubscribed, and we
15 have addressed that within the last few months by increasing
16 the class size of some of the classes on a trial basis to see
17 if we could work off the backlog. That has worked out
18 successfully.
19 COMMISSIONER CARR: So you have a priority list when
20 you get more people requesting it than you can apply?
21 MR. RAGLIN: Yes.
22 COMMISSIONER CARR: And that goes Regions first?
23 MR. RAGLIN: Not necessarily Regions first. It
24 depends on what the course is and what the requirements of the
25 people who are attending the course are. But we have gone to

1 prioritizing to take the best advantage of the ones that are
2 already scheduled.
3 COMMISSIONER ROGERS: What is your average class
4 size?
5 MR. RAGLIN: It varies depending on which course it
6 is. For the reactor technology course series, the class size
7 has historically been 18 for the last few years. We have
8 increased that to 24 on a trial basis, and it worked out
9 reasonably well. So we're willing to accept up to 24 there.
10 When we get into simulator courses, we have to break
11 it down into much smaller groups. Typically we deal with six
12 in a class in a simulator course. When we're training
13 technical managers, we have eight in a course, and that
14 involves both classroom and simulator.
15 The largest class size is 24, and the smallest is
16 six.
17 MR. JORDAN: I think this is an area where the Office
18 of Personnel has been very helpful in helping us gear the right
19 type of course and the right class size, so that there is a
20 maximum utilization without any severe sacrifice of quality.
21 MR. RAGLIN: Okay. Page 6, please.
22 [Slide.]
23 We feel very proud of the quality of the technical
24 training that has been provided over the last few years and
25 feel that the instruction is excellent: quality instructors,

1 both on the Technical Training Center staff, the other NRC
2 Staff that assist in technical training programs, and
3 contracted instructors.
4 Within the statements of work that go out on the
5 contracting initiatives for technical training courses are our
6 specific requirements for the quality of the contracted
7 instructors to participate in the courses, and we pretty well
8 hold the people to the line on that, and we insist on quality
9 presentations, and if we don't feel we get that, we make
10 changes. So I feel comfortable in commenting that we have
11 quality instructors for essentially all of the courses that are
12 ongoing.
13 COMMISSIONER BERNTHAL: Do you do any testing in any
14 of these training courses?
15 MR. RAGLIN: Yes, sir.
16 COMMISSIONER BERNTHAL: Generally -- not in detail,
17 but generally in what areas?
18 MR. RAGLIN: In fact, most of the technical training
19 courses do have course exams. We test on the content of the
20 course. For example, in the reactor technology course, there
21 is a separate test on each of the three courses of the series.
22 It's -- for the first one, it's a system-oriented course. It's
23 a test on the system purpose function, major components, a
24 little bit on interrelations for mechanical systems,
25 instrumentation and control systems, that type of stuff.

1 For the second course, which is more of an
2 integration course, we have sections that deal with transient
3 analysis, operational events, technical specifications. We
4 test in each of those areas.
5 And then for the last, for the simulator course, we
6 test inspectors on their ability to do a control board walkdown
7 and identify problems that are associated with the boards, like
8 switch mispositions, systems that would be inoperable as a
9 result of current configuration.
10 For the specialized technical training areas, it's
11 testing on the material. The course is -- welding technology
12 and codes, the exam is associated with the actual welding
13 technology, the theory of it typically. Essentially all of the
14 tests are associated with theory.
15 COMMISSIONER BERNTHAL: I don't want to make the
16 mistake so often made these days in education and emphasize the
17 process over the substance or the technique of education over
18 the substance. But I'm curious to know whether you also have a
19 certain amount of oversight in the way the testing is done.
20 Do you have experts or people with experience, let's
21 say, in that area that take a broad view and overview, in fact,
22 of the testing that you do? That's one question.
23 And the next question is, if we have people with that
24 kind of knowledge and expertise in-house, are they in
25 communication with the people that devise testing, for example,

1 for requalification examinations?

2 MR. RAGLIN: Okay. On the first question, I would
3 say we have people at the Training Center with a great deal of
4 experience, although I wouldn't classify them as experts in the
5 sense of an expert in educational training or instructional
6 technologists.

7 One of our longer-range initiatives is working with
8 the Office of Personnel to more or less validate the entire
9 testing process. I don't believe that it's bad. We do have
10 procedures for examination content types of questions, the
11 number of questions. We have questions in question banks which
12 have been approved through the management change at the
13 Technical Training Center. It is an area that we would like to
14 become a little more formal in in the upcoming years.

15 MR. JORDAN: I would give a plug for the Office of
16 Personnel there, that Carolyn Bassin has been working with us
17 in this area, and so in the idea of trying to continue to
18 improve the viability of the courses, she is giving us advice,
19 which will include the examinations.

20 But the examinations we have now, I think, have been
21 derived through experience and through feedback, because each
22 of these individuals who go through the course -- and these are
23 senior people in the agency frequently -- feed back that "this
24 exam question is dumb; don't use it again," or that, you know,
25 "You really nailed me on this one. It was a good question, and

1 I just missed it." So the process, through evolution, has
2 arrived at, I think, a reasonable exam bank, but it can be
3 improved.
4 COMMISSIONER BERNTHAL: And then the second question
5 quickly, is that same -- are those same people -- is that
6 capability and expertise also finding its way into the other
7 testing that we have to worry about; that is, testing on the
8 outside for requal?
9 MR. JORDAN: Those people go through the training
10 center and interact and use a simulator.
11 MR. STELLO: I think he's questioning the test
12 procedures.
13 COMMISSIONER BERNTHAL: I'm worried about the same
14 problem with respect to requal.
15 MR. STELLO: The bank of tests that we have were, in
16 fact, derived by people in the Human Factors Branch, who are
17 expert in this area of making sure that the testing, in fact,
18 is an adequate test of the training through the job and task
19 analysis and what information should they have gotten in the
20 training program, and then is the test a correct measure of
21 whether they got it.
22 So there are in the Human Factors Branch --
23 COMMISSIONER BERNTHAL: I don't want to get
24 sidetracked on this, but I would just urge that what expertise
25 we have, we make sure we use, not only internally but with

1 respect to that important external factor.

2 MR. GOLDMAN: We now have one of those people in the

3 Office of Personnel.

4 COMMISSIONER BERNTHAL: Good.

5 COMMISSIONER CARR: Do you know what the attrition

6 rate is in the technology courses?

7 MR. RAGLIN: A ballpark figure is about 10 or 11

8 percent.

9 COMMISSIONER CARR: Okay.

10 MR. RAGLIN: I'd like to mention a couple of items on

11 methods that we work at to keep and improve the quality at the

12 Technical Training Center in various courses.

13 First of all, it's a known fact that the courses are

14 all very intense. When the individual employees go to the

15 Training Center, they quickly find out that there's a lot of

16 work to be done associated with any given course. It is

17 certainly no holiday, and this is validated in the course

18 comments that we get back from almost every course, where

19 frequently students will say that there is too much material in

20 too short of time. "I wish we had more time to talk about

21 these things in more detail." And it is very intense.

22 We do have exams in most of the courses. We do have

23 a certain standard for passing. We solicit feedback through

24 some different mechanisms. The first one, of course, is the

25 comments from the students who have taken the course.

1 Additionally we get feedback through the Training Advisory
2 Group, which is a group of senior managers within the agency,
3 representing the Regions and the program offices. The Training
4 Advisory Group meets twice a year at the Technical Training
5 Center and is a great source of information to shape technical
6 training programs. There's a lot of information that has come
7 through the Training Advisory Group that has really helped
8 determine which way to go.
9 Other feedback consists of individual audits of
10 courses and continued involvement on the part of Source
11 Evaluation Panel members in the case of contracted courses. We
12 recognize that there are a number of technical training areas
13 that the Technical Training Center staff lacks the expertise
14 in, and we do tap the expertise of certain people within the
15 agency in those individual areas, and we follow up on that to
16 the point that in some cases the Source Evaluation Panel not
17 only comments on the bids that come in for the contracted
18 courses, but they attend the courses, and they comment on the
19 recommended changes to the courses that are made by the
20 contracted instructors or based on student comments.
21 So it's an ongoing process in an attempt to keep and
22 improve the overall quality.
23 Finally, we seek to inject current information into
24 our courses as much as possible. This has been possible more
25 in the reactor technology area, in the longer courses, because

1 there's a little bit more time to work with. In the shorter
2 courses, it's so time-intensive that there's generally little
3 chance to work in new material. But we do make a conscientious
4 effort to work things in, particularly in the advanced
5 technology course, which is part of the full course series.
6 Page 7, please.
7 [Slide.]
8 This slide shows the reactor technology curricula.
9 There are four separate curricula, one for General Electric,
10 one for Westinghouse, one for Combustion Engineering, and one
11 for Babcock & Wilcox. Each involves classroom and simulator
12 training, the simulator, of course, being a full scope control
13 room simulator either located at the Technical Training Center
14 or a different location.
15 Each of the four vendor design programs includes
16 initial and refresher training for inspectors, and each also
17 includes training for technical managers within the agency.
18 Each involves a spectrum of courses from one week to
19 three weeks, including a course series of a mini-course series,
20 and variations in length, size, and teaching methods are used
21 to try to accomplish the goals. Different methods are required
22 in simulator training, as contrasted with classroom training,
23 which for the most part is what I would term interactive
24 presentations. The instructor is on the platform providing the
25 presentations, but the session is very interactive in that

1 there are almost always a number of student questions that are
2 answered on the spot.
3 The reactor technology curricula also includes some
4 other reactor technology training. There is one course which
5 is associated with the high-temperature gas reactor design,
6 contracted. There is a reactor concept course which is given
7 to non-technical people within the agency, and there are news
8 media seminars which are coordinated by GPA. This is in
9 support of the public affairs function, and in these courses,
10 local news media -- radio, TV, newspaper people -- get a basic
11 indoctrination on nuclear technology.
12 The reactor technology courses that are listed show
13 the spectrum. There are one, two, and three-week technology
14 courses, and advanced technology course of two weeks.
15 Simulator courses are typically one week where it could mean
16 five days or it could mean six days. Simulator refresher
17 courses for inspectors and operator license examiners, one
18 week, and technical managers courses which presently are three
19 days.
20 Page 8, please.
21 [Slide.]
22 This slide continues with the theme of the reactor
23 technology curriculum, and the first point is on the full
24 course series and content. This is the core of the existing
25 reactor technology program. It consists of three-week

1 technology course on the systems level covering major plant
2 systems, core characteristics, primary and auxiliary systems,
3 containment systems, secondary systems in the case of PWRs,
4 instrumentation and control, emergency core cooling systems,
5 electrical systems -- coverage at the systems level.
6 The second of the three courses in the series is an
7 advanced technology course lasting two weeks. The same group
8 of students would proceed right into it. The thrust in this
9 course is system integration. The major categories include
10 transient analysis where we're after system response,
11 interlocks, typical setpoints, integration of systems, how one
12 system affects another, technical specifications where we're
13 seeking an awareness of facility technical specifications with
14 emphasis on the bases -- safety limits, limiting safety system
15 settings, limiting conditions for operation, use of operational
16 events, which are log summaries from actual reactor events in
17 the past. These are discussed as case studies, discussing the
18 problems, the solutions, possible alternatives, what went
19 right, what went wrong, what could have been improved.
20 Technical issues, this is an area in the advanced
21 technology course where we can conveniently shift material in
22 and out of the course based on things that are important to the
23 agency at the time. So this is our best method of feeding back
24 important new technical information to the Staff.
25 For example, when anticipated transients without

1 scram became a topic of a great deal of discussion, we
2 developed and inserted a module in the events technology course
3 in that area. As new issues come up in the next few years, I
4 would anticipate that we would move some of the older material
5 out and move some of the newer material in.
6 Finally in the series, we have a simulator course
7 which presently lasts six days, provides hands-on training to
8 show the level of difficulty in doing different evaluations and
9 to show the expertise that is required. We are not seeking to
10 make operators out of our people. What we are seeking is some
11 appreciation of what's involved in doing some different plant
12 evolutions. Also within the simulator course, we have
13 demonstrations which show plant response to a number of
14 different perturbations. We can show a scenario with no
15 operator action; we can repeat the same scenario with correct
16 operator action; we can repeat the same scenario with incorrect
17 operator action, and we use demonstrations to a large extent.
18 So the simulator course is a mixture of hands-on training by
19 students who they teach and demonstrations, just so they can
20 see the response.
21 There are a number of curriculum additions that are
22 ongoing within the reactor technology area. The first one is a
23 new initiative called the reactor technology and operations
24 course. We have taken a look at the content of the full course
25 series and pulled out what is considered to be the highlights

1 and shaped it into a mini-series consisting of a two-week
2 classroom course followed by a one-week simulator course. This
3 is believed to be appropriate training for some of the NRC
4 technical staff in a given reactor technology area in cases
5 where training in the full course series is not necessarily
6 required. That particular course will be available this year
7 in all four vendor designs, that mini-series.
8 Another initiative is on emergency operating
9 procedure courses for both EOP inspectors and for operator
10 license examiners. These include the structure and intent,
11 entry conditions, symptoms, philosophy of the emergency
12 operating procedures and response to transients,
13 demonstrations, a walkthrough of the flowchart of the emergency
14 operating procedures. These are greatly facilitated using the
15 simulators.
16 Another new initiative, also for FY 1988, is severe
17 accident overview training. There was some training provided
18 in degraded core the last couple of years through contracted
19 courses. The Technical Training Center staff has picked this
20 up in-house now and will offer severe accident overview
21 training upon request to the Regions or to Headquarters program
22 offices.
23 Slide 9, please.
24 [Slide.]
25 The next several slides provide a basic outline of

1 the specialized technical training curriculum. This particular
2 one shows the major areas, which include engineering support,
3 health physics, safeguards, and inspection or examination
4 techniques.
5 Specialized technical training in this sense is
6 training in specialized areas which may or may not be directly
7 associated with reactor technology. Some of the courses in the
8 specialized technical training curriculum do have some reactor
9 technology basis, and others are more engineering type courses,
10 and we can see some examples of each of the areas on the
11 following slides.
12 Page 10, please.
13 [Slide.]
14 In the classification of engineering support courses
15 within the specialized technical training curriculum, there are
16 a number of examples here: the power plant engineering course,
17 which was developed by the Technical Training Center staff a
18 couple of years ago to cover a number of topics like fluid
19 flow, heat transfer, AC theory, DC theory, diesel generators,
20 motors, generators, a number of topics in response to a
21 perceived problem at the time with new employees to the NRC
22 Staff at the entry level -- that is, they have a technical
23 degree from a college or university, but have very little
24 practical experience on how to apply the theory. This course
25 was developed in direct support of that.

1 Other examples in this broad category include
2 training on motorized valve actuators, welding, electrical
3 instrumentation, and non-destructive examination technology and
4 codes.
5 So these represent courses that are in the course
6 syllabus and are on the schedule in the case of all but the
7 power plant engineering.
8 Page 11, please.
9 [Slide.]
10 The next broad category is health physics. The
11 existing curriculum is displayed on the slide. It includes a
12 shorter course on radiation/contamination through health
13 physics technology, radwaste systems, and a number of
14 radiological accident type courses, planning courses,
15 independent measurements, several different courses in a field
16 that we know we need to strengthen. This is an area that will
17 receive additional attention in FY '88. We do have a health
18 physics curriculum. We know we would like to improve it.
19 Page 12, please.
20 [Slide.]
21 This broad category deals with some safeguards
22 courses which have been in the technical training curriculum
23 for the last few years. These are courses which are given at
24 different locations. The first one, the key assets protection
25 through the Defense Security Institute, operation and

1 maintenance of intrusion detection through Norfolk Navy
2 Shipyard, the last three through Los Alamos National Lab.
3 This is another area where we expect the curriculum
4 to change in the relatively near future. This just represents
5 what's in the syllabus and what is available at the present
6 time.
7 Okay, page 13, please.
8 [Slide.]
9 This represents the last broad category within the
10 specialized technical training curriculum, which includes
11 inspection techniques or examination techniques. Examples are
12 given here: fundamentals of inspection course given for NRC
13 inspectors. That's a course that has received a considerable
14 amount of attention within the last year, development on the
15 part of several people throughout the agency. It's one that's
16 really taught by the NRC Staff as a whole. The Technical
17 Training Center has coordinated the activities, but really
18 doesn't provide the instruction for any of the modules in that
19 particular course.
20 Other courses that are associated with techniques of
21 one sort or another are those that are associated with MORT,
22 management oversight and risk tree analysis. These are offered
23 through EG&G at the Idaho Nuclear Engineering Lab or other
24 locations throughout the country. We're able to send NRC Staff
25 on a slot basis to these courses.

