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United States Senate

WASHINGTON, DC 20510

January 13, 2000

The Honorable Richard A. Meserve Chairman Nuclear Regulatory Commission Washington, D.C. 20555-0001

Dear Chairman Meserve:

We are writing to express our concern about the Nuclear Regulatory Commission's (NRC) proposal to close its Technical Training Center in Chattanooga, Tennessee. Enclosed is a packet of information from the Chattanooga Area Chamber of Commerce concerning this proposed closure.

According to the Chattanooga Chamber, the NRC initially located this office in Chattanooga because of its close proximity to a variety of nuclear facilities and reactor designs. The enclosed material also details the cost to the taxpayers of the proposed move and the adverse impact that closing this facility would have on the Chattanooga area economy.

In light of this information, we urge you to carefully consider the proposed closure of the Technical Training Center in Chattanooga. If you have any questions or need further information, please do not hesitate to contact us.

Sincerely,

Bill Frist United States Senator



Add to

<u>Technical Training Center</u> <u>US Nuclear Regulatory Commission</u> <u>Chattanooga, Tennessee</u>

Report to Senator Fred Thompson

Overview:

The U. S. Nuclear Regulatory Commission (NRC) is considering the possibility of moving the Technical Training Center (TTC) from the current location in Chattanooga, Tennessee, to Rockville, Maryland. The move to Maryland would not be in the best interest of the federal government, the employees currently employed at the TTC, or the 31 states currently served by the TTC in Chattanooga.

The Chattanooga TTC trains hundreds of people annually in the area of nuclear inspections for nuclear power facilities throughout the United States.

It is the opinion of the people of Chattanooga that the NRC's Technical Training Center remain in Chattanooga, and that the five commissioners of the NRC vote in this manner.

Service Area

The Chattanooga TTC currently serves the states of Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Rhode Island, South Carolina, Tennessee, Texas, Utah, and Washington. Other states that have sent a Letter of Intent to become an agreement state include four other states...Minnesota, Oklahoma, Pennsylvania, and Wisconsin.

Chattanooga Facility

The Chattanooga TTC facility is currently located in the Eastgate Town Centre area of the city, adjacent to the interchange of Interstate 75 and Interstate 24, and is located within five miles of the Chattanooga Airport. The 48,855 square foot facility is located in an upscale office park, with numerous restaurants, hotels, and other goods and service providers within walking distance of the office complex. The current rent on the facility is approximately \$750,000 per year, which totals an average of only \$15 per square foot for premium office facilities. All infrastructure to house all classrooms, including all audiovisual facilities, computer operations and the simulators themselves, are already in place in the TTC's facility. The cost of additional office space in the District of Columbia area would be much more expensive to the federal government if the Chattanooga facility were moved to that area.

History of the Chattanooga TTC

In 1980, the Chattanooga TTC was established. SECY-79-622, a directive from Victor Stello, Jr., Director of the Office of Inspection and Enforcement, recommended to the NRC that the facility be placed in Chattanooga, after considering four alternatives: keeping the TTC in the State of Maryland; constructing an NRC reactor simulator facility; moving the training to a Regional Office such as Region II or IV, or relocation to Chattanooga. The latter was chosen because *"it achieves the goal of access to simulators of the five types of reactor designs, and near access to a variety of reactor facilities. Chattanooga is the only place in the United States where simulators of the five basic types of reactor designs will be located at one site."*

A copy of SECY-79-622 is attached to this report.

Employment in Chattanooga

The Chattanooga TTC employs 26 NRC instructors and support staff, with wages ranging in the \$80,000 to \$100,000 per year range per person. An additional 6 people are employed under contract.

The Chattanooga TTC originally started in 1980 with 12 employees. The NRC found that the Chattanooga facility operated so efficiently that expansions and additional employees were hired during the past 19 years.

The current budget of the Chattanooga TTC is approximately \$4,000,000 per year.

Comparison Costs

The per diem cost per student at the Chattanooga TTC is \$80 per day. The per diem cost per student in the District of Columbia area is \$153 per day. Other factors, such as utility costs, including water, sewer, natural gas, and electricity, are much more reasonable in the Chattanooga location than any location in the District of Columbia/Rockville, Maryland area.