1 Inspecting for performance is a course that has
2 resulted out of an initiative by NRR. Additionally, PRA basics
3 for inspection applications is formally part of the PRA
4 technology transfer curriculum. It's also included in this
5 category. And finally, IIT training for the incident
6 investigation teams.
7 We expect this curriculum area to expand probably
8 significantly in the next year or so.
9 Okay, page 14, please.
10 [Slide.]
11 I'd like to take a minute to describe the Technical
12 Training Center facility, and then I have a few backup slides
13 which show some of the things at the facility.
14 First of all, it's a conveniently located, modern
15 office building that has the space for the Technical Training
16 Center staff. Five classrooms are present at the Technical
17 Training Center. It occupies one complete floor and then parts
18 of two other floors of the building. Physically located at the
19 Technical Training Center at this time are two full-scope
20 reactor control room training simulators. Also located there
21 are two engineering models of cancelled nuclear power plants
22 and a number of hardware training aids. The training aids
23 include dummy fuel assemblies for the Westinghouse and the
24 General Electric design, a hydraulic control unit, a cutaway
25 control rod drive mechanism, and a jet pump for the General

1 Electric design, as well as a tabletop model of the Babcock &
2 Wilcox nuclear steam supply system.
3 [Slide.]
4 This shows the Technical Training Center building in
5 Chattanooga, and it is a nice facility, a great place to
6 conduct training, and the facilities really are excellent.
7 Okay, the second one, please.
8 [Slide.]
9 This shows the boiling water reactor simulator, which
10 is on the fourth floor of the building, and in fact this slide
11 is showing one of the simulator courses in session. The
12 simulator that you see is modeled after the Black Fox design,
13 which was a BWR-6 plant that would have been built for the
14 Public Service Company of Oklahoma. The project was cancelled.
15 The simulator became available, and we were able to reach a
16 contract with the General Electric Company to relocate that
17 particular simulator to the Technical Training Center.
18 Okay, the next one, please.
19 [Slide.]
20 This slide shows the second full-scope reactor
21 simulator at the Technical Training Center. It's the
22 Westinghouse SNUPPS design, which is the standard nuclear power
23 plant system design. The simulator that's there is the SNUPPS-
24 1 design, original design, upgraded to the SNUPPS-2 capability.
25 Its control board layout is essentially identical to that of

1 the Callaway plant, so it's a Westinghouse four-loop control
2 room simulator, and it's on the first floor of the building
3 that I showed you.
4 Okay, the next one, please.
5 [Slide.]
6 Okay. This shows one of the hardware training aids
7 that's used in GE reactor technology courses. The Technical
8 Training Center instructor is shown with the pointer in the
9 center of the picture, and he's discussing the dummy fuel
10 assembly, which is a cutaway fuel assembly showing component
11 size and several components that are associated with a boiling
12 water reactor fuel assembly.
13 So any time that we can get hardware training aids
14 such as this, we feel that they greatly enhance the learning
15 potential.
16 Okay, could we go to Slide 15, please?
17 [Slide.]
18 I'd like to talk for a minute about the Technical
19 Training Center staff. Organizationally there has historically
20 been a Boiling Water Reactor Technology Branch and a
21 Pressurized Water Reactor Technology Branch, each of which has
22 been responsible for training in the GE or the Westinghouse,
23 CE, and B&W designs. Within the last year, we have also added
24 a specialized technical training staff to the Technical
25 Training Center complement. This is in recognition of the

1 necessary attention in the non-reactor areas, and the positions
2 within this staff include two new positions representing
3 expertise never before present at the Technical Training
4 Center. One of these is a reactor health physics position, and
5 the other is a nuclear materials fuel cycle health physics
6 position. We are presently in the advertisement/selection
7 process for those two positions, and we're eager to fill out
8 the specialized technical training staff in the near future,
9 because we feel we can make significant advancements in those
10 areas.
11 The authorized staff complement for the Training
12 Center is relatively small compared to other technical training
13 organizations throughout the industry. We are authorized 24
14 technical positions, which include the two branches, the
15 specialized technical training staff, and the position of the
16 Director of the Technical Training Center. We have three
17 positions that are either clerical or administrative support,
18 and that's also fairly lean in comparison to some other
19 training organizations, and we make the best of the positions
20 that are available.
21 The existing staff complement is actually 21 and 3,
22 and we're still seeking to fill the specialized technical
23 training staff, which would include those two HP positions and
24 a program manager position.
25 The experience of the Technical Training Center staff

1 is excellent. We have people in the technical positions with
2 an average of 15 or 16 years experience in the nuclear
3 industry. We have a number of instructors who formerly held
4 senior reactor operator licenses. In fact, we have 14 former
5 SRO licenses or certifications when a license was not awarded.
6 That represents 12 different people on the Technical Training
7 Center staff with SRO experience.
8 We have three on the staff who are former resident
9 inspectors, two who are former operator license examiners, 11
10 who are former Navy nuclear either enlisted or officers, three
11 who are former Navy nuclear with engineer officer
12 qualification, and four who are former vendor reactor
13 instructors, 11 who are former utility instructors.
14 So the experience level of the Training Center staff
15 is excellent. That's probably one of the biggest strengths in
16 the whole program.
17 By virtue of the experience, the operational
18 experience, the Training Center staff has seen relatively
19 frequent use as internal consultants within the agency. People
20 call the instructors up frequently. They ask for them in
21 support of inspection activities, and we try to respond as much
22 as possible.
23 [Slide.]
24 This slide identifies the contract support that is
25 associated with TTC technical training programs.

1 First of all, the fiscal budget is roughly $2.5
2 million for FY '88. Of that, about 2.1 would be associated
3 with program support activities and the balance with
4 administrative support activities. Of the program support,
5 most of that funding is associated with reactor technology and
6 reactor simulator time.
7 We have a number of commercial contracts which are
8 listed on the slide, the first one being the BWR simulator
9 contract with the General Electric Company. That was the
10 contract which allowed relocating the Black Fox simulator to
11 the Training Center. It's becoming fairly complex in that it's
12 been modified a couple of times and will be further modified in
13 the relatively near future. It's been modified in direct
14 support of the second contract, which is for the Westinghouse
15 simulator.
16 The contract with Westinghouse is for the hardware.
17 The contract, the existing contract with General Electric,
18 takes care of maintenance and operational support on the
19 Westinghouse simulator.
20 Additionally, we have contracts for Combustion
21 Engineering simulator time. That's using the Combustion
22 Engineering Calvert Cliffs simulator in Windsor, Connecticut.
23 We have a separate contract with General Electric for
24 a nuclear engineering course presented by GE instructors. We
25 have another contract through which we are getting boiling

1 water reactor maintenance overview training from General
2 Electric using their refueling facility in San Jose.
3 We have a contract for high-temperature gas
4 technology training as necessary, and we have a number of
5 specialized technical training contracts in non-reactor areas.
6 They are listed there: electrical and instrumentation
7 technology and codes. That's one contract which covers both
8 the electrical and the instrumentation area with the same
9 contractor. Non-destructive examination technology and codes,
10 medical uses of byproduct material, safety aspects of
11 industrial radiography. Those represent contracts that the
12 Technical Training Center administers.
13 The last one the list is for inspecting for
14 performance. The contractor is SAIC, and this is an example of
15 a program office initiative, in this case NRR, where NRR has
16 established the contract to get this course up and running.
17 They're funding it through the end of this year. This is a
18 program element that would be picked up by the Training Center
19 in the next fiscal year. But it's a contract in direct
20 support.
21 Okay, page 17, please.
22 [Slide.]
23 Continuing with the contract support, some other
24 tools that are available to assist in providing technical
25 training include the use of task order contracts which were

1 recently awarded. There are actually four in support of TTC
2 programs, boiling water reactor technology and pressurized
3 water reactor technology, two separate ask orders both of which
4 were awarded to the same company. The third area is radiation
5 protection, and the fourth area is specialized technical
6 training, which is more of a catchall than the first three. It
7 includes support for some of the techniques training that we're
8 hoping to provide, and the contractors are listed in the
9 parentheses there.
10 These task order contracts were established near the
11 end of the last fiscal year. We have not yet issued a task
12 order in any of the four areas, but we anticipate this to be a
13 very effective meeting -- a very effective method of responding
14 to needs.
15 Additional tool that we have are interagency
16 agreements which allow providing training that is provided
17 within a different agency to people on the NRC Staff. The
18 examples are listed on the slide covering things from PRA
19 basics through motorized valve actuators to accident
20 assessment.
21 Another tool that's available is the use of off-the-
22 shelf training. The concept here is, if somebody has the
23 course which already fits the needs, it's possible for us to
24 buy slots into the course. Examples are how to train the
25 trainer or courses that are used for training TTC instructors,

1 earlier GE maintenance overview courses that were purchased on
2 a slot basis in the past.
3 Page 18, please.
4 [Slide.]
5 Other technical training support includes again a
6 number of areas. The initiatives that come up within the
7 Regions or program offices represent one source. Another is
8 the use of non-TTC agency experts; for example, the
9 fundamentals of inspection course is really taught by the
10 agency as a whole, transportation of radioactive materials by
11 NMSS. Simulator refresher training for operator license
12 examiners is co-instructed by the Technical Training Center
13 staff and operator licensing section chiefs from either
14 Headquarters or the Regions.
15 Another important tool is the use of the NRC Form 368
16 for individual training. This is administered through the
17 Office of Personnel. It represents opportunities for
18 individuals to go to courses that exist again on a slot basis.
19 Next we have contracting support directly from the
20 Office of Personnel. That includes the entire PRA technology
21 transfer program and other initiatives such as the site access
22 training that's ongoing for NRR personnel at this time.
23 Additionally, we have the state programs training
24 curriculum through the Office of Government and Public Affairs.
25 This is support in that we project sending some of the NMSS and

1 some of the regional materials people through some of the
2 courses that are already existing within the GPA state programs
3 curriculum.
4 Finally, an untapped potential source is through an
5 organization called TRADE, which is the Training Resource and
6 Data Exchange. This is an organization of the DOE contractor
7 facilities whereby the courses and capabilities have been
8 catalogued and are made available within the DOE organization
9 and outside of DOE, and we hope to be able to tap this to a
10 great extent in the future. We're exploring the possibilities
11 at this time.
12 Page 19, please.
13 [Slide.]
14 The evolution of the existing programs I think has
15 been essentially covered in the introduction. We've recognized
16 that we have a staff with diverse training needs. The origins
17 started with the regional inspectors, and that's where the
18 emphasis has been over the years.
19 We see times changing, and we see a need to adjust
20 the resources and the efforts in different areas based on these
21 changing needs.
22 Needs are determined through a survey done every
23 year. This is part of the budget process. In this case, we've
24 validated the training needs because they were overwhelming in
25 comparison with the resources, and I'm pleased to say that the

1 validated numbers allowed us some additional flexibility, which
2 has allowed us to come out with a completely revised schedule,
3 cutting some courses -- cutting the quantity of some courses,
4 but injecting a number of other courses, such as inspector
5 refresher training courses, and injecting several new
6 initiatives, such as the reactor technology and operations
7 course, the EOP training, and the severe accident training.
8 So the whole process has resulted in some
9 reprogramming of effort and a revised schedule.
10 The efforts planned for the upcoming years are in
11 recognition of the changing needs, the switch from a licensing
12 profile to operations, emphasis in the nuclear materials and
13 waste management areas, and the initiatives which are outlined
14 in the strategic plan and the five-year plan. These pretty
15 well dictate where the emphasis needs to be in areas that it
16 presently is not located.
17 Page 20, please.
18 [Slide.]
19 This slide deals with the methods that are ongoing to
20 try to improve the utilization of the existing resources, and
21 one big one at the top deals with long-term simulator training
22 solutions. The recent successes in relocating a General
23 Electric vendor design simulator and a Westinghouse simulator
24 to the Technical Training Center have a profound impact on the
25 technical training programs in this area.

1 The cashflow is very positive compared to what it
2 would have cost to get the budgeted training in the different
3 reactor technology areas over the next several years; that is,
4 we are actually saving money at the same time we're having more
5 training hours available. There's no way that the projected
6 budget a couple of years ago would have supported anywhere near
7 that quantity of hours that are available on the boiling water
8 reactor simulator and the Westinghouse simulator, and hopefully
9 soon a third simulator in the Babcock & Wilcox design.
10 In addition to the cashflow advantages, there are
11 other obvious advantages such as the ability to train the NRC
12 Staff on day shift as opposed to night shift and the ability to
13 integrate simulator training into previously classroom-only.
14 Other adjustments that have been made have dealt with
15 the class size and the prioritizing of who goes to a given
16 course. That's been mentioned before. And some reactive
17 training that has been provided based on regional or program
18 office requests.
19 A number of curriculum and scheduling adjustments
20 have been made based on the validated needs and the changing
21 needs and requests. Those include the new initiatives for the
22 reactor technology and operations, EOP, and severe accident
23 training areas, the reinstatement of the refresher training,
24 and the revised schedule.
25 Other ways for improving the resource utilization

1 include the use of a TTC instructor qualification program.
2 Five areas of qualification. We're seeking qualification in
3 two of the five areas. The five areas are boiling water
4 reactor product lines, then Westinghouse, Combustion
5 Engineering, and Babcock & Wilcox. So what we end up with are
6 instructors who are qualified in two areas, which gives us a
7 lot more scheduling flexibility and really a lot more utility
8 within the agency.
9 Other enhancements that are working are the use of
10 personal computers by the Training Center staff, the
11 acquisition of a computerized examination bank system, and the
12 acquisition of some equipment in support of graphics generation
13 at the Technical Training Center.
14 The last three bullets on the slide deal with
15 coordination efforts, and there are some major coordination
16 efforts underway, first of all with the Office of Personnel.
17 This involves clarification of program responsibilities for
18 technical training, which was done in a recent memorandum;
19 common goals for technical training, and the use of
20 instructional technology expertise in a consulting role for
21 Technical Training Center programs.
22 The next one is with NMSS and GPA. Clearly a great
23 deal of coordination is required and is ongoing in support of
24 building a reasonable curriculum for materials inspectors, both
25 within the program offices and within the Regions. That effort

1 is ongoing.

2 And finally with NRR and Research on a couple of

3 different fronts, one on the potential use of nuclear plant

4 analyzer technology, another with expertise associated with

5 severe accident training that we're planning to provide.

6 Page 21, please.

7 [Slide.]

8 The continuing initiatives, some of which have been

9 mentioned and maybe some of which haven't, include the

10 continuing effort to provide a Babcock & Wilcox simulator at

11 the Training Center. We project contract award on this within

12 about two weeks, and we project having a Babcock & Wilcox

13 design full-scope simulator at the Training Center by around

14 the end of May, up and operational.

15 We're exploring the potential use of the nuclear

16 plant analyzer technology within the curriculum.

17 There is a phased plan for qualification and

18 technical training of the NRC Staff that will take place in the

19 relatively near future. This is modeled after the successful

20 inspector qualification programs, a number of phases for

21 different activities associated with the definition and

22 implementation of the program. It's really definition on the

23 part of the program offices, support by the Training Center, by

24 the Office of Personnel, and it involves job analyses in some

25 cases. So that's a big-ticket initiative for the rest of this

1 fiscal year and probably continuing on into the next fiscal
2 year.
3 Other big-ticket items would include curriculum
4 expansion or enhancements that we already know we're going to
5 do. They include the reactor health physics area, the nuclear
6 materials fuel cycle health physics area, and we're projecting
7 enhancements or additions will be required in other parts
8 within the reactor technology areas and other specialized
9 technical training areas based on the program for identifying
10 the qualification requirements for other technical staff.
11 We're exploring the use of alternate training methods
12 in cases where there is insufficient time to cover material in
13 formal courses or as front-end training for a number of
14 courses. That's another area of close coordination with the
15 Office of Personnel and the instructional technologist
16 expertise there.
17 And finally we are exploring the opportunities
18 through that TRADE organization.
19 I might mention another one even though it's not on
20 the slide. There are other federal agencies which have
21 existing programs which can possibly be tapped. We've recently
22 become aware of some courses within the Occupational Safety and
23 Health Administration that would be of benefit to some
24 materials inspectors, so we're going to fully explore that in
25 the near future.

1 I appreciate the opportunity for the briefing.

2 CHAIRMAN ZECH: Thank you very much.

3 Questions from my fellow Commissioners? Commissioner

4 Roberts?

5 COMMISSIONER ROBERTS: No.

6 CHAIRMAN ZECH: Commissioner Bernthal?

7 COMMISSIONER ROBERTS: No.

8 CHAIRMAN ZECH: Commissioner Carr?

9 COMMISSIONER CARR: No questions.

10 CHAIRMAN ZECH: Commissioner Rogers?

11 COMMISSIONER ROGERS: Yes, I have a couple. Your

12 instrumentation and control instructors and the levels of the

13 courses and the kind of things that are in those courses,

14 that's an area that's changing. The technology is changing

15 steadily. And one of my observations is, in most of the plants

16 that I've been visiting and, in fact, the whole industry is

17 pretty much behinds the times in the use of digital systems and

18 instrumentation in nuclear plants, but gradually that

19 technology is finding its way in as systems are replaced.

20 Are you paying some attention to the trends and

21 changes and what will be coming into being in the use of

22 digital systems for instrumentation and control in operating

23 plants? That's one area.

24 The other one is, what are you doing about, if

25 anything or contemplating anything, with respect to exposure of

1 inspectors to looking at water chemistry situations, what
2 constitutes a good and well-run water chemistry program in an
3 operating plant?
4 I don't see the words in here anywhere, but they may
5 be -- the content may be there someplace, but I don't see any
6 of the words.
7 MR. RAGLIN: Okay. On the first one, on the
8 instrumentation technology and codes course, there is an
9 existing contract for the course to be given at some frequency.
10 When the course was first given last year, there were a number
11 of course comments suggesting revisions to the schedule,
12 covering different topics. We do have the ability to require
13 the contractor to make changes along the areas that you've
14 suggested. That would be something that we would typically do
15 for any particular area.
16 That's where we rely on the experts that have served
17 on the Source Evaluation Panel for that particular contract or
18 other experts within the agency to tell us when a curriculum
19 needs to be modified to crank in recent changes such as that.
20 So I would say, yes, we're going to put that one up
21 in the change process
22 MR. JORDAN: But I think it would be fair to say that
23 we are somewhat backward-looking in providing technical
24 training for the equipment that is generally out in service
25 rather than on the edge of technology.

1 COMMISSIONER ROGERS: Yes, I understand. That's what
2 you really principally have to deal with. But on the other
3 hand, you have to be ready for those changes as they start to
4 feed in, and they are coming in in some places. You can see
5 some introduction of modern instrumentation into nuclear
6 plants, not an awful lot, but there's a little bit. Most of it
7 is about 20 years behind the times, but it's coming in from
8 time to time.
9 And the other area is, of course, training inspectors
10 to look for a well-run and qualified water chemistry program.
11 MR. RAGLIN: That does not show up in the existing
12 health physics curriculum. There would be at least one course
13 that's associated with radiochemistry in a revised health
14 physics curriculum. At the health physics counterpart meetings
15 that are held at some frequency, hosted by NRR, the last couple
16 of years that's been on the list. I have little doubt that as
17 we revise the health physics curriculum, there will be water
18 chemistry training in it.
19 Right now we have no such course, because we haven't
20 had the capability in-house to do it.
21 COMMISSIONER BERNTHAL: Why would water chemistry be
22 in a health physics curriculum?
23 COMMISSIONER ROGERS: Because that's where it always
24 winds up in the plant. They link the two together. I think
25 it's a mistake, because it very much limits the whole

1 perspective of what can come out of your water chemistry, but
2 that's where it always is, and it really is seen as just a part
3 of the health physics program, but it really has much more
4 great -- much more powerful analytical use in monitoring the
5 quality of the operations of the plant, and most plants are
6 putting in some pretty sophisticated instrumentation for their
7 water chemistry these days, and it would seem to me that our
8 inspectors ought to have some familiarity with what that
9 equipment is and how it works and whether it's being maintained
10 properly or not.
11 MR. JORDAN: We'll look more closely at that area.
12 Thank you.
13 COMMISSIONER BERNTHAL: If I may interject, you learn
14 something every day, and I'm surprised, and my suspicion is
15 that that's a hangover from the day when health physics --
16 water chemistry, rather, did find its principal concern and
17 manifestation in the health physics area, whereas I would view
18 water chemistry today as being predominantly a question of
19 plant maintenance, reliability, survivability, and engineering.
20 MR. JORDAN: But the chemistry does include the
21 radiochemistry, so it has to be a homogeneous effort.
22 COMMISSIONER BERNTHAL: Yes, but that, it seems to
23 me, is the most obvious part of it, whereas the most subtle
24 part is, are these problems that we're encountering now where
25 water chemistry affects the reliability and lifetime of the

1 plant and its components.

2 COMMISSIONER ROGERS: Yes. And some awareness of

3 that on the part of inspectors is very desirable.

4 The other thing is -- I didn't hear anything about

5 it, but are you contemplating or are you using audio/video

6 tapes? Are you taping your instructional sessions, so that the

7 really best ones can be played back if need be, and are you --

8 you could even send some of those around; you can mail them out

9 to other sites where they might be a useful -- it might be

10 useful for somebody to at least sit down and be able to play

11 one of those things to a small group, even if they couldn't to

12 Chattanooga?

13 There's a lot that can be done in that direction, and

14 maybe you're doing it -- offsite instruction from your own --

15 off your own site.

16 MR. JORDAN: Maybe I could respond by saying that

17 we're getting over the bad experiences in that. In the very

18 early times when the Training Center was, in fact, two rooms in

19 East-West Towers, we had a library of tapes that were mailed

20 around and were sleeping equipment. They were just --

21 COMMISSIONER ROBERTS: They were what?

22 MR. JORDAN: They were sleeping equipment.

23 [Laughter.]

24 They were produced by contractors, and in some cases

25 they were tapes of our own Staff's presentations, but they were

1 not sufficiently interactive, and so people sat through them,
2 and they were not something that were really overall
3 beneficial. So we felt that --
4 COMMISSIONER ROGERS: Well, there are some very nice
5 techniques now that allow you to be interactive over telephone
6 lines with an instructor in your own center that could be
7 communicating with a small class, answering questions, and
8 aiding in the use of those tapes.
9 MR. JORDAN: That's why I put it that we were getting
10 over that bad experience. We have been working with the Office
11 of Personnel in how can we get more out of the resources, and
12 can we provide that level of communication. We do look forward
13 to, for instance, when we have the capability with satellite
14 communication for a wide band width and having the video
15 transmission readily available, that we can, in fact,
16 communicate with the Regions readily.
17 COMMISSIONER ROGERS: Yes.
18 MR. JORDAN: So that's all integrated in that
19 communications plan.
20 MR. RAGLIN: As a sidebar, there are a number of
21 high-quality commercial videotapes that are availability on a
22 number of different subjects. We have procured some of those,
23 and they are available. People can borrow them. And we intend
24 to expand that capability where something of high quality
25 already exists.

1 MR. GOLDMAN: We looked at some. The University of
2 Maryland has done a lot of work in that type of thing, but too
3 much was glitz rather than substance, and so --
4 COMMISSIONER ROGERS: Well, there are some very good
5 systems now that universities have been thrashing around with
6 for years on this, and it's now starting to become reasonably
7 good. There was a long time when really it wasn't so good, but
8 right now there's 10 or 15 years of experience under our belts
9 on these things.
10 MR. JORDAN: We are definitely pursuing it.
11 COMMISSIONER ROGERS: And it's time to really take a
12 look at that, if you haven't looked at it lately --
13 MR. JORDAN: We are looking at it.
14 COMMISSIONER ROGERS: -- to see what can be adapted.
15 MR. STELLO: It sounds like we're arguing. We don't
16 want to. We're going to do what you say.
17 COMMISSIONER ROGERS: No, no. I didn't have any
18 sense of that.
19 CHAIRMAN ZECH: Are there any other comments?
20 Please.
21 COMMISSIONER CARR: I might say that when I went down
22 and took one of their five-day courses, I was impressed with
23 the quality of instruction, and I can vouch for the fact they
24 can keep you busy down there.
25 [Laughter.]

1 COMMISSIONER BERNTHAL: Did you go anonymously?

2 COMMISSIONER CARR: No. I went to learn.

3 MR. JORDAN: We didn't know he was there.

4 COMMISSIONER CARR: I took a BWR -- you know, sailors

5 can't even spell BWR, so --

6 [Laughter.]

7 COMMISSIONER BERNTHAL: I think there's a Heisenburg

8 Principle involved here when a Commissioner attends.

9 CHAIRMAN ZECH: Well, I didn't attend the course but

10 --

11 MR. STELLO: I don't think so. In fact, if you go,

12 you'll get the same exam.

13 [Laughter.]

14 MR. STELLO: Although we promise not to send the

15 results to your supervisor.

16 [Laughter.]

17 CHAIRMAN ZECH: Well, I didn't take the course, but

18 I did visit the facility, and I was impressed with it, and I've

19 visited a lot of training facilities in my other life, and I

20 think that this is a training facility that this agency can be

21 very proud of.

22 I could tell from the presentation I got there and

23 from today, too, that we're very fortunate in having some very

24 fine people down there, and they do a job that we can be proud

25 of. It's a first-class training facility.

1 Training is so important, as we all know, both for
2 ourselves and for the industry that we regulate. And we're
3 talking today about training for NRC personnel generally, I
4 recognize, but it made me feel confident to know that we are
5 putting this much into training ourselves and in a facility
6 that is well-run and does such an excellent job.
7 I know you're oversubscribed for your courses, as you
8 pointed out today again, but I would hope that our regional
9 people, too, will continue to take advantage of the courses
10 that you have. And I was particularly impressed during my
11 visit and also today and your presentation regarding your
12 forward-looking scope, and I think that's important, to stay up
13 with the changing times and to try to adapt your courses to an
14 operational mode that we're in now and to try to keep up with
15 some of the modern technology that Commissioner Rogers has
16 pointed out and others.
17 I think training is such a fast-moving world these
18 days, that there are so many advances that we should attempt in
19 every way to keep up with those advances, too.
20 But I would just like to compliment all of your and
21 especially Ken Raglin and your staff down there. Please give
22 your folks down there, your instructors and your staff, my
23 respects and that of my fellow Commissioners, too, and ask you
24 -- you're doing an awfully important job for all of us down
25 there -- and to keep up the good work.

1 And, Vic, I just hope that all of our senior staff
2 and our regional people will continue to take advantage of this
3 very fine Training Center.
4 With that, if there are no further comments, we stand
5 adjourned. Thank you very much.
6 [Whereupon, at 3:32 o'clock, p.m., the Commission
7 meeting was concluded.]
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1

2 REPORTER'S CERTIFICATE

3

4 This is to certify that the attached events of a

5 meeting of the U.S. Nuclear Regulatory Commission entitled:

6

7 TITLE OF MEETING: Briefing on NRC Technical Training Program

8 PLACE OF MEETING: Washington, D.C.

9 DATE OF MEETING: Wednesday, January 20, 1988

10

11 were held as herein appears, and that this is the original

12 transcript thereof for the file of the Commission taken

13 stenographically by me, thereafter reduced to typewriting by

14 me or under the direction of the court reporting company, and

15 that the transcript is a true and accurate record of the

16 foregoing events.

17

18 Marilynn M. Nations

19 Marilynn M. Nations

20

21

22 Ann Riley & Associates, Ltd.

23

24

25

NRC Technical Training Program

Commission Briefing

Edward L. Jordan, Director, AEOD
R. Lee Spessard, Director, DOA, AEOD
Kenneth A. Raglin, Director, TTC, DOA, AEOD

January 20, 1988

Contact: Kenneth A. Raglin
FTS 852-8121

Scope of Technical Training

* Formal Training (In-House or Contracted)
    * TTC Programs
        * Reactor Technology Curricula
        * STT Curriculum
    * OP Programs
        * PRA Technology Transfer Curriculum
        * End User ADP Training Curriculum
    * GPA State Programs Curriculum
    * Intermittent Region/PO Initiatives
* Inspector Qualification Process
    * Regional Qualification Cards
    * Self-Study/Quizzes
    * Required Seminars
    * Checklists and Practical Factors
    * OJT
    * Oral Checkouts

Other Informal Training
(In-House)

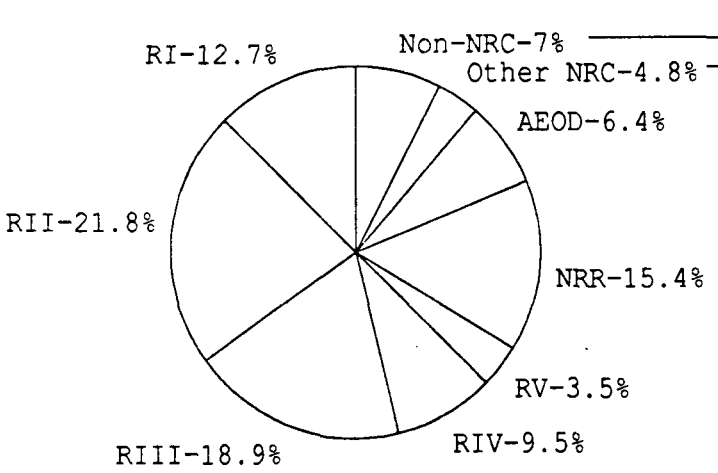
* Seminars
    * Region or Program Office Originated
    * Scheduled in Local Training Plans
    * Scheduled for Counterpart Meetings
    * Maintain & Enhance Knowledge
* Examples
    * NUREG Changes
    * CFR/Industry Codes and Standards Changes
    * Emergency Response
    * Chernobyl Accident
    * Sequoyah Fuels Accident
    * ECCS Rule Changes
    * Aging of Electrical Components
    * TDI Diesel Generators
    * In-Place Filter Testing
    * Mark I Containment
    * ALARA

Quantity of FY 1987 TTC Training

* 115 Courses
* 1,162 Students
* Capacity Factor: 86%
* 162 Course-Weeks (C-W)
    * 106 C-W in Reactor Technology
        * 41 C-W in GE Technology
        * 42 C-W in Westinghouse Technology
        * 5 C-W in CE Technology
        * 10 C-W in B&W Technology
        * 8 C-W in Generic or Other
    * 56 C-W in Specialized Technical Training
        * 12 C-W in Engineering Support
        * 28 C-W in Health Physics
        * 16 C-W in Insp. or Exam. Techniques

Distribution of Technical Training

* Composite Distribution of Slot Usage
* All Courses Presented or Controlled by TTC
* Totals for FY 1987
* Distribution of Students



Contractors	2.2%
State/Local	3.3%
Foreign	1.5%
Total	7.0%

NMSS	0.7%
RES	1.0%
OSP	0.7%
All Others	2.4%
Total	4.8%

Quality of Technical Training

* Instruction
    * Quality Instructors
    * High Standards
* Methods to Keep or Improve Quality
    * Intense Courses
    * Course Exams and Passing Criteria
    * Training Advisory Group (TAG)
    * Other Feedback Channels
    * Current Information

Reactor Technology Curricula

* Parallel Curricula for 4 Vendor Designs
    * Classroom and Simulator
    * Spectrum of Courses
    * Variations in Length, Size, and Methods
* Other Reactor Technology Training
    * HTGR Technology
    * Reactor Concepts Courses
    * News Media Seminars (Coordinated by GPA)
* Reactor Technology Courses
    * Technology *(1 Week)*
    * Technology *(2 Weeks)*
    * Technology *(3 Weeks)*
    * Advanced Technology *(2 Weeks)*
    * Simulator *(1 Week)*
    * Simulator Refresher for Inspectors *(1 Week)*
    * Simulator Refresher for Examiners *(1 Week)*
    * Technical Managers *(<1 Week)*

Reactor Technology Curricula (Continued)

* Full Course Series and Content
    * Technology Course *(3 Weeks)*
    * Advanced Technology Course *(2 Weeks)*
        * Transient Analysis
        * Technical Specifications
        * Operational Events
        * Technical Issues
        * Product Line Differences (BWR)
    * Simulator Course *(6 Days)*
        * Hands-On
        * Demonstrations
* Curriculum Additions
    * Reactor Technology & Operations (RTO) Mini Series
    * Emergency Operating Procedures (EOP) Courses for Inspectors and Examiners
    * Severe Accident Overview Seminars

Specialized Technical Training (STT) Curriculum

* STT Curriculum Areas
    * Engineering Support
    * Health Physics
    * Safeguards
    * Inspection or Examination Techniques
* Specialized Training in Specialized Areas
* Training in Non-Reactor Technology Areas