Students Served

During FY 1997, the Chattanooga TTC provided training to 295 students in a 1-week course, 142 students in 2-week courses, and 86 students in 3-week courses for a total of 523 students. During FY 1998, the Chattanooga TTC provided training to 310 students in a 1-week course, 217 students in 2-week courses, and 68 students in 3-week courses for a total of 595 students. These students, from across the country, were trained in a comfortable, relaxed learning environment in Chattanooga. The local economic impact of these students was estimated at \$537,465 in FY1997 and \$606,144 in FY1998 for local merchants and vendors in the Chattanooga, Hamilton County TN, and north Georgia area.

Action Needed

The people of Chattanooga, Hamilton County, southeastern Tennessee and northern Georgia want the Technical Training Center of the US Nuclear Regulatory Commission to remain in Chattanooga. With much discussion nationally about saving taxpayers funds through lower federal spending, the move of the TTC to the District of Columbia/Rockville, Maryland area would be (1) cost prohibitive to the employees involved

(2) more expensive for the 31 Agreement States to send their students to another place other than the Chattanooga TTC

- (3) have a major economic downturn for Chattanooga, Hamilton County, southeastern Tennessee and northern Georgia, and
- sourceastern remessee and nonnem Georgia, and

(4) would not be fiscally prudent, reasonable or proper.

The people of Chattanooga, Hamilton County, southeastern Tennessee and northern Georgia request the action of our elected Congressmen and Senators to contact the NRC Commissioners and request their support to leave the NRC's Technical Training Center in Chattanooga, Tennessee, and where it has efficiently operated and produced the world's finest nuclear inspectors for the past 19+ years.

We respectfully request your immediate attention to this matter

Attachments

SECY-79-622 November 19, 1979 Recommendation to locate the TTC in Chattanooga, Tennessee

MRC Mission and Organization Statement

NRC Commission Offices and biographical sketches

State Program Directory

SECY-98-291 December 18, 1998 Plan for Improving the Effectiveness of NRC's Training Programs

Chattanooga TTC Special Edition Newsletter from 1992 Program highlights, features on various instructors, various support materials for the Chattanooga TTC

Walter C. Sprouse, Jr., CED, CCE Vice President-Economic Development Chattanooga Area Chamber of Commerce 1001 Market Street Chattanooga, TN 37402-2690 (423) 756-2515, extension 148 (423) 267-7242 wsprouse@chattanooga-chamber.com



Movember 19, 1979

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SEC7-79-622

	COMMISSIONER ACTION
For:	The Commissioners
From:	Victor Stello, Jr., Director Office of Inspection and Enforcement
<u>Thru:</u>	Executive Director for Operations
Subject:	IMPROVEMENTS IN THE INSPECTION AND ENFORCEMENT TRAINING PROGRAM
<u>Purpose</u> :	To inform the Commission about planned improvements in the IE training program and to request Commission approval of a relocation of the training staff from Bethesda, Maryland to Chattanooga, Tennessee.
<u>Discussion</u> :	Based primarily on lessons learned from the TMI experience, IE is planning an expanded program of training which features these improvements:
	 An expansion of the resident inspector operations training program from 8 weeks to 11 weeks. Included in the additional training is more time on the reactor simulator, detailed discussion of the safety importance of plant auxiliary systems and increased emphasis on reactor transients.
	2. Establishment of a requirement that each resident inspector attain a defined level of knowledge about the specific facility to which he or she is assigned. This will be accomplished through a combined program of formal IE-sponsored and on-the-job training for each area of inspection speciality. Completion of each part of the program will require certification by the Career Management Branch for the IE formal training and by the inspector's supervisor for the OJT. This type of planned formal program will provide uniformity and assurance of inspector qualifications.
	3. In coordination with the Office of Administration

(MDTS) agency-wide program in systems and safety

CONTACT: J. C. LeDoux, IE 49-27941



management education, provide courses in reactor safety analysis to improve a resident inspector's understanding of the safety analysis of the plant from an engineer's point of view.

- 4. For NRC staff members who are likely to be called to respond to an incident, there will be detailed training in the NRC's emergency procedures, personal radiation safety and plant security.
- More detailed training of inspectors in how to conduct inspections of plant procedures, tests, emergency plans, and of the training and performance of licensed operators.
- 6. Training for foreign nationals consistent with providing training to all NRC offices.
- 7. Location of the reactor training staff near reactor simulators to climinate the time that is lost in travel and to have more opportunity to use the simulators to develop course material.