STT Engineering Support

* Power Plant Engineering
* Motorized Valve Actuators
* Welding Technology & Codes
* Electrical Technology & Codes
* Instrumentation Technology & Codes
* Nondestructive Examination (NDE) Technology & Codes

STT Health Physics

* Radiation/Contamination
* Reactor HP Technology
* BWR/PWR Radwaste
* Radiological Emergency Response
* Medical Uses of Byproduct Material
* Safety Aspects of Industrial Radiography
* Advanced Multi-Hazard Planning
* Radiological Accident Assessment
* Transportation of Radioactive Materials
* Health Physics in Radiation Accidents
* Independent Measurements Training
* Occupational Respiratory Protection
* Advanced Health Physics

STT Safeguards

* Key Assets Protection Program
* Ops. & Maintenance of Intrusion Detection
* Fund. of Nondestructive Assay of NM
* Neutron Assay of Nuclear Material
* Gamma-Ray Assay of Nuclear Material

STT Inspection or Examination Techniques

* Fundamentals of Inspection
* MORT Seminar
* MORT-A/I Workshop
* A/I Workshop
* A/I Workshop Refresher
* Inspecting for Performance
* PRA Basics for Inspection Applications
* IIT Training

TTC Facility

* Modern Office Building
* Conviently Located
* Office Space for TTC Staff
* 5 Classrooms
* 2 Full Scope Reactor Simulators
* 2 Engineering Models of Cancelled Projects
* Various Training Aids

TTC Staff

* TTC Organization
    * BWR Technology Branch
    * PWR Technology Branch
    * STT Staff
* Authorized Staff Complement
    * 24 Technical Positions
    * 3 Clerical or Administrative Positions
* Existing Staff Complement
* Technical Staff Experience
    * Former SRO Licenses
    * Former Resident Inspectors
    * Former Operator License Examiners
    * Former Navy Nuclear
    * Former Navy Engineer Officer Qualification
    * Former Vendor/Utility Training Experience
* Frequent Use as Internal Consultants

Contract Support

* Fiscal Budget of $2.5M
    * Program Support
    * Administrative Support
* Commercial Contracts
    * BWR Simulator *(GE)*
    * Westinghouse Simulator *(Westinghouse)*
    * CE Simulator Time *(CE)*
    * GE Nuclear Engineering *(GE)*
    * BWR Maintenance Overview *(GE)*
    * HTGR Technology *(GA Technologies)*
    * Elect. & Inst. Technology & Codes *(NUS)*
    * NDE Technology & Codes *(Hellier & Assoc.)*
    * Medical Uses of Byproduct Matl. *(UTSA)*
    * Safety Aspects of Indus. Rad. *(Gamma Ind.)*
    * Inspecting for Performance *(SAIC)* [NRR]

Contract Support (Continued)

* Task Order Contracts
    * BWR and PWR Technology *(RTS)*
    * Radiation Protection (*Roy F. Weston)*
    * STT *(Sonalysts)*
* Interagency Agreements
    * Rad. Emerg. Response *(DOE: REECO)*
    * Independent Measurements *(DOE: RESL)*
    * MORT , A/I, etc. *(DOE: INEL)*
    * PRA Basics for Insp. Appl. *(DOE: BNL* + NRC)
    * B&W Simulator Time [Bellefonte] *(TVA)*
    * Motorized Valve Actuators *(TVA)*
    * Advanced Multi-Hazard Planning *(FEMA)*
    * Radiological Accident Assessment *(FEMA)*
* Off-The-Shelf Training
    * How To Train The Trainer
    * Earlier GE Maintenance O/V Courses

Other Technical Training Support

* Regional or Program Office Initiatives
* Non-TTC Agency Experts
    * Fundamentals of Inspection *(Various)*
    * Transportation of Rad. Matl. *(NMSS)*
    * Sim. Ref. for Examiners (TTC + *NRR/Regions*)
* NRC Form 368 for Individual Training
    * HP in Rad. Accidents *(ORAU)*
    * Occup. Resp. Protection *(Rad. Saf. Assoc.)*
    * Key Assets Prot. Program *(DSI)*
    * Ops. & Maint. of Intrusion Det. *(NNSY)*
    * NM Assay Courses *(LANL)*
    * Individual Opportunities (No Formal Reqmt.)
* OP Contracting Support
    * PRA Technology Transfer Program
    * Site Access Training (for NRR)
* GPA State Programs Curriculum
* Training Resource and Data Exchange (TRADE)

Evolution of Existing Programs

* NRC Staff with Diverse Training Needs
    * Range of Jobs and Responsibilities
    * Range of Experience and Background
    * Typical Students
    * Changing Needs and Areas of Interest
    * Past Emphasis on Inspection Programs
* Determination of Training Needs
    * Annual Training Needs Survey
    * Budget Process and Original Schedule
    * Validation and Prioritization of Needs
    * Effort Reprogramming and Revised Schedule
* Recognition of Changing Needs
    * Switch from Licensing to Operations
    * Emphasis in Nuclear Materials Area
    * Emphasis in Waste Management Area
    * Support of Strategic Plan & Five Year Plan

Improved Resource Utilization

* Long Term Simulator Solutions
    * Lease/Purchase Agreements
        * GE Simulator Project Success
        * Westinghouse Simulator Project Success
    * Cash Flow, Hours, & Other Advantages
* Interim Adjustments
    * Class Size and Prioritized Slots
    * Reactive Training Provided
* Curriculum and Schedule Adjustments
    * RTO, EOP, and SAO Training
    * Reinstatement of Inspector Refresher Training
    * Revised, Optimized Schedule
* TTC Instructor Qualification Program
* Efficiency Enhancements for TTC Staff
* AEOD/OP Coordination
* AEOD/NMSS/GPA Coordination
* AEOD/NRR/RES Coordination

Continuing Initiatives

* Continuing Effort on B&W Simulator Project
* Use of Nuclear Plant Analyzer (NPA) Technology
* Qualification and Technical Training of Staff
    * Modeled after Inspector Qual. Program
    * Phased Program under Development
        * Determined by Program Offices
        * Assistance by AEOD and OP
        * Involves Job Analysis
* Curriculum Expansion or Enhancement
    * Reactor HP Area
    * Nuclear Materials/Fuel Cycle HP Area
    * Reactor Technology Areas
    * Other STT Areas
* Exploration of Alternate Training Methods
* Exploration of Opportunities through TRADE

The Nuclear Regulatory Commission

Guide to Training Opportunities

(ADDENDUM)

OFFICE OF PERSONNEL

Management Development and Training Staff

1987-1988

UNITED STATES
NUCLEAR REGULATORY COMMISSION
TECHNICAL TRAINING CENTER
OSBORNE OFFICE CENTER, SUITE 200
CHATTANOOGA, TN 37411

TO: All NRC Employees

SUBJECT: ADDENDUM TO NRC GUIDE TO TRAINING OPPORTUNITIES

This addendum presents a syllabus of training courses dealing with nuclear reactor technology and specialized technical training which are offered through the Technical Training Center (TTC), located in Chattanooga, Tennessee. The schedule for these courses is updated and distributed by TTC to all NRC Offices and Regions.

Kenneth A. Raglin

Kenneth A. Raglin, Director
Technical Training Center
Office for Analysis and Evaluation
of Operational Data

TECHNICAL TRAINING CENTER

CHATTANOOGA, TENNESSEE

A SYLLABUS OF COURSES OFFERED THROUGH THE NRC TECHNICAL TRAINING CENTER

1987 - 1988

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GE TECHNOLOGY COURSE (R-101B)

LENGTH - 4 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee and other locations as announced.

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the mechanical and instrumentation systems of the General Electric design. The course describes the functions and flow paths of major systems, instrumentation, terminology, and equipment location. Emphasis is placed on the nuclear steam supply system including the engineered safety features.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - None. A technical background is desirable.

APPLICABILITY - All NRC technical staff personnel who desire to understand basic General Electric power plant design.

This is also the BWR Technology Course associated with the PRA Technology Transfer Program.

GE TECHNOLOGY COURSE (R-106B)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the mechanical and instrumentation systems of the General Electric design. The course describes the functions and flow paths of major systems, instrumentation, terminology, and equipment location. Emphasis is placed on the nuclear steam supply system including the engineered safety features.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a written examination.

PREREQUISITES FOR ATTENDANCE - None. A technical background is desirable.

APPLICABILITY - Reactor Radiation Specialists, Reactor Construction Inspectors, and other NRC personnel who have a need to understand basic GE power plant design.

GE NSSS TECHNOLOGY COURSE (R-111B)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide students who already have a working knowledge of one reactor vendor design with a working knowledge of an additional reactor vendor design. The course emphasis is on the major mechanical, control, and instrumentation systems associated with the General Electric NSSS.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination.

PREREQUISITES FOR ATTENDANCE - Completion of full reactor technology course series in a different technology or completion of an RTO mini series in a different technology or equivalent knowledge in a different technology.

APPLICABILITY - NRC technical personnel who have a solid background in one reactor technology area and need an understanding of a second reactor technology area.

NOTE 1 - A better understanding of the second reactor technology area would be obtained by completion of a full course series or an RTO mini series in the second area.

NOTE 2 - The following major topics, which are covered in the Reactor Technology and Operations Course, are NOT covered in this course: reactivity control; power distribution limits; power conversion systems; balance of plant instrumentation; electrical systems; technical specification coverage; plant transients, and plant events.

NOTE 3 - This course is not presently on the schedule. The TTC will issue an announcement if and when the course is scheduled.

GE REACTOR TECHNOLOGY AND OPERATIONS (RTO) COURSE (R-211B)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the General Electric design and operation with emphasis in the following areas:

1. System purpose
2. System design
3. System instrumentation
4. System interrelationships
5. Integrated plant response to normal operating and transient conditions.
6. Technical specifications

Systems presentations are at the one-line diagram level with reference to technical specifications for major NSS systems and components. System interrelationships and integrated plant responses are presented utilizing simulator-generated transient curves and data from actual plant events.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - An understanding of light water reactor technology or successful completion of a 100 level reactor technology course.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

GE TECHNOLOGY COURSE (R-306B)

LENGTH - 15 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the General Electric design with emphasis in the following areas:

1. System design
2. System function
3. System instrumentation
4. System interlocks
5. System design problems
6. System operational problems and difficulties
7. Technical specifications
8. Thermal limits

Presentations are at the one-line level with references to technical specifications for major NSS systems and components. Additional attention is also focused on both safety and non-safety related support and auxiliary systems. This course is the first in a series of three courses in GE technology (R-306B, R-506B, R-606B).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a mid-course examination and a comprehensive final examination.

PREREQUISITES FOR ATTENDANCE - A knowledge of nuclear engineering and reactor operations, or successful completion of an R-100 level GE technology course.

Priority placement in this course will be given to students scheduled to attend the series, and students enrolled in this course will be enrolled in the advanced technology course (R-506B) and simulator course (R-606B) of the series.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the aspects of the systems of GE plant design as specified above.

GE ADVANCED TECHNOLOGY COURSE (R-506B)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the General Electric design with emphasis in the following areas:

1. Systems interrelationships
2. Integrated plant response to normal operating and transient conditions
3. Analysis of operational and transient conditions
4. Plant procedures and their applications
5. Facility abnormal events
6. Technical specifications (LCOs LSSS, Safety Limits, Bases)
7. Process computer usage, application and available data.

Presentations utilize simulator generated transient curves and data from actual plant events to show integrated facility operation during normal and abnormal conditions. Technical specifications, plant procedures, actual plant events, and technical issues are discussed. This course is the second in a series of three courses in GE technology (R-306B, R-506B, R-606B).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive final examination.

PREREQUISITES FOR ATTENDANCE - Successful completion of the R-306B course or equivalency examination.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the areas specified in the course objectives.

GE SIMULATOR COURSE (R-605B)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the General Electric design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Technical specification evaluation and application to control room conditions
3. How and when normal and emergency procedures are applied
4. Effect upon plant operation of equipment malfunction or incorrect or untimely operator action
5. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope, control room simulator. Operations include evolutions from plant startup to major accidents. Emphasis is placed upon integrated plant response and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - A general understanding of General Electric systems.

APPLICABILITY - NRC personnel who have a need to understand the areas specified in the course objectives.

GE SIMULATOR COURSE (R-606B)

LENGTH - 6 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the General Electric design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Evaluation of system and plant conditions
3. Technical specifications evaluation and application to control room conditions
4. Evaluation of data available from the plant computer(s)
5. How and when surveillance, abnormal, and emergency procedures are applied
6. Effect upon plant operation of equipment malfunction or incorrect or untimely operator actions
7. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions, and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment. This course is the last in a series of GE technology courses (R-306B, R-506B, R-606B).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a practical application examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - Successful completion of the GE Advanced Technology Course (R-506B).

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors and other NRC personnel who have a need to understand the areas specified in the course objectives.

GE REACTOR TECHNOLOGY AND OPERATIONS (RTO) SIMULATOR COURSE (R-611B)

LENGTH - 5 Days

LOCATIONS - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the General Electric design and operation with emphasis in the following areas:

1. Use of control room instrumentation in the evaluation of normal and transient operating conditions.
2. Technical specifications evaluation and application to control room conditions.
3. Application of normal, abnormal, and emergency procedures.
4. Effect of equipment malfunction or incorrect or untimely operator actions.
5. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions, and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the associated Reactor Technology and Operations Course, associated NSSS Technology Course, or equivalent.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

GE EMERGENCY OPERATING PROCEDURES (EOP) SIMULATOR COURSE (R-621B)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the General Electric design emergency operating procedures and their application utilizing a combination of classroom and simulator training. Major types include:

1. EOP structure and interfacing
2. Intent of each EOP
3. Entry conditions and symptoms
4. Monitoring critical status trees
5. EOP use and philosophy
6. EOP, operator and plant responses to various plant transients and emergency conditions.
7. Normal and abnormal plant operations

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the General Electric technology series or the General Electric RTO mini series or equivalent experience.

APPLICABILITY - NRC personnel who inspect or evaluate EOPs and their application, or other personnel who have a need to understand the areas specified in the course objectives.

GE SIMULATOR REFRESHER COURSE FOR OPERATOR LICENSE EXAMINERS (R-701B)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff and OLB Staff

COURSE OBJECTIVES - The course is designed to strengthen examiner skills in simulator examination administration, familiarize examiners with the capabilities of simulators as testing devices, and refresh examiner knowledge of the General Electric design and operation. Emphasis is in the following areas:

1. Simulator capabilities
2. Scenario development
3. Scenario use (role playing)
4. Examiner techniques
5. Hands-on operation
6. Operational feedback (LERs, design changes, etc.).

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. The course emphasizes examination techniques including scenario development, role playing and candidate evaluations.

EXAMINATION - None.

PREREQUISITES FOR ATTENDANCE - Certification as an operator license examiner and a minimum of one year's experience.

APPLICABILITY - NRC or contractor operator license examiners.

GE SIMULATOR REFRESHER COURSE (R-706B)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to maintain a working knowledge of the General Electric design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Evaluation of system and plant conditions
3. Technical specifications evaluation and application to control room conditions
4. Evaluation of data available from the plant computer(s)
5. How and when surveillance, abnormal and emergency procedures are applied
6. Effect upon plant operation of equipment malfunction or incorrect or untimely operator action
7. Integrated plant operations
8. Design, function and flow paths of major mechanical and instrumentation systems.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - Students will demonstrate maintenance of the required level of knowledge by successful completion of a written examination covering mechanical, instrumentation and control systems, and technical specifications and a practical application examination.

PREREQUISITES FOR ATTENDANCE - Successful completion of a GE technology series.

APPLICABILITY - Resident and Region - based (Reactor and Project) Inspectors and other NRC personnel who are required to maintain a working level of knowledge as described in the course objectives.

GE NUCLEAR ENGINEERING COURSE (R-801B)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - General Electric Company

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the following General Electric design nuclear engineering concepts:

1. Basis for core thermal limits
2. Process computer programs
3. Control rod pattern and sequence development
4. Principles of core design
5. Core management
6. Fuel design and performance
7. Preconditioning Interim Operating Management Recommendations (PCIOMR).

Presentations by General Electric instructors will cover areas of concern to a BWR Station Nuclear Engineer. Emphasis will be placed on relationships to technical specifications and licensing activities where applicable.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of two weekly written examinations.

PREREQUISITES FOR ATTENDANCE - Successful completion of a GE technology (R-204B, R-206B, R-306B, or R-404B) course. The Technical Training Center controls attendance.

APPLICABILITY - Resident and Region - based (Reactor and Project) Inspectors and other NRC personnel working with BWR thermal limits, core performance, and process computer applications.

GE MAINTENANCE TRAINING OVERVIEW COURSE (R-802B)

LENGTH - 5 Days

LOCATION - GE BWR Services Training Facility, San Jose, CA.

CONDUCTED BY - General Electric Company

COURSE OBJECTIVES - The course is designed to provide the student with an overview of the General Electric design refuel floor activities and maintenance activities for the following:

1. Reactor internals
2. Fuel movement
3. Control rod drives
4. Undervessel CRD components
5. Main steam isolation valves
6. Recirculation pump seals

Presentations by General Electric instructors include both classroom discussions and hands-on training on actual equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of a GE technology series or equivalent experience.

APPLICABILITY - Resident and Region - based (Reactor and Project Inspectors and other NRC personnel who have a need to understand the areas specified in the course objectives.

GE TECHNICAL MANAGERS COURSE (R-906B)

LENGTH - 3 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to assist NRC Technical Managers in maintaining a general familiarity with the General Electric design and operations with emphasis in the following areas:

1. Plant operational characteristics
2. Conduct of control room operations
3. Instrumentation and plant data available in the control room
4. Application of abnormal and emergency procedures
5. Plant response to abnormal and emergency conditions
6. Effect upon plant operation of equipment malfunction or incorrect or untimely operator actions.

Presentations include both classroom discussions and simulator demonstrations using a full scope control room simulator. Classroom discussions are keyed to the evolutions to be demonstrated on the simulator. Emphasis is placed upon identification of abnormal or accident conditions, determination of plant status, and discussion of proper immediate and subsequent operator actions for a given plant condition.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Although there are no prerequisites for attendance, attendees should have a general familiarity with General Electric systems.

APPLICABILITY - All NRC Technical Managers.

GE SEVERE ACCIDENT OVERVIEW SEMINAR (R-911B)

LENGTH - 1 Day

LOCATION - Bethesda, Maryland or Regional Offices

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The seminar is designed to provide students with an overview of severe accident conditions for the General Electric reactor design. Major topics for the seminar include:

1. Safety Parameter Display System (or equivalent)
2. Emergency Operating Procedures (EOPs)
   a. Historical background
   b. Philosophy (EOP logic)
   c. Key EOP instrumentation
   d. Instrumentation response during severe accidents
   e. Core cooling methods
3. Degraded Core Assessment
   a. Definition of a degraded core
   b. Recognition of a degraded core
   c. Effects of degraded core conditions
   d. Core cooling with a degraded core
   e. Fission product release paths
   f. Vendor specific containment design overview
4. Containment Response During Severe Accidents
   a. NUREG/CR 4920
   b. BWR Mark I and/or BWR Mark II and/or BWR Mark III

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of 100 level course or equivalent experience for the appropriate reactor technology area.

APPLICABILITY - Reactor Safety Team members, Protective Measures Team members, Directors of Site Operations, Executive Team Members, Resident Inspectors, Project Managers, or other NRC personnel who have a need to receive an overview of the topics specified in the course objectives.

WESTINGHOUSE TECHNOLOGY COURSE (R-101P)

LENGTH - 4 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee and other locations as announced.

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the mechanical and instrumentation systems of the Westinghouse design. The course describes functions and flow paths of major systems, instrumentation, terminology, and equipment location. Emphasis is placed upon the nuclear steam supply system including the engineered safety features.

EXAMINATION - None.

PREREQUISITES FOR ATTENDANCE - None. A technical background is desirable.

APPLICABILITY - All NRC technical staff personnel who desire to understand basic Westinghouse power plant design.

This is also the PWR Technology Course associated with the PRA Technology Transfer Program.

WESTINGHOUSE TECHNOLOGY COURSE (R-104P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the mechanical and instrumentation systems of the Westinghouse design. The course describes functions and flow paths of major systems, instrumentation, terminology, and equipment location. Emphasis is placed upon the nuclear steam supply system including the engineered safety features.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a written examination.

PREREQUISITES FOR ATTENDANCE - None. A technical background is desirable.

APPLICABILITY - Reactor Radiation Specialists, Reactor Construction Inspectors, and other NRC personnel who have a need to understand basic Westinghouse power plant design.

WESTINGHOUSE NSSS TECHNOLOGY COURSE (R-111P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide students who already have a working knowledge of one reactor vendor design with a working knowledge of an additional reactor vendor design. The course emphasis is on the major mechanical, control, and instrumentation systems associated with the Westinghouse NSSS.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination.

PREREQUISITES FOR ATTENDANCE - Completion of full reactor technology course series in a different technology or completion of an RTO mini series in a different technology or equivalent knowledge in a different technology.

APPLICABILITY - NRC technical personnel who have a solid background in one reactor technology area and need an understanding of a second reactor technology area.

NOTE 1 - A better understanding of the second reactor technology area would be obtained by completion of a full course series or an RTO mini series in the second area.

NOTE 2 - The following major topics, which are covered in the Reactor Technology and Operations Course, are NOT covered in this course: reactivity control; power distribution limits; power conversion systems; balance of plant instrumentation; electrical systems; technical specification coverage; plant transients, and plant events.

NOTE 3 - This course is not presently on the schedule. The TTC will issue an announcement if and when the course is scheduled.

WESTINGHOUSE TECHNOLOGY COURSE (R-204P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Westinghouse plant design with emphasis in the following areas:

1. System design
2. System function
3. System instrumentation
4. System interlocks
5. System design problems
6. Technical specifications.

Presentations are at the one-line diagram level with references to technical specifications for major NSS systems and components. Operations are discussed mainly at the individual systems level.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - A general knowledge of nuclear engineering and reactor operations, or successful completion of an R-100 level course.

APPLICABILITY - Resident and Region-based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the aspects of the systems of a Westinghouse plant as specified above.

WESTINGHOUSE REACTOR TECHNOLOGY AND OPERATIONS (RTO) COURSE (R-211P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Westinghouse design and operation with emphasis in the following areas:

1. System purpose
2. System design
3. System instrumentation
4. System interrelationships
5. Integrated plant response to normal operating and transient conditions.
6. Technical specifications

Systems presentations are at the one-line diagram level with reference to technical specifications for major NSS systems and components. System interrelationships and integrated plant responses are presented utilizing simulator-generated transient curves and data from actual plant events.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - An understanding of light water reactor technology or successful completion of a 100 level reactor technology course.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

WESTINGHOUSE TECHNOLOGY COURSE (R-304P)

LENGTH - 15 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Westinghouse design with emphasis in the following areas:

1. System design
2. System function
3. System instrumentation
4. System interlocks
5. System design problems
6. System operational problems and difficulties
7. Technical specifications
8. Power distribution and thermal-hydraulic limits.

Presentations are at both the one-line and piping and instrumentation diagram level with the inclusion of more detailed system design and operational detail than 200 level courses. Additional attention is also focused on both safety and non-safety related support and auxiliary systems. This course is the first in a series of three courses in Westinghouse Technology (R-304P, R-504P, R-604P).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a mid-week course examination and a comprehensive final examination.

PREREQUISITES FOR ATTENDANCE - A general knowledge of nuclear engineering and reactor operations or successful completion of the R-104P course.

Priority placement in this course will be given to students scheduled to attend the series, and students enrolled in this course will also be enrolled in the advanced technology course (R-504P) and the simulator course (R-604P) of the series.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the aspects of the systems of a Westinghouse plant as specified above.

WESTINGHOUSE ADVANCED TECHNOLOGY COURSE (R-504P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Westinghouse design with emphasis in the following areas:

1. Systems interrelationships
2. Integrated plant response to normal operating and transient conditions
3. Analysis of operational and transient conditions
4. Plant procedures and their applications
5. Facility abnormal events
6. Technical specifications (LCOs, LSSS, Safety Limits, Bases).

Presentations utilize simulator-generated transient curves and data from actual plant events to show integrated facility operation during normal and upset conditions. Technical specifications, abnormal, emergency, and other procedures are discussed during selected transient discussions using examples from operating plants. This course is the second in a series of three courses in Westinghouse technology (R-204P, R-504P, R-604P).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive final examination.

PREREQUISITES FOR ATTENDANCE - Successful completion of the R-304P course or equivalency examination.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the areas specified in the course objectives.

WESTINGHOUSE SIMULATOR COURSE (R-601P)

(Formerly R-603P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of Westinghouse design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Technical specification evaluation and application to control room conditions
3. How and when normal and emergency procedures are applied
4. Effect upon plant operation of equipment malfunction or incorrect or untimely operator action
5. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations comprise evolutions from plant startup to major accidents. Emphasis is placed upon integrated plant response and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - A general understanding of Westinghouse systems or completion of an R-100 level course.

APPLICABILITY - NRC personnel who have a desire to understand the areas specified in the course objectives.

WESTINGHOUSE SIMULATOR COURSE (R-604P)

LENGTH - 6 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of Westinghouse design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Evaluation of system and plant conditions
3. Technical specifications evaluation and application to control room conditions
4. How and when surveillance, abnormal, and emergency procedures are applied
5. Effect upon plant operation of equipment malfunction or incorrect or untimely operator actions
6. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations comprise evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions, and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment. This course is the last in a series of three courses in Westinghouse technology (R-304P, R-504P, R-604P).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a practical application examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - Successful completion of a Westinghouse Advanced Technology Course (R-504P).

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors and other NRC personnel who have a need to understand the areas specified in the objectives.

WESTINGHOUSE REACTOR TECHNOLOGY AND OPERATIONS (RTO) SIMULATOR COURSE (R-611P)

LENGTH - 5 Days

LOCATIONS - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Westinghouse design and operation with emphasis in the following areas:

1. Use of control room instrumentation in the evaluation of normal and transient operating conditions.
2. Technical specifications evaluation and application to control room conditions.
3. Application of normal, abnormal, and emergency procedures.
4. Effect of equipment malfunction or incorrect or untimely operator actions.
5. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions, and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the associated Reactor Technology and Operations Course, associated NSSS Technology Course, or equivalent.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

WESTINGHOUSE EMERGENCY OPERATING PROCEDURES (EOP) SIMULATOR COURSE (R-621P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the Westinghouse design emergency operating procedures and their application utilizing a combination of classroom and simulator training. Major types include:

1. EOP structure and interfacing
2. Intent of each EOP
3. Entry conditions and symptoms
4. Monitoring critical status trees
5. EOP use and philosophy
6. EOP, operator and plant responses to various plant transients and emergency conditions.
7. Normal and abnormal plant operations

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the Westinghouse technology series, the Westinghouse RTO mini series, or equivalent experience.

APPLICABILITY - NRC personnel who inspect or evaluate EOPs and their application, or other personnel who have a need to understand the areas specified in the course objectives.

WESTINGHOUSE SIMULATOR REFRESHER COURSE FOR OPERATOR LICENSE EXAMINERS (R-701P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee.

CONDUCTED BY - NRC Technical Training Center Staff and OLB Staff

COURSE OBJECTIVES - The course is designed to strengthen examiner skills in simulator examination administration, familiarize examiners with the capabilities of simulators as testing devices, and refresh examiner knowledge of Westinghouse design and operation. Emphasis is in the following areas:

1. Simulator capabilities
2. Scenario development
3. Scenario use (role playing)
4. Examiner techniques
5. Hands-on operation
6. Operational feedback (LERs, design changes, etc.).

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. The course emphasizes examination techniques including scenario development, role playing and candidate evaluations.

EXAMINATION - None.

PREREQUISITES FOR ATTENDANCE - Certification as an operator license examiner and a minimum of one year's experience.

APPLICABILITY - NRC or contractor operator license examiners.

WESTINGHOUSE SIMULATOR REFRESHER COURSE (R-704P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to update and refresh the inspectors' knowledge of Westinghouse design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Evaluation of system and plant conditions
3. Technical specifications evaluation and application to control room conditions
4. How and when surveillance, abnormal and emergency procedures are applied
5. Effect upon plant operation of equipment malfunctions or incorrect or untimely operator action
6. Integrated plant operations
7. Design, function and flow paths of major mechanical and instrumentation systems.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations comprise evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - Students will demonstrate maintenance of the required level of knowledge by successful completion of a written examination covering mechanical, instrumentation and control systems, and technical specifications and a practical application examination.

PREREQUISITES FOR ATTENDANCE - Successful completion of a Westinghouse technology series.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors and other NRC personnel who are required to maintain a working level of knowledge as described in the course objectives.

WESTINGHOUSE TECHNICAL MANAGERS COURSE (R-904P)

(Formerly R-901P)

LENGTH - 3 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to assist NRC Technical Managers in maintaining a general familiarity with Westinghouse design and operations with emphasis in the following areas:

1. Plant operational characteristics
2. Conduct of control room operations
3. Instrumentation and plant data available in the control room
4. Application of abnormal and emergency procedures
5. Plant response to abnormal and emergency conditions
6. Effect upon plant operation of equipment malfunction or incorrect or untimely operator actions.

Presentations include both classroom discussions and simulator demonstrations using a full scope simulator. Classroom discussions are keyed to the evolutions to be demonstrated on the simulator. Emphasis is placed upon identification of abnormal or accident conditions, determination of plant status, and discussion of proper immediate and subsequent operator actions for a given plant condition.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Although there are no prerequisites for attendance, attendees should have a general familiarity with Westinghouse systems.

APPLICABILITY - All NRC Technical Managers

WESTINGHOUSE SEVERE ACCIDENT OVERVIEW SEMINAR (R-911P)

LENGTH - 1 Day

LOCATION - Bethesda, Maryland or Regional Offices

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The seminar is designed to provide students with an overview of severe accident conditions for the Westinghouse reactor design. Major topics for the seminar include:

1. Safety Parameter Display System (or equivalent)
2. Emergency Operating Procedures (EOPs)
   a. Historical background
   b. Philosophy (EOP logic)
   c. Key EOP instrumentation
   d. Instrumentation response during severe accidents
   e. Core cooling methods
3. Degraded Core Assessment
   a. Definition of a degraded core
   b. Recognition of a degraded core
   c. Effects of degraded core conditions
   d. Core cooling with a degraded core
   e. Fission product release paths
   f. Vendor specific containment design overview
4. Containment Response During Severe Accidents
   a. NUREG/CR 4920
   b. PWR Ice Condenser and/or PWR Large Dry

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of 100 level course or equivalent experience for the appropriate reactor technology area.

APPLICABILITY - Reactor Safety Team members, Protective Measures Team members, Directors of Site Operations, Executive Team Members, Resident Inspectors, Project Managers, or other NRC personnel who have a need to receive an overview of the topics specified in the course objectives.

CE NSSS TECHNOLOGY COURSE (R-112P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide students who already have a working knowledge of one reactor vendor design with a working knowledge of an additional reactor vendor design. The course emphasis is on the major mechanical, control, and instrumentation systems associated with the Combustion Engineering NSSS.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination.

PREREQUISITES FOR ATTENDANCE - Completion of full reactor technology course series in a different technology or completion of an RTO mini series in a different technology or equivalent knowledge in a different technology.

APPLICABILITY - NRC technical personnel who have a solid background in one reactor technology area and need an understanding of a second reactor technology area.

NOTE 1 - A better understanding of the second reactor technology area would be obtained by completion of a full course series or an RTO mini series in the second area.

NOTE 2 - The following major topics, which are covered in the Reactor Technology and Operations Course, are NOT covered in this course: reactivity control; power distribution limits; power conversion systems; balance of plant instrumentation; electrical systems; technical specification coverage; plant transients, and plant events.

NOTE 3 - This course is not presently on the schedule. The TTC will issue an announcement if and when the course is scheduled.

CE TECHNOLOGY COURSE (R-205P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Combustion Engineering plant design with emphasis in the following areas:

1. System design
2. System function
3. System instrumentation
4. System interlocks
5. System design problems
6. Technical specifications.

Presentations are at the one-line diagram level with references to technical specifications for major NSS systems and components. Operations are discussed mainly at the individual systems level.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - A general knowledge of nuclear engineering and reactor operations, or successful completion of an R-100 level course.

APPLICABILITY - CE Facility Resident Inspectors, Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the aspects of the systems of a CE plant as specified above.