A new objective of the reactor operations inspector training program is to achieve substantial comparability to the knowledge level of the average Senior Reactor Operator (SRO). The current basic training program, administered from IE Headquarters in Bethesda, consists of six weeks of classroom instruction, one week of simulator training using the TVA simulators in Chattanooga, Tennessee, and one week of instruction in inspection techniques. This current program provides an estimated 53% of the average SRO knowledge level (See Attachment A, Table 1). Inspection experience and on-the-job training increase the inspector's knowledge of SRO activity. Duty as a resident or unit inspector will provide the best opportunity for gaining specific plant knowledge.

To improve the effectiveness of reactor operations training, the required courses for new inspectors will be expanded from eight to eleven weeks with an additional week of simulator training, one week of observation training at a reactor site, and an additional week of classroom instruction. The simulator training has proved to be the most effective method for implanting plant operations knowiedge. Greater use of simulators is essential for improving inspector knowledge. It is estimated that this expanded program will provide inspectors with 87% of the SRO knowledge level. This expanded program is feasible only if the reactor training staff is located in Chattanooga, Tennessee.

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We are aware that the President's Commission and other TMI investigating bodies have focused on improvements in the training of licensee employees. These bodies and the NRC's own TMI Special Investigation Group may recommend that NRC provide specific training to licensee employees and/or more extensive training of NRC staff members than has been outlined above. The proposed new location for the IE training staff would accommodate readily any such expansion in the program, if such a requirement is forthcoming and statutorily authorized.

With the transfer of the reactor training staff to its own location, we would plan to rename the group and the facilities it occupies as the NRC Reactor Training Center. This change in title would emphasize that the training program includes the rest of NRC and its technical programs and not simply IE inspectors.

The issue as to the best location for the training staff arose during the NRC Training Consolidation Study. SECY 79-206 endorsed relocation to a field office to facilitate attracting experienced inspectors to apply for instructor positions. We have been unable to recruit inspectors for these positions at the Bethesda location due to the high cost-of-living in the Washington area.

Need to Locate Training Staff Near Reactor Simulators and Reactor Facilities

To meet the increased demand for reactor training, the IE Training Staff will be increased from eight to twenty instructors by the end of FY 1980. Recruitment of fully aualified reactor instructors has always been difficult since the industry-wide pool of such personnel is very small. Therefore, we have found it necessary to hire some instructors who do not possess a detailed familiarity with the PWR or BWR commercial plants although they possess a good general background in reactors and have necessary teaching skills. As a result, a significant amount of in-house training is required for these new instructors in both plant design and operations. The practical operating experience can be gained by extended periods of observation training at reactor facilities. A successful observation type program has been effected with TVA using Sequoyah and Browns Ferry Plants. A significant amount of reactor simulator training is also required.

In addition to training new instructors, the training staff must continually have the time and opportunity to keep up to date on the state of the art. This requires onsite time, simulator updating, and technology study. The present staff of instructors spend about one-third of their teaching time at the TVA simulators in Chattanooga, Tennessee. Each one week simulator class requires 2 to 3 instructors. Travel to and from Chattanooga requires at least two instructor days for each simulator class. This travel schedule reduces the time available for class preparation, updating training material and for keeping up with technology changes.

Since a significant portion of the reactor training of both inspector and instructor relies on reactor simulator and observation training at reactor sites, the training should be performed at a location with access to simulators and nuclear power plants. Locating the staff near simulators and reactor facilities will not only improve the effectiveness of learning by inspectors but will improve the efficiency of instructors by eliminating a substantial amount of travel each year. This reduction in instructor travel time could be used to partially meet the increasing demand for reactor courses from other NRC offices, particularly NRR, RES, and potentially IP.

Basis for Selection of Chattanooga

We have considered five alternatives for meeting the need of the training staff to be located near reactor simulators and reactor facilities. These include staying in Bethesda; constructing an NRC reactor simulator facility; contracting for simulator training; moving the training to a Regional Office such as Region II or IV; and a relocation to Chattanooga, Tennessee. The detailed pros and cons are outlined in Attachment B.