CE REACTOR TECHNOLOGY AND OPERATIONS (RTO) COURSE (R-212P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Combustion Engineering design and operation with emphasis in the following areas:

1. System purpose
2. System design
3. System instrumentation
4. System interrelationships
5. Integrated plant response to normal operating and transient conditions.
6. Technical specifications

Systems presentations are at the one-line diagram level with reference to technical specifications for major NSS systems and components. System interrelationships and integrated plant responses are presented utilizing simulator-generated transient curves and data from actual plant events.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - An understanding of light water reactor technology or successful completion of a 100 level reactor technology course.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

CE SIMULATOR COURSE (R-605P)

LENGTH - 5 Days

LOCATION - Windsor, Connecticut

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the Combustion Engineering design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Technical specification evaluation and application to control room conditions
3. How and when normal and emergency procedures are applied
4. Effect upon plant operation of equipment malfunction or incorrect or untimely operator action
5. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations comprise evolutions from plant startup to major accidents. Emphasis is placed upon integrated plant response and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Completion of the CE Technology Course (R-205P) or equivalent knowledge of CE facility design.

APPLICABILITY - NRC personnel who have a need to understand the areas specified in the course objectives.

CE REACTOR TECHNOLOGY AND OPERATIONS (RTO) SIMULATOR COURSE (R-612P)

LENGTH - 5 Days

LOCATIONS - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Combustion Engineering design and operation with emphasis in the following areas:

1. Use of control room instrumentation in the evaluation of normal and transient operating conditions.
2. Technical specifications evaluation and application to control room conditions.
3. Application of normal, abnormal, and emergency procedures.
4. Effect of equipment malfunction or incorrect or untimely operator actions.
5. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions, and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the associated Reactor Technology and Operations Course, associated NSSS Technology Course, or equivalent.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

CE EMERGENCY OPERATING PROCEDURES (EOP) SIMULATOR COURSE (R-622P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the Combustion Engineering design emergency operating procedures and their application utilizing a combination of classroom and simulator training. Major types include:

1. EOP structure and interfacing
2. Intent of each EOP
3. Entry conditions and symptoms
4. Monitoring critical status trees
5. EOP use and philosophy
6. EOP, operator and plant responses to various plant transients and emergency conditions.
7. Normal and abnormal plant operations

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the Combustion Engineering technology series or the Combustion Engineering RTO mini series or equivalent experience.

APPLICABILITY - NRC personnel who inspect or evaluate EOPs and their application, or other personnel who have a need to understand the areas specified in the course objectives.

CE SIMULATOR REFRESHER COURSE FOR OPERATOR LICENSE EXAMINERS (R-702P)

LENGTH - 5 Days

LOCATION - Windsor, Connecticut

CONDUCTED BY - NRC Technical Training Center Staff and OLB Staff

COURSE OBJECTIVES - The course is designed to strengthen examiner skills in simulator examination administration, familiarize examiners with the capabilities of simulators as testing devices, and refresh examiner knowledge of Combustion Engineering design and operation. Emphasis is in the following areas:

1. Simulator capabilities
2. Scenario development
3. Scenario use (role playing)
4. Examiner techniques
5. Hands-on operation
6. Operational feedback (LERs, design changes, etc.).

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. The course emphasizes examination techniques including scenario development, role playing and candidate evaluations.

EXAMINATION - None.

PREREQUISITES FOR ATTENDANCE - Certification as an operator license examiner and a minimum of one year's experience.

APPLICABILITY - NRC or contractor operator license examiners.

CE SIMULATOR REFRESHER COURSE (R-705P)

LENGTH - 5 Days

LOCATION - Windsor, Connecticut

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to update and refresh the inspectors' knowledge of Combustion Engineering design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate steady state and transient operating conditions
2. Evaluation of normal and abnormal system and plant conditions
3. Technical specifications and their application to these plant conditions
4. Application of plant procedures including normal, abnormal and emergency operating procedures
5. Effect upon plant operation of equipment malfunction or incorrect or untimely operator action
6. Integrated plant operations, with emphasis on the Integrated Control System
7. Design, function and flow paths of major mechanical and instrumentation systems.

Presentations include demonstrations and hands-on operation utilizing a full-scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - Students will demonstrate maintenance of the required level of knowledge by successful completion of a written examination covering mechanical, instrumentation and control systems, and technical specifications and a practical application examination.

PREREQUISITES FOR ATTENDANCE - Successful completion of the CE Technology Course (R-205P) or equivalent experience.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors and other NRC personnel who are required to maintain a working level of knowledge as described in the course objectives.

CE TECHNICAL MANAGERS COURSE (R-905P)

LENGTH - 3 Days

LOCATION - Windsor, Connecticut

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to assist NRC Technical Managers in maintaining a general familiarity with Combustion Engineering design and operations with emphasis in the following areas:

1. Plant operational characteristics
2. Conduct of control room operations
3. Instrumentation and plant data available in the control room
4. Application of abnormal and emergency procedures
5. Plant response to abnormal and emergency conditions
6. Effect upon plant operation of equipment malfunction or incorrect or untimely operator actions.

Presentations include both classroom discussions and simulator demonstrations using a full scope simulator. Classroom discussions are keyed to the evolutions to be demonstrated on the simulator. Emphasis is placed upon identification of abnormal or accident conditions, determination of plant status, and discussion of proper immediate and subsequent operator actions for a given plant condition.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Although there are no prerequisites for attendance, attendees should have a general familiarity with Combustion Engineering systems.

APPLICABILITY - All NRC Technical Managers

CE SEVERE ACCIDENT OVERVIEW SEMINAR (R-912P)

LENGTH - 1 Day

LOCATION - Bethesda, Maryland or Regional Offices

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The seminar is designed to provide students with an overview of severe accident conditions for the Combustion Engineering reactor design. Major topics for the seminar include:

1. Safety Parameter Display System (or equivalent)
2. Emergency Operating Procedures (EOPs)
   a. Historical background
   b. Philosophy (EOP logic)
   c. Key EOP instrumentation
   d. Instrumentation response during severe accidents
   e. Core cooling methods
3. Degraded Core Assessment
   a. Definition of a degraded core
   b. Recognition of a degraded core
   c. Effects of degraded core conditions
   d. Core cooling with a degraded core
   e. Fission product release paths
   f. Vendor specific containment design overview
4. Containment Response During Severe Accidents
   a. NUREG/CR 4920
   b. PWR Large Dry

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of 100 level course or equivalent experience for the appropriate reactor technology area.

APPLICABILITY - Reactor Safety Team members, Protective Measures Team members, Directors of Site Operations, Executive Team Members, Resident Inspectors, Project Managers, or other NRC personnel who have a need to receive an overview of the topics specified in the course objectives.

B&W NSSS TECHNOLOGY COURSE (R-113P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide students who already have a working knowledge of one reactor vendor design with a working knowledge of an additional reactor vendor design. The course emphasis is on the major mechanical, control, and instrumentation systems associated with the Babcock & Wilcox NSSS.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination.

PREREQUISITES FOR ATTENDANCE - Completion of full reactor technology course series in a different technology or completion of an RTO mini series in a different technology or equivalent knowledge in a different technology.

APPLICABILITY - NRC technical personnel who have a solid background in one reactor technology area and need an understanding of a second reactor technology area.

NOTE 1 - A better understanding of the second reactor technology area would be obtained by completion of a full course series or an RTO mini series in the second area.

NOTE 2 - The following major topics, which are covered in the Reactor Technology and Operations Course, are NOT covered in this course: reactivity control; power distribution limits; power conversion systems; balance of plant instrumentation; electrical systems; technical specification coverage; plant transients, and plant events.

NOTE 3 - This course is not presently on the schedule. The TTC will issue an announcement if and when the course is scheduled.

B&W TECHNOLOGY COURSE (R-206P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Babcock & Wilcox plant design with emphasis in the following areas:

1. System design
2. System function
3. System instrumentation
4. System interlocks
5. System design problems
6. Technical specifications.

Presentations are at the one-line diagram level with references to technical specifications for major NSS systems and components. Operations are discussed mainly at the individual systems level.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - A general knowledge of nuclear engineering and reactor operations, or successful completion of an R-100 level course.

APPLICABILITY - B&W Facility Resident Inspectors, Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the aspects of the systems of a B&W plant as specified above.

B&W REACTOR TECHNOLOGY AND OPERATIONS (RTO) COURSE (R-213P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Babcock & Wilcox design and operation with emphasis in the following areas:

1. System purpose
2. System design
3. System instrumentation
4. System interrelationships
5. Integrated plant response to normal operating and transient conditions.
6. Technical specifications

Systems presentations are at the one-line diagram level with reference to technical specifications for major NSS systems and components. System interrelationships and integrated plant responses are presented utilizing simulator-generated transient curves and data from actual plant events.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - An understanding of light water reactor technology or successful completion of a 100 level reactor technology course.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

B&W TECHNOLOGY COURSE (R-306P)

LENGTH - 15 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Babcock & Wilcox design with emphasis in the following areas:

1. System design
2. System function
3. System instrumentation
4. System interlocks
5. System design problems
6. System operational problems and difficulties
7. Technical specifications
8. Power distribution and thermal-hydraulic limits.

Presentations are at both the one-line and piping and instrumentation diagram level with the inclusion of more detailed system design and operational detail than 200 level courses. Additional attention is also focused on both safety and non-safety related support and auxiliary systems. This course is the first in a series of three courses in B&W technology (R-306P, R-506P, R-606P).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a mid-week course examination and a comprehensive final examination.

PREREQUISITES FOR ATTENDANCE - A general knowledge of nuclear engineering and reactor operations or successful completion of the R-104P course.

Priority placement in this course will be given to students scheduled to attend the series, and students enrolled in this course will also be enrolled in the advanced technology course (R-506P) and the simulator course (R-606P) of the series.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the aspects of the systems of a B&W plant as specified above.

B&W ADVANCED TECHNOLOGY COURSE (R-506P)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Babcock & Wilcox design with emphasis in the following areas:

1. Systems interrelationships
2. Integrated plant response to normal operating and transient conditions
3. Analysis of operational and transient conditions
4. Plant procedures and their applications
5. Facility abnormal events
6. Technical specifications (LCOs, LSSS, Safety Limits, Bases).

Presentations utilize simulator-generated transient curves and data from actual plant events to show integrated facility operation during normal and upset conditions. Technical specifications, abnormal, emergency, and other procedures are discussed during selected transient discussions using examples from operating plants. This course is the second in a series of three courses in B&W technology (R-306P, R-506P, R-606P).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive final examination.

PREREQUISITES FOR ATTENDANCE - Successful completion of the R-306P course or equivalency examination.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors, and other NRC personnel who have a need to understand the areas specified in the course objectives.

B&W SIMULATOR COURSE (R-606P)

LENGTH - 6 Days

LOCATION - Bellefonte Nuclear Plant, Scottsboro, Alabama

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Babcock & Wilcox design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate normal and transient operating conditions
2. Evaluation of system and plant conditions
3. Technical specifications evaluation and application to control room conditions
4. How and when surveillance, abnormal, and emergency procedures are applied
5. Effect upon plant operation of equipment malfunction or incorrect or untimely operator actions
6. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations comprise evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions, and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment. This course is the last in a series of three courses in B&W technology (R-306P, R-506P, R-606P).

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a practical application examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - Successful completion of the B&W Advanced Technology Course (R-506P).

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors and other NRC personnel who have a need to understand the areas specified in the objectives.

B&W REACTOR TECHNOLOGY AND OPERATIONS (RTO) SIMULATOR COURSE (R-613P)

LENGTH - 5 Days

LOCATIONS - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the Babcock & Wilcox design and operation with emphasis in the following areas:

1. Use of control room instrumentation in the evaluation of normal and transient operating conditions.
2. Technical specifications evaluation and application to control room conditions.
3. Application of normal, abnormal, and emergency procedures.
4. Effect of equipment malfunction or incorrect or untimely operator actions.
5. Integrated plant operations.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and technical specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions, and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the associated Reactor Technology and Operations Course, associated NSSS Technology Course, or equivalent.

APPLICABILITY - NRC technical personnel who have a need to understand the areas specified in the course objectives.

B&W EMERGENCY OPERATING PROCEDURES (EOP) SIMULATOR COURSE (R-623P)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the Babcock & Wilcox design emergency operating procedures and their application utilizing a combination of classroom and simulator training. Major types include:

1. EOP structure and interfacing
2. Intent of each EOP
3. Entry conditions and symptoms
4. Monitoring critical status trees
5. EOP use and philosophy
6. EOP, operator and plant responses to various plant transients and emergency conditions.
7. Normal and abnormal plant operations

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of the Babcock & Wilcox technology series or the Babcock & Wilcox RTO mini series or equivalent experience.

APPLICABILITY - NRC personnel who inspect or evaluate EOPs and their application, or other personnel who have a need to understand the areas specified in the course objectives.

B&W SIMULATOR REFRESHER COURSE FOR OPERATOR LICENSE EXAMINERS (R-703P)

LENGTH - 5 Days

LOCATION - Bellefonte Nuclear Plant, Scottsboro, Alabama

CONDUCTED BY - NRC Technical Training Center Staff and OLB Staff

COURSE OBJECTIVES - The course is designed to strengthen examiner skills in simulator examination administration, familiarize examiners with the capabilities of simulators as testing devices, and refresh examiner knowledge of Babcock & Wilcox design and operation. Emphasis is in the following areas:

1. Simulator capabilities
2. Scenario development
3. Scenario use (role playing)
4. Examiner techniques
5. Hands-on operation
6. Operational feedback (LERs, design changes, etc.).

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. The course emphasizes examination techniques including scenario development, role playing and candidate evaluations.

EXAMINATION - None.

PREREQUISITES FOR ATTENDANCE - Certification as an operator license examiner and a minimum of one year's experience.

APPLICABILITY - NRC or contractor operator license examiners.

B&W SIMULATOR REFRESHER COURSE (R-706P)

LENGTH - 5 Days

LOCATION - Bellefonte Nuclear Plant, Scottsboro, Alabama

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to update and refresh the inspectors' knowledge of Babcock & Wilcox design and operation with emphasis in the following areas:

1. Control room instrumentation and how it is used to evaluate steady state and transient operating conditions
2. Evaluation of normal and abnormal system and plant conditions
3. Technical specifications and their application to these plant conditions
4. Application of plant procedures including normal, abnormal and emergency operating procedures
5. Effect upon plant operation of equipment malfunction or incorrect or untimely operator action
6. Integrated plant operations, with emphasis on the Integrated Control System
7. Design, function and flow paths of major mechanical and instrumentation systems.

Presentations include demonstrations and hands-on operation utilizing a full scope control room simulator. Operations include evolutions from plant startup to major accidents with concurrent discussions of plant procedural and Technical Specification requirements. Emphasis is placed upon integrated plant response, recognition of unusual plant conditions and the interaction between the plant operations staff, plant systems, procedures and regulations rather than how to operate equipment.

EXAMINATION - Students will demonstrate maintenance of the required level of knowledge by successful completion of a written examination covering mechanical, instrumentation and control systems, and technical specifications and a practical application examination.

PREREQUISITES FOR ATTENDANCE - Successful completion of the B&W Technology Course (R-206P), B&W course series (R-306P, R-506P and R-606P) or equivalent experience.

APPLICABILITY - Resident and Region - based (Reactor Project) Inspectors and other NRC personnel who are required to maintain a working level of knowledge as described in the course objectives.

B&W TECHNICAL MANAGERS COURSE (R-906P)

LENGTH - 3 Days

LOCATION - Bellefonte Nuclear Plant, Scottsboro, Alabama

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to assist NRC Technical Managers in maintaining a general familiarity with Babcock & Wilcox design and operations with emphasis in the following areas:

1. Plant operational characteristics
2. Conduct of control room operations
3. Instrumentation and plant data available in the control room
4. Application of abnormal and emergency procedures
5. Plant response to abnormal and emergency conditions
6. Effect upon plant operation of equipment malfunction or incorrect or untimely operator actions.

Presentations include both classroom discussions and simulator demonstrations using a full scope simulator. Classroom discussions are keyed to the evolutions to be demonstrated on the simulator. Emphasis is placed upon identification of abnormal or accident conditions, determination of plant status, and discussion of proper immediate and subsequent operator actions for a given plant condition.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Although there are no prerequisites for attendance, attendees should have a general familiarity with B&W systems.

APPLICABILITY - All NRC Technical Managers

B&W SEVERE ACCIDENT OVERVIEW SEMINAR (R-913P)

LENGTH - 1 Day

LOCATION - Bethesda, Maryland or Regional Offices

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The seminar is designed to provide students with an overview of severe accident conditions for the Babcock & Wilcox reactor design. Major topics for the seminar include:

1. Safety Parameter Display System (or equivalent)
2. Emergency Operating Procedures (EOPs)
   a. Historical background
   b. Philosophy (EOP logic)
   c. Key EOP instrumentation
   d. Instrumentation response during severe accidents
   e. Core cooling methods
3. Degraded Core Assessment
   a. Definition of a degraded core
   b. Recognition of a degraded core
   c. Effects of degraded core conditions
   d. Core cooling with a degraded core
   e. Fission product release paths
   f. Vendor specific containment design overview
4. Containment Response During Severe Accidents
   a. NUREG/CR 4920
   b. PWR Large Dry

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Successful completion of 100 level course or equivalent experience for the appropriate reactor technology area.

APPLICABILITY - Reactor Safety Team members, Protective Measures Team members, Directors of Site Operations, Executive Team Members, Resident Inspectors, Project Managers, or other NRC personnel who have a need to receive an overview of the topics specified in the course objectives.

REACTOR CONCEPTS COURSE (G-100)

LENGTH - 2 Days

LOCATION - Bethesda, Maryland or Regional Offices

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with an introductory level of understanding of:

1. Nuclear plant power generation
2. The fission process and its controlling factors
3. Types and sources of radiation
4. Biological effects of radiation
5. PWR/BWR plant systems
6. Reactor emergencies

and a general familiarization of:

7. Nuclear plant and radiation terminology
8. Methods of protection against radiation and contamination
9. Emergency preparedness systems
10. The sequence of events during the accident at Three Mile Island

The course consists of informational lectures using slides and transparencies of one-line diagrams and pictures of various facilities. Non-technical language is used so that the non-technical person can understand the basic design and operation of nuclear power plants, and have a better understanding of the terminology, abbreviations and units of measurement used in regulating nuclear facilities.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - None. Attendance controlled by OP/TBEA for Headquarters sessions, or Regional Offices for Regional sessions.

APPLICABILITY - Non-technical NRC employees.

HTGR TECHNOLOGY COURSE (G-111)

LENGTH - 5 Days

LOCATION - San Diego, California

CONDUCTED BY - GA Technologies, Inc.

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the mechanical and instrumentation systems of the high temperature gas reactor (HTGR) using the Fort St. Vrain plant as the reference design. The course describes the functions and flow paths of major systems, instrumentation, terminology, and equipment location. Emphasis is placed on the nuclear steam supply system including the engineered safety features.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a written examination.

PREREQUISITES FOR ATTENDANCE - None. A technical background is desirable.

APPLICABILITY - Reactor Inspectors and other NRC personnel who have a need to understand basic HTGR power plant design.

NOTE - This course is not scheduled on a regular basis. The TTC will issue an announcement when the course is scheduled.

POWER PLANT ENGINEERING COURSE (G-110)

LENGTH - 10 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with an understanding of the practical aspects of power plant operation. Emphasis is placed on the use and operation of various types of equipment (valves, valve operators, pumps, instrumentation, controllers, generators, motors, breakers, etc.) rather than design. When topics such as physics, chemistry and heat transfer are discussed, their relationship to basic reactor operation and the nuclear plant cycle are stressed. Course topics include:

1. Basic Plant Cycles
2. Piping
3. Plant Instrumentation
4. Pumps
5. Diesel Generators
6. Reactor Physics
7. Controllers
8. Basic Electrical Theory
9. Generators
10. AC Motors
11. Electrical Distribution Equipment
12. Turbines
13. Heat Transfer and Thermal Hydraulics
14. Chemistry
15. Nuclear Instrumentation

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by the successful completion of written examinations.

PREREQUISITES FOR ATTENDANCE - None. A technical background is desirable. Priority will be given to students scheduled to attend a BWR or PWR series.

APPLICABILITY - Entry level personnel and other NRC personnel who have a need to understand the practical aspects of power plant operation as specified above.

NOTE - This course is not scheduled on a regular basis. The TTC will issue an announcement when the course is scheduled.

MOTORIZED VALVE ACTUATORS (G-112)

LENGTH - 3 Days

LOCATION - Tennessee Valley Authority Power Operations Training Center, near Soddy-Daisy, TN.

CONDUCTED BY - Tennessee Valley Authority

COURSE OBJECTIVES - The course is designed to provide the student with technical information and hands-on experience pertaining to the operation and maintenance of motorized valve actuators.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - None. A technical background is desirable.

APPLICABILITY - NRC personnel who have a need to understand basic motorized valve operator design and operation.

WELDING TECHNOLOGY AND CODES COURSE (C-303)

LENGTH - 2 Weeks

LOCATION - Knoxville, Tennessee

CONDUCTED BY - American Welding Institute

COURSE OBJECTIVES - The course will provide the student with a working knowledge of the following:

1. Metallurgy and welding technology as applicable to welding fabrication and construction at nuclear power facilities
2. Codes and standards of special interest in welding inspection.

EXAMINATION - Students will demonstrate attainment of this level of knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - None. The Technical Training Center controls attendance.

APPLICABILITY - Reactor Construction Resident and Region-based Inspectors and other NRC personnel working with welding technology and code applications.

ELECTRICAL TECHNOLOGY AND CODES COURSE (C-304)

LENGTH - 2 Weeks

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NUS Corporation

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the following:

1. Electrical technology as applicable to nuclear power plants.
2. Performing technical evaluations of licensee and contractor performance
3. Applicable electrical codes and other reference documents used to determine compliance or noncompliance
4. The design, operation, purpose and application of electrical systems
5. Common problems or deficiencies in nuclear plant electrical systems

EXAMINATION - Students will demonstrate attainment of this level of knowledge by successful completion of course requirements and examinations.

PREREQUISITES FOR ATTENDANCE - Basic understanding of electrical theory. The Technical Training Center controls attendance.

APPLICABILITY - Reactor Construction Resident and Region-based Inspectors and other NRC personnel working with electrical technology and code applications.

INSTRUMENTATION TECHNOLOGY AND CODES COURSE (C-305)

LENGTH - 2 Weeks

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NUS Corporation

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the following:

1. Instrumentation technology and the theory and principles upon which its rules are based
2. Instrumentation installation and use in nuclear power plants
3. Performing technical evaluations of licensee and contractor performance
4. Applicable instrumentation codes and other reference documents used to determine compliance or noncompliance
5. The design, operation, purpose and application of instrumentation systems
6. Common problems or deficiencies in the installation and operation of nuclear plant instrumentation.

EXAMINATION - Students will demonstrate attainment of this level of knowledge by successful completion of all course requirements and examinations.

PREREQUISITES FOR ATTENDANCE - Basic understanding of electrical theory. The Technical Training Center controls attendance.

APPLICABILITY - Reactor Construction Resident and Region-based Inspectors and other NRC personnel working with instrumentation technology and code applications.

NONDESTRUCTIVE EXAMINATION (NDE) TECHNOLOGY AND CODES COURSE (C-306)

LENGTH - 2 Weeks

LOCATION - Essex, Connecticut

CONDUCTED BY - Hellier & Associates

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the following:

1. Ultrasonic, radiographic, liquid penetrant, and magnetic particle testing
2. Performing technical evaluations of licensee and licensee contractor performance in these areas
3. The codes and standards of special interest in NDE inspection.

EXAMINATION - Students will demonstrate attainment of this level of knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - None. The Technical Training Center controls attendance.

APPLICABILITY - Reactor Construction Resident and Region-based Inspectors and other NRC personnel working with nondestructive examination and code applications.

RADIATION/CONTAMINATION PROTECTION COURSE (G-102)

LENGTH - 8 Hours

LOCATION - Bethesda, Maryland or Regional Offices

CONDUCTED BY - Selected Staff Members

COURSE OBJECTIVES - The course is designed to provide the student with an understanding of:

1. Radiation/contamination terminology
2. Types and sources of radiation
3. Biological effects of radiation
4. 10 CFR 19 & 10 CFR 20
5. The ALARA program
6. Methods of protection against radiation and contamination
7. Personal monitoring devices
8. Security and radiation areas at nuclear plants
9. Typical access control procedures at nuclear plants
10. The proper use of protective clothing and control point procedures
11. Personal conduct while inside a radiation/contamination area
12. Types and use of respiratory protection equipment.

EXAMINATION - Students will demonstrate attainment of an acceptable level of knowledge by successful completion of a written examination.

PREREQUISITES FOR ATTENDANCE - Reactor Concepts Course (G-100) or equivalent technical expertise. An experienced health physicist should be available to answer questions.

APPLICABILITY - NRC employees who must enter radiation/contamination areas in performance of their duties.

REACTOR HEALTH PHYSICS TECHNOLOGY COURSE (H-200)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - To Be Announced

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the following applied health physics areas:

1. Health physics fundamentals for Inspectors
2. Inspector's health physics responsibilities
3. Area survey requirements; procedures, recordkeeping
4. Managerial aspects of internal and external dosimetry programs
5. Typical radiation/contamination levels at nuclear power plants
6. Evaluation of radiation hazards at nuclear power plants
7. Health physics problems associated with special plant maintenance/refueling
8. Emergency preparedness and accident assessment techniques
9. Transportation.

EXAMINATION - Students will demonstrate attainment of this knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - Successful completion of the Radiation/Contamination Protection Course (G-102) or equivalent experience. The Technical Training Center controls attendance.

APPLICABILITY - Entry-level Radiation Specialists, Reactor and Resident Inspectors, and other NRC personnel who have a need to understand the aspects of applied reactor health physics described in the course objectives.

NOTE - Not currently offered. The TTC will issue an announcement when the course is scheduled.

BWR/PWR RADWASTE COURSE (H-302)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of BWR and PWR radioactive waste management systems. Classroom presentations utilize system one-line diagrams and emphasize the following:

1. The design and operation of those systems involved in the containment, monitoring, and processing of radioactive waste
2. The various design and operational problems associated with the systems.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of written examinations during the course.

PREREQUISITES FOR ATTENDANCE - Successful completion of a BWR Technology Course (100 level) and a PWR Technology Course (100 level). The Technical Training Center controls attendance.

APPLICABILITY - Radiation Specialist Inspectors and other NRC personnel who have a need to understand BWR and PWR radioactive waste management systems.

NOTE - Not currently offered. The TTC will issue an announcement when the course is scheduled.

RADIOLOGICAL EMERGENCY RESPONSE COURSE (H-303)

LENGTH - 8½ Days

LOCATION - Las Vegas and Nevada Test Site, Mercury, Nevada

CONDUCTED BY -DOE/Reynolds Electrical & Engineering Co. (REECO)

COURSE OBJECTIVES - The course is designed to provide the student with a familiarity of the "on scene" response to radiological emergencies involving a nuclear power plant accident, a nuclear materials transportation accident, and a nuclear industrial accident. Presentations will emphasize the following areas:

1. Emergency team organization and procedures
2. Emergency team leadership
3. Emergency team instruments
4. Anti-contamination equipment and procedures

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Students must have a knowledge of basic health physics. FEMA Form 75-5 (available from Training Coordinators) must be submitted to the Technical Training Center 30 days before the start of the course. The Technical Training Center controls attendance. U. S. Citizenship required.

APPLICABILITY - Radiation Specialist Inspectors, emergency preparedness personnel and other NRC personnel involved in the development and inspection of radiological emergency plans and activities.

MEDICAL USES OF BYPRODUCT MATERIAL COURSE (H-304)

LENGTH - 5 Days

LOCATION - San Antonio, Texas

CONDUCTED BY - University of Texas Health Sciences Center at San Antonio

COURSE OBJECTIVES - The course is designed to provide the student with a familiarity of the following:

1. The physical, mathematical and instrumentation principles involved in the medical uses of radionuclides
2. The health and safety aspects of various radionuclides as they affect patient and laboratory personnel
3. The licensing and regulatory activities involved in the medical use of radionuclides.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - A knowledge of basic health physics. The Technical Training Center controls attendance. A hand-held calculator with exponential and log functions is required.

APPLICABILITY - Materials Radiation Specialist Inspectors and NMSS personnel.

SAFETY ASPECTS OF INDUSTRIAL RADIOGRAPHY COURSE (H-305)

LENGTH - 5 Days

LOCATION - Baton Rouge, Louisiana

CONDUCTED BY - Gamma Industries

COURSE OBJECTIVES - The course is designed to provide the student with a working knowledge of the following:

1. Radiography principles, sources, techniques and equipment
2. Regulatory and licensing requirements for radiographic activities
3. Regulatory requirements for handling, storing and shipping radiographic sources
4. Past radiographic incidents
5. Inspection techniques for radiographic activities.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - A knowledge of basic health physics. The Technical Training Center controls attendance.

APPLICABILITY - Materials Radiation Specialist Inspectors and NMSS personnel.

NOTE - This course is not scheduled on a regular basis. The TTC will issue an announcement when the course is scheduled.

ADVANCED MULTI-HAZARD PLANNING COURSE (H-306)

LENGTH - 10 Days

LOCATION - Emmitsburg, Maryland

CONDUCTED BY - Federal Emergency Management Agency (FEMA)

COURSE OBJECTIVES - This is an advanced level, two-week, multi-track course dealing with planning efforts for management of disasters of various kinds and magnitude. All participants will join in exploring advanced planning techniques, state-of-the-art planning tools and aids (such as the Integrated Emergency Management Information System), as well as multi-hazard and multi-year development planning systems. Additionally, course participants will be able to choose hazard-specific planning tracks with small group workshops in the following areas:

Catastrophic Disasters - planning for a very large disaster of national and international scope;

Natural Disasters - planning for natural disasters such as floods, tornados, earthquakes, hurricanes, winter storms, etc.;

Hazardous Materials Disasters - planning with a focus on chemical and radiological hazardous materials response and recovery including tactical requirements, hazardous materials characteristics, and regulatory compliance;

Fixed Nuclear Facility Planning - a specialized track focusing on nuclear power plant and other fixed facility off-site emergency preparedness.

Additional "tracks" may be added and announced on a course-by-course basis; participants should choose only a single track of concentration in each course.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - FEMA Form 75-5 (available from Training Coordinators) must be submitted to the Technical Training Center 30 days before the start of the course. The Technical Training Center Controls attendance.

APPLICABILITY - Emergency preparedness personnel and other NRC personnel involved in the preparation and evaluation of emergency preparedness documents.

RADIOLOGICAL ACCIDENT ASSESSMENT COURSE (H-307)

LENGTH - 5 Days

LOCATION - Emmitsburg, Maryland and other U.S. cities

CONDUCTED BY - Federal Emergency Management Agency (FEMA)

COURSE OBJECTIVES - The course is designed to provide the student with the following:

1. An understanding of the duties and responsibilities of radiological accident assessment personnel
2. A knowledge of possible accident scenarios at a nuclear plant, the time significance of these events and the significant indicators of an accident
3. The ability to perform off-site dose calculations given a specific source term and meteorological conditions
4. The ability to utilize and interpret Federal Protection Action Guides as a basis for recommending appropriate protective measures to state and local officials.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - A knowledge of basic algebra and health physics. FEMA Form 75-5 (available from Training Coordinators) must be submitted to the Technical Training Center 30 days before the start of the course. The Technical Training Center controls attendance.

APPLICABILITY - Emergency preparedness personnel and other NRC personnel responsible for the assessment of radiological emergencies and for making recommendations/decisions regarding protective actions for public safety.

TRANSPORTATION OF RADIOACTIVE MATERIALS COURSE (H-308)

LENGTH - 2 - 3 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee and Regional Offices

CONDUCTED BY - A. W. Grella, NMSS

COURSE OBJECTIVES - The course is designed to provide the student with an understanding of the following:

1. Transportation regulatory agencies and their interface
2. Transportation regulations involving packaging, labelling, marking, shipping papers, placarding and carrier requirements
3. LSA, exclusive use shipments, and special transportation problems
4. Current NRC enforcement criteria in the radioactive materials transportation area
5. IAEA Transport Regulations and proposed changes to the U.S. Code
6. Accident Experience Data and selected accident case histories.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - None.

APPLICABILITY - All NRC personnel involved in the regulation/inspection of radioactive materials transportation activities.

NOTE - This course is not scheduled on a regular basis. The TTC will issue an announcement when the course is scheduled.