After carefully considering these alternatives, we have selected Chattanooga as the recommended location for the training staff because it achieves the goal of access to simulators of the five types of reactor designs, and near access to a variety of reactor facilities. Chattanooga is the only place in the United States where simulators of the five basic types of reactor designs will be located at one site.

At present, TVA has a PWR (Westinghouse) and a BWR/4 (GE). By 1983, there will be a simulator for each type of PWR (W, CE and B&W) and a BWR/6. Within 160 miles, there are 7 TVA plants which have reactors representing each type of plant (Attachment A - Table II).

The initial move to Chattanooga would cost about \$200,000 which includes staff moves and preparation of classroom space. TVA has informally agreed that it could provide

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separate space to the NRC training staff at the location of the TVA simulators which is about 20 miles from Chattanooga when the new buildings are completed in 1983. The costs per square foot for this space will be about \$10/sq. ft. Rental space in Chattanooga ranges from \$6 to \$12/sq. ft. The E/W Towers training space now costs about \$14/sq. ft. The net savings per year should be close to \$20,000 per year. The travel costs for students and staff would also provide a net savings over the Bethesda location of more than \$100,000 per year. The cost of moving would be amortized over a two year period as shown in Attachment C.

Setting up a training office in Chattanooga would not require additional positions. The training staff has its own clerical and administrative staff and does not need any additional overhead positions to function in another geographical area. This training function would be directed by IE:HQs through the Director, Region II. This would be similar to the Vendor Inspection Program operated out of Region IV.

Avoidance of Conflict of Interest

The only major obstacle of such a move is the possible conflict of interest with TVA as a licensed utility. This has been addressed previously since we now use TVA facilities for the simulator training and for observation training. The conflict can be minimized since the training staff is not directly involved in inspecting TVA facilities. The following principles would have to be followed if the staff were located at or near the TVA training center. 1. The facilities, classrooms, study areas would be used by NRC only. 2. No direct contact of NRC study personnel with TVA personnel. 3. No supervision by TVA. 4. Courses taught solely by NRC instructors.

<u>Recommendation</u>: Move the reactor training staff to Chattanooga during the summer of 1980.

Effect an agreement with TVA for future space at the simulator site which meets desirable separation criteria.

<u>Coordination</u>: This paper has been coordinated with the Office of Administration. The ELD has no legal objections.

"NTEU will be informed of actions which may be authorized by the Commission with respect to the recommendations of this paper." Scheduling:

If this paper is scheduled for discussion, I recommend an open session.

Victor Stello, Jr. Director Office of Inspection and Enforcement

Enclosures:

- A Power Plant Knowledge Level Evaluation w/Tables I & II
- B Possible Alternative Sites
- C Cost Analysis of Moving Staff to Chattanooga
- NOTE: Commissioner's comments should be provided directly to the Office of the Secretary by c.o.b. Tuesday, December 4, 1979.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT November 28, 1979; with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

DISTRIBUTION Commissioners Commission Staff Offices Exec Dir for Operations ACRS Secretariat - 8 -

ENCLOSURE A

POWER PLANT KNOWLEDGE LEVEL EVALUATION

The objective of the reactor technology training given to operations inspectors is to approach, as nearly as possible, the level of knowledge that the average Senior Reactor Operator (SRO) possesses. To qualify for an SRO license requires years of experience as a Reactor Operator plus academic training and simulator drills. The NRC is recommending that applicants for an SRO should have four years of operating experience, plus two years of nuclear technical experience (staff engineer, control room operator, or two years of academics), and at least six months of on-site experience.

The IE technical training will be expanded from seven weeks to ten weeks by increasing the academics by one week, simulator training by one week, and the additional one week of observation training at a power plant. This expanded training will improve the basic knowledge level of inspectors but can not be expected to provide the same degree of working knowledge that a SRO has. With a good training program foundation, the inspector will rapidly gain more specific plant knowledge with observation training and on-site experience.

In order to assess the effectiveness of IE reactor training, the current seven week and proposed ten week programs were compared to the "ideal" SRO knowledge level. The results of that comparison are tabulated in Table I. The subject areas are those required of an SRO by 10 CFR 55.20 (Operator Examinations). The assigned knowledge levels (defined below) were taken from a study performed by the General Research Corporation. The knowledge levels for an SRO were assigned to each subject area by members of the training staff who have held SRO licenses on commercial power plants. Finally, the IE training given to inspectors was reviewed and rated on these same factors.

Although the rating factors assigned to each area are subjective, this comparison does provide a valid assessment of inspector training. This analysis provides insight into areas that classroom academics or simulator training can not provide. Thus, more emphasis must be given to observation and on-the-job training efforts to fill in the gaps.

KNOWLEDGE AREA DEFINITIONS:

EXP = EXPERT KNOWLEDGE at this level is a complete-understanding of theory, principles and design considerations underlying the area under consideration, reflecting the Current State-of-the-Art: It is the product of in-depth training, formalized education and extensive experience in the specific area. Knowledge at this level enables its possessor to write procedures and regulations which are authentic and accurate. This person is an authority in the area, whose judgments are accepted by associates.

¹ Definitions of Qualification for Assignment to Specified NRC/IE Job/ Position Classifications; General Research Corporation, December 30, 1977.

- TU = THOROUGH UNDERSTANDING entails knowing the why of the rules and the consequences of their misapplication or nonapplication. Its possessor can readily detect deviations from prescribed standards; more than that, can spot situations which pose danger, and even though not the authority in the area, is one whose judgments are accepted by associates.
- WK = WORKING KNOWLEDGE is that possessed by the experienced worker in this field. It means an understanding of the area under consideration, and an appreciation for the theory and principles upon which its rules are based. Working knowledge implies a capability to defend findings before one's peers and associates, and to participate in the decision process.
- GF = GENERAL FAMILIARITY with a topic is that possessed by the wellgrounded beginner. It means knowing the field applications of one's education and training and understanding the technical language of the area.

Attachments:

- 1. Table I Power Plant Knowledge Level Evaluation
- Table II Potential Observation Training Sites

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POWER PLANT KNOWLEDGE LEVEL EVALUATION - TABLE I

Sut	<u>) ject Area</u>	Ideal SRO Level	Inspector Ten Weak Course	Inspector Seven Week Course
1.	Reactor Theory	<tu< td=""><td>>₩K</td><td>WK .</td></tu<>	>₩K	WK .
2.	General Design Features of Core	TIJ	>WK	>WK
3.	Mechanical Features Primary System	ΤU	<7U	WK
4.	Auxiliary Systems	TU	>WK .	GF
5.	General Operating Characteristics	<exp< td=""><td><70</td><td>₩К</td></exp<>	<70	₩К
6.	Reactivity Control	TU	<tu< td=""><td>WK</td></tu<>	WK
7.	Safety Systems	<exp< td=""><td>TU</td><td>>WK</td></exp<>	TU	>WK
8.	Reserve and Emergency Systems	<tu< td=""><td>TU</td><td>>WK</td></tu<>	TU	>WK
9.	Containment	ΤU	>WK	<wk< td=""></wk<>
10.	Procedures	EXP	WK	GF
11.	Radiation Monitoring System	<tu< td=""><td>WK</td><td><gf< td=""></gf<></td></tu<>	WK	<gf< td=""></gf<>
12.	Radiological Safety Principles/ Procedures	TU	>WK	N/A
13.	Conditions and Limitations of Facility License	TU	ΤU	<tu< td=""></tu<>

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	Sut	<u>ject Area</u>	Ideai SRO Level	Inspector Ten Week Course	Inspector Seven Week Course
	14.	Design and Operating Limitations	TU	(1)	<t()< td=""></t()<>
	15.	Design and Operating Change Procedures	<70	WK	N/A
	16.	Radiation Hazards	τυ	<wk< td=""><td>GF</td></wk<>	GF
	17.	Coolant Chemistry	WK	<wk< td=""><td>GF</td></wk<>	GF
	18.	Core Alterations Limitations/ Procedures	TU	>WK	GF .
·	19.	Fuel Handling	EXP	>WK	GF
	20.	Radioactive Materials Handling/ Disposal	TU	WΚ	GF
	21.	Prestartup Procedures	EXP	TU	WK
	22.	Cold S/D to Power Procedures	EXP	ЖK	GF
	23.	Annunciator Signals	ЕХР	WK	GF
	24.	Instrumenta- tion System Signals	ЕХР	ΤU	WK
	25.	Facility Behavior Characteristics	EXP	ΤU	WK
	26.	Control Manipulation	EXP	<tu< td=""><td><\K</td></tu<>	<\K

<u>Sub</u>	<u>ject Area</u>	ideal <u>SRO Level</u>	inspector <u>Fen Week Course</u>	Inspector Seven Week Course
27.	Heat Removal Systems Operations	EXP	<tu< td=""><td>МК</td></tu<>	МК
28.	Auxiliary Systems Operations vs. Reactivity	ЕХР	τIJ	WK
29.	Radiation Monitoring Systems	<tv< td=""><td>МŔ</td><td><gf t<="" td=""></gf></td></tv<>	МŔ	<gf t<="" td=""></gf>
30.	Radiation Hazard Significance	TU	, WK	<gf< td=""></gf<>
31.	Emergency Plans	ЕХР	97K	N/A
32.	Necessity for Safe Plant Operations	EXP .	EXP	ЕХР
	Average Levels	EXP/TU	TU/WK	WK/GF

- EXP = Expert Knowledge TU = Thorough Understanding WK = Working Knowledge GF = General Familiarity N/A = Not Applicable

TABLE 11

POTENTIAL OBSERVATION TRAINING SITES

Plant Name	<u>Vendor/Type</u>	Location	Distance from TVA Training Center
Sequoyah Nuclear	Westinghouse Power Plant	Daisy, Tennessee	l mile
Watts Bar Nuclear Plant	Westinghouse Tennessee	Spring City,	40 miles
TVA Hartsville Plant	GE-EWR/6	Hartsville, Tennessee	100 miles
Phipps Bend	GE-BWR/6	Phipps Bend, Tennessee	110 miles
Brown's Ferry Nuclear Plant	GE-BWR/4	Decatur, Alabama	115 miles
Bellefonte Nuclear Plant	Babcock & Wilcox	Scottsboro, Alabama	55 miles
Yellow Creek	Combusion Engineering	Yellow Creek, Mississippi	160 miles

ETECLOSURE B

POSSIBLE ALTERNATIVE SITES FOR THE TRAINING STAFF

Alternative 1: Stay in Bethesda at present location.

Pros: No relocation costs.

Pros:

Cons: Far away from reactor simulators with resulting loss of time by instructors and heavy travel costs.

Difficult for out-of-town students to find accommodations within the government cost allowance (per diem).

Difficult to recruit instructors, and impossible to recruit inspectors as instructors due to the high cost of housing in the Washington area.

Alternative 2: Build NRC reactor simulator facility.

No competition for simulator time.

No travel by training staff:

Cons: Each simulator costs \$9 million, or a total of \$45 million to simulate five reactor designs.

Lead time for purchase of simulators is 5 - 7 years. During this period, there would be inefficient use of the staff and large travel costs.

Would need 18,000 sq, ft. of space to house the simulators and provide offices and classrooms. This would cost approximately \$14 per sq. ft. per year.

Need a staff of 5 - 7 technicians and programmers to maintain the simulators.

Alternative 3: Contract out the reactor simulator training.

Pros: Reduce IE training staff by 4 instructors,

No travel required for instruction staff.

Cons: Cost of commercial simulator time runs at \$1,500 per hour as compared to \$250/hour at present TVA simulators and \$500 per hour for the new (1983) simulators. For expanded program, this would cost over \$2 million per year.

Previous experience with contract simulator courses has been poor.

Competition with industry for available time on simulators.

The contractor (nuclear industry) would provide the instructors. This represents a possible conflict of interest in which the industry is training NRC inspectors.

Alternative 4: Move training to a Region such as Region II or iV.

Pros: Easier to attract inspectors as instructors and recruit from industrial training staffs.

Lower costs for student accommodations.

Would allow more interaction between the inspection staff and the training staff than in Bethesda.

Minor travel savings over the Bethesda location.

Cons: A relocation cost of \$200,000.

Loss of time by instructors traveling to simulators. More difficult to get simulator time for lesson preparation because of separation from TVA simulators.

Alternative 5: Move to Chattanooga, Tennessee

Pros:

Ability to utilize 5 reactor simulators without waste of time involved in travel.

Savings of about \$120,000 in per diem and rental of space after 2-year period to amortize the move costs.

Ability to attract experienced NRC inspectors for instructor positions and to compete better with industry for fully qualified instructors.

Better accommodations for students within allowable per diem.

Ready access to 7 TVA reactor plants for observation training. The plants are within 160 miles of Chattanooga.

Cons: Relocation costs of \$200,000.

Possible appearance of a conflict of interest with TVA.

ENCLOSURE C

COST AMALYSIS OF MOVING TRAINING STAFF TO CHATTANOUGA

	FY 1980 (3 months)	<u>FY 1981</u>	FY 1982	<u>FY 1983</u>
Staff Move 1	\$200,000	• () ·	- 0 -	. 🛥 () 🚥
Office Admin"	1,300	5,000	5,000	5,000
Space Cost ²	- 4,500	- 18,000	- 18,000	- 18,000
Travel ³	- 3,300	. 14,500	- 15,700	- 15,500
Per Diem ⁴	- 21,900	- 88,000	- 87,400	- 83,900
Per Year	+ 171,600	- 115,000	- 116,100	- 112,400
Cumulative Cost	t +\$171,600	+\$ 56,100	-\$ 60,000	-\$172,400

- NOTES: 1. Estimated increased cost above the Bethesda location due to the need for a facsimile machine, XEROX copier, and possibly a GSA auto.
 - Cost in Chattanooga averages about \$2/sq. ft. less than in the D.C. area. 9000 sq. ft. figuired.
 - 3. Travel costs increase for Region I and Headquarters, decrease for all other regions. Includes only per trip airline differential.
 - 4. Per diem rates are \$15 per day less in Chattanooga than in Bethesda area. Each week of training costs 7 days of per diem either in travel or weekend stays for long courses.





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Mission

HE mission of the U.S. Nuclear Regulatory Commission (NRC) is to ensure adequate protection of the public health and safety, the common defense and security, and the environment in the use of nuclear materials in the United States. The NRC's scope of responsibility includes regulation of commercial nuclear power reactors; nonpower research, test, and training reactors; fuel cycle facilities; medical, academic, and industrial uses of nuclear materials; and the transport, storage, and disposal of nuclear materials and waste.

Statutory Authority

The <u>NRC</u> was created as an independent agency by the *Energy Reorganization Act of 1974*, which abolished the <u>Atomic Energy Commission (AEC)</u> and moved the AEC's regulatory function to NRC. This act, along with the Atomic Energy Act of 1954, as amended, provides the foundation for regulation of the nation's commercial nuclear power industry.

NRC regulations are issued under the <u>United States Code of Federal Regulations (CFR) Title 10.</u> <u>Chapter 1.</u> Principal statutory authorities that govern NRC's work are--

- Atomic Energy Act of 1954, as amended
- Energy Reorganization Act of 1974, as amended
- · Uranium Mill Tailings Radiation Control Act of 1978, as amended
- Nuclear Non-Proliferation Act of 1978
- Low-Level Radioactive Waste Policy Act of 1980
- West Valley Demonstration Project Act of 1980
- Nuclear Waste Policy Act of 1982
- · Low-Level Radioactive Waste Policy Amendments Act of 1985
- · Diplomatic Security and Anti-Terrorism Act of 1986
- Nuclear Waste Policy Amendments Act of 1987
- Solar, Wind, Waste and Geothermal Power Production Incentives Act of 1990
- Energy Policy Act of 1992

The NRC and its licensees share a common responsibility to protect the public health and safety.

Federal regulations and the NRC regulatory program are important elements in the protection of the public. NRC licensees, however, have the primary resplatability for the safe use of nuclear materials.

Licensing and Regulatory Responsibilities

The NRC fulfills its responsibilities through a system of heensing and regulatory activities that include--

- Licensing the construction and operation of nuclear reactors and other nuclear facilities, such as nuclear fuel cycle facilities and nonpower test and research reactors, and overseeing their decommissioning
- · Licensing the possession, use, processing, handling, and export of nuclear material
- Licensing the siting, design, construction, operation, and closure of low-level radioactive waste disposal sites under NRC jurisdiction and the construction, operation, and closure of the geologic repository for high-level radioactive waste
- · Licensing the operators of nuclear power and nonpower test and research reactors
- Inspecting licensed