HEALTH PHYSICS IN RADIATION ACCIDENTS COURSE (H-309)

LENGTH - 5 Days

LOCATION - Oak Ridge, Tennessee

CONDUCTED BY - Oak Ridge Associated Universities' Radiation Emergency Assistance Center/Training Site (REAC/TS)

COURSE OBJECTIVES - The course is designed to provide the student with an understanding of the following:

1. A review of radiation physics, radiation detection, protective clothing and equipment
2. The principles of internal dosimetry
3. Radiological emergency procedures
4. The role of the Health Physicist in the medical environment
5. Practical experience attained by a combination of lectures, demonstrations, lab exercises and a simulated radiation accident drill.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE -

1. A working knowledge of health physics principles.
2. Submission of NRC Form 368 to OP/TBEA 30 to 60 days in advance of course start date.
3. ORAU (REAC/TS) controls attendance. An $80.00 attendance fee is charged and payable in advance.

APPLICABILITY - Emergency Preparedness Analysts, Health Physicists and other NRC personnel involved in the development and inspection of emergency preparedness activities.

INDEPENDENT MEASUREMENTS TRAINING COURSE (H-310)

LENGTH - 5 Days

LOCATION - Idaho Falls, Idaho

CONDUCTED BY - Radiological and Environmental Sciences Laboratory (RESL)

COURSE OBJECTIVES - The course is designed to provide the student with a familiarity of the following:

1. Sampling and monitoring techniques for environmental media and in-plant samples
2. Sample collection, treatment and analysis
3. Methods used in reporting and treatment of data
4. Personal dosimetry and bioassay
5. Quality assurance in independent measurements.

EXAMINATION - None.

PREREQUISITES FOR ATTENDANCE - None. The Technical Training Center controls attendance.

APPLICABILITY - Health Physics Inspectors and other NRC personnel involved in radiological and environmental sampling.

OCCUPATIONAL RESPIRATORY PROTECTION FOR THE NUCLEAR INDUSTRY COURSE (H-311)

LENGTH - 5 Days

LOCATION - Various locations

CONDUCTED BY - Darell Bevis Associates, Inc. or Radiation Safety Associates, Inc.

COURSE OBJECTIVES - The course is designed to provide the student with a knowledge of the following:

1. The terminology and special problems associated with nuclear respiratory protection programs
2. Respiratory protection devices; including selection, inspection, donning and use
3. NUREG 0041 and other requirements unique to the nuclear industry
4. Practical experience in respirator fitting techniques including several acceptable qualitative and quantitative fit test methods.

EXAMINATION - None.

PREREQUISITES FOR ATTENDANCE - NRC Form 368 must be submitted to OP/TBEA 30 to 60 days in advance of course start date. Course information will be provided by the Technical Training Center. Attendance is controlled by Darell Bevis Associates and Radiation Safety Associates.

APPLICABILITY - Health Physics Inspectors and other NRC personnel involved in occupational respiratory protection.

ADVANCED HEALTH PHYSICS COURSE (H-401)

LENGTH - 2 Weeks

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - To Be Announced

COURSE OBJECTIVES - The course is designed to provide the student with an advanced understanding of:

1. External Radiation Exposure and Dosimetry
2. Internal Exposures and Bioassays
3. Respiratory Protection
4. Radiation Surveys
5. Radiation Survey Instrumentation
6. Effluent and Process Monitoring
7. Offsite Dose Assessment
8. Decontamination Methods
9. Licensee Auditing, Training, Staffing and Organization
10. Health Physics Problems Associated with certain Reactor Systems/Operations
11. Filter Testing
12. INPO "Good Practices" Program
13. ALARA Program
14. Reactor Plant Chemistry/Radiochemistry

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - At least two years' experience as a Reactor Health Physics Inspector. All students must complete a precourse study program. The Technical Training Center controls attendance.

APPLICABILITY - Senior Reactor Health Physics Inspectors.

NOTE - Not currently offered. The TTC will issue an announcement when the course is scheduled.

KEY ASSETS PROTECTION PROGRAM COURSE (S-210S)

LENGTH - 5 Days

LOCATION - Richmond, Virginia and other U.S. cities.

CONDUCTED BY - Defense Security Institute (DSI)

COURSE OBJECTIVES - The course is designed to provide the student with a general knowledge of the following:

1. The protective measure needed to safeguard industrial facilities from the effects of sabotage, espionage, terrorism, and other hostile or destructive acts.
2. The application of physical security and emergency preparedness measures.

EXAMINATION - Students will demonstrate attainment of this knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - Submission of NRC Form 368 (for record purposes) to OP/TBEA 45 - 60 days in advance of course start date. DSI controls attendance. No cost to NRC.

APPLICABILITY - Physical Security Inspectors and NMSS personnel.

OPERATIONS AND MAINTENANCE OF INTRUSION DETECTION SYSTEMS COURSE (S-320S)

LENGTH - 8 Days

LOCATION - Norfolk, Virginia

CONDUCTED BY - Norfolk Naval Shipyard

COURSE OBJECTIVE - The course is designed to provide the student with a working knowledge of the following:

1. Electrical/electronic theory applicable to intrusion detection systems
2. The theory of operation, installation and countermeasures of microwave, ultrasonic, capacitance, vibration, audio, passive infrared, and balanced magnetic contact systems
3. Sound masking as used in SAO, SCI and SI facilities
4. CCTV systems
5. Hands on troubleshooting and maintenance of the above devices conducted by the manufacturer's representatives and other maintenance experts

EXAMINATION - Students will demonstrate attainment of this knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - Submission of NRC Form 368 to OP/TBEA 30 to 60 days in advance of course start date. Cost is $800 per student. Norfolk Naval Shipyard controls attendance.

APPLICABILITY - Physical Security Inspectors and NMSS personnel.

REACTOR SAFETY SYSTEMS AND VITAL EQUIPMENT FOR SAFEGUARDS PERSONNEL (S-401)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee

CONDUCTED BY - NRC Technical Training Center Staff and NMSS Staff

COURSE OBJECTIVES - The course is designed to familiarize the student with basic reactor concepts, boiling water reactors (BWRs), pressurized water reactor (PWRs) and reactor plant vital equipment. Presentations will emphasize the following areas:

1. Purpose of major systems and components
2. Physical location of major systems and components
3. Vulnerability of systems and components to sabotage and the impact their loss would have on plant safety
4. Background on vital equipment
5. Case studies.

EXAMINATION - Students will demonstrate attainment of this knowledge by successful completion of a written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - None. The Technical Training Center controls attendance.

APPLICABILITY - Safeguards Physical Security Inspectors and NMSS personnel.

NOTE - Currently not offered. The TTC will issue an announcement when the course is scheduled.

FUNDAMENTALS OF NONDESTRUCTIVE ASSAY OF NUCLEAR MATERIAL COURSE (S-602A)

LENGTH - 5 Days

LOCATION - Los Alamos, New Mexico

CONDUCTED BY - DOE, Los Alamos National Laboratory (LANL)

COURSE OBJECTIVES - The course is designed to provide the student with a general understanding of the following:

1. Basic neutron and gamma detection methods
2. Gamma-ray measurement of uranium enrichment
3. Quantitative plutonium assay using gamma-ray, neutron singles, and neutron coincidence counting methods for both plutonium and uranium samples.

Instruction is provided in gamma-ray and neutron based nondestructive assay techniques, based upon commercially available portable instrumentation.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE -

1. Although some technical background is recommended, a detailed knowledge of nondestructive assay techniques is not assumed.
2. Submission of NRC Form 368 to OP/TBEA, (for record purposes) 30 to 60 days in advance of course start date.
3. Los Alamos National Laboratory controls attendance. The tuition cost for NRC employees is waived; however, there is a $150.00 materials and supplies fee payable before or at the time of registration.

APPLICABILITY - Safeguards material control and accountability personnel and other NRC personnel involved in nuclear materials accounting procedures.

NEUTRON ASSAY OF NUCLEAR MATERIAL COURSE (S-603A)

LENGTH - 5 Days

LOCATION - Los Alamos, New Mexico

CONDUCTED BY - DOE, Los Alamos National Laboratory (LANL)

COURSE OBJECTIVES - The course consists of a combination of lectures and laboratory sessions on active and passive neutron assay. The lectures cover the principles of neutron interactions in materials, neutron sources, and detectors. The laboratory sessions are selected from topics such as neutron coincidence counting, delayed neutron measurements, photoneutron interrogation and pulsed neutron generators. Nuclear fuel cycle materials such as plutonium and uranium metals, oxides, and fabricated fuel rods are assayed. The emphasis is on understanding the design features, measurement principles, and relative capabilities of these techniques.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE -

1. Successful completion of the Fundamentals of Nondestructive Assay of Nuclear Material (S-602A) or equivalent experience is strongly recommended.
2. Submission of NRC Form 368 (for record purposes) to OP/TBEA, 30 to 60 days in advance of course start date.
3. Los Alamos National Laboratory controls attendance. No tuition cost for NRC employees. A $150.00 materials & supplies fee is payable before or at the time of registration.

APPLICABILITY - Safeguards material control and accountability personnel and other NRC personnel involved in nuclear material audit activities.

GAMMA-RAY ASSAY OF NUCLEAR MATERIAL COURSE (S-604A)

LENGTH - 5 Days

LOCATION - Los Alamos, New Mexico

CONDUCTED BY - DOE, Los Alamos National Laboratory (LANL)

COURSE OBJECTIVES - The course provides an overview of the use of high-resolution gamma-ray spectroscopy in the nondestructive assay of plutonium and uranium in various materials. The course emphasizes laboratory experience, but includes a number of formal lectures. Topics include: general techniques of high-resolution spectroscopy, transmission correction factors, and absorption-edge densitometry. Demonstrations of automated systems are given.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE -

1. Successful completion of the Fundamentals of Nondestructive Assay of Nuclear Material (S-602A) or equivalent experience is strongly recommended.
2. Submission of NRC Form 368 (for record purposes) to OP/TBEA, 30 to 60 days in advance of course start date.
3. Los Alamos National Laboratory controls attendance. Tuition cost for NRC employees is waived; however, there is a $150.00 materials and supplies fee payable before or at the time of registration.

APPLICABILITY - Safeguards material control and accountability personnel and other NRC personnel involved in nuclear material accounting procedures.

FUNDAMENTALS OF INSPECTION COURSE (G-101)

LENGTH - 5 Days

LOCATION - To Be Announced

CONDUCTED BY - Selected Staff Members

COURSE OBJECTIVES - The course is designed to provide the student with a good understanding of:

1. The inspection program
2. Personal conduct of inspectors
3. Legal aspects of inspections
4. Preparation for an inspection
5. Effective communication during inspections
6. Performing an inspection
7. Conducting entrance and exit meetings with licensee management
8. Documenting inspection results
9. Evaluation of licensee management effectiveness
10. Handling allegations
11. Enforcement of NRC regulations and license conditions
12. Backfitting
13. Licensee corrective action systems
14. Emergency preparedness follow-up of a major accident
15. Participation in public hearings
16. Freedom of Information Act
17. Informing the Public

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - None.

APPLICABILITY - All regional and headquarters inspector personnel.

MORT-ACCIDENT/INCIDENT INVESTIGATION WORKSHOP (G-200)

LENGTH - 10 Days

LOCATION - Various cities throughout the U.S.

CONDUCTED BY - EG&G Idaho, Inc.

COURSE OBJECTIVES - The course is designed to provide the student with the following:

1. The ability to evaluate management policies and systems relating to safety, and acquire a better understanding of:
   a. specific oversights and omissions
   b. assumed risks
   c. general management systems weaknesses
2. An understanding of the causes of an accidental occurrence and the prevention of similar occurrences to improve the safety of operations.
3. An understanding of a system safety concept.
4. The ability to define safety responsibilities to reduce errors.
5. The application of analytical procedures to all phases of the safety effort.

Attendance at this course is the same as the attendance at the G-201 and G-202 courses.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - None. The Technical Training Center controls attendance.

APPLICABILITY - NRC personnel who may be assigned accident/incident investigation responsibilities.

NOTE - This course combines the Management Oversight and Risk Tree Analysis (MORT) Seminar (G-201) and the Accident/Incident Investigation Workshop (G-202). Refresher training (G-203) should be scheduled 18 - 36 months after completion of this course.

MANAGEMENT OVERSIGHT AND RISK TREE ANALYSIS (MORT) SEMINAR (G-201)

LENGTH - 5 Days

LOCATION - Various cities throughout the U.S.

CONDUCTED BY - EG&G Idaho, Inc.

COURSE OBJECTIVES - The course is designed to provide the student with the following:

1. The ability to evaluate management policies and systems relating to safety, and acquire a better understanding of:

   a. specific oversights and omissions
   b. assumed risks
   c. general management systems weaknesses

2. A basic understanding of the application of the method for determining the causes and contributing factors of an accident.

3. An understanding of a system safety concept.

4. The application of analytical procedures to all phases of the safety effort.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - None. The Technical Training Center controls attendance.

APPLICABILITY - NRC personnel who may be assigned accident/incident investigation responsibilities.

ACCIDENT/INCIDENT INVESTIGATION WORKSHOP (G-202)

LENGTH - 8 Days

LOCATION - Various cities throughout the U.S.

CONDUCTED BY - EG&G Idaho, Inc.

COURSE OBJECTIVES - The course is designed to provide the student with the following:

1. An understanding of the causes of an accidental occurrence and the prevention of similar occurrences to improve the safety of operations.

2. The ability to define safety responsibilities to reduce errors.

3. The ability to assess the effectiveness of practical corrective actions which are based upon a relatively small number of serious accidents.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Completion of a MORT Seminar (G-201). The Technical Training Center controls attendance.

APPLICABILITY - NRC personnel who may be assigned accident/incident investigation responsibilities.

NOTE - Refresher training (G-203) should be scheduled 18 - 36 months after completion of this course.

ACCIDENT/INCIDENT INVESTIGATION WORKSHOP REFRESHER (G-203)

LENGTH - 3 Days

LOCATION - Various cities throughout the U.S.

CONDUCTED BY - EG&G Idaho, Inc.

COURSE OBJECTIVES - The course is designed to provide the student a review and reinforcement of:

1. The causes of an accidental occurrence and the prevention of similar occurrences to improve the safety of operations
2. The ability to define safety responsibilities to reduce errors
3. The ability to assess the effectiveness of practical corrective actions which are based upon a relatively small number of serious accidents.

EXAMINATION - None

PREREQUISITES FOR ATTENDANCE - Completion of the Accident/Incident Investigation Workshop (G-202). The Technical Training Center controls attendance.

APPLICABILITY - NRC personnel who may be assigned accident/incident investigation responsibilities.

NOTE - To maintain certification as an A/I Investigator, refresher training should be taken every 3 years.

INSPECTING FOR PERFORMANCE COURSE (G-303)

LENGTH - 2 1/2 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee and other locations as announced.

CONDUCTED BY - SAI, Inc.

COURSE OBJECTIVES - The course is designed to provide the student with the following:

1. An understanding of the concepts of performance-oriented inspection.
2. Performance-oriented inspection tools and techniques.
3. Insight on and understanding of how to apply these inspection tools and techniques effectively.

The course consists of lectures and discussions as well as workshops which allow the students individually and in groups to examine, exercise, and critique the use of performance-oriented inspection tools and techniques.

EXAMINATION - Students will demonstrate attainment of an acceptable level of knowledge by successful completion of a written examination.

PREREQUISITES FOR ATTENDANCE - None

APPLICABILITY - All regional and headquarters inspection personnel.

NOTE - This course replaces the previous QA Construction (C-301) and QA Operations/Modifications (G-302) Courses.

PRA BASICS FOR INSPECTION APPLICATIONS COURSE (G-500)

LENGTH - 5 Days

LOCATION - NRC Technical Training Center, Chattanooga, Tennessee and Other Locations As Announced.

CONDUCTED BY - NRC and Brookhaven National Laboratory

COURSE OBJECTIVES - The course is an adaptation of PRA Fundamentals, especially designed for NRC inspectors and other regional personnel. The course is designed to:

1. Introduce NRC inspection staff to the basic concepts and terminology of probabilistic risk assessments (PRAs).
2. Familiarize the target audience with the available tools to understand the use of PRAs in inspection and general plant review; and
3. Help participants apply the information documented in PRAs for their own inspection efforts.

The course topics cover a wide range of needs expressed by inspectors and other regional staff members. Emphasis is placed on reading and interpreting PRAs for inspection purposes.

EXAMINATION - Students will demonstrate attainment of the required level of knowledge by successful completion of a comprehensive written examination at the conclusion of the course.

PREREQUISITES FOR ATTENDANCE - BWR and PWR systems knowledge is required. Inspectors should take this course rather than PRA Fundamentals. Fully qualified inspectors are preferred for the course because of the systems knowledge assumed and the case study method used.

APPLICABILITY - Inspectors and other NRC personnel who desire an introduction to PRA and its application to the inspection program.

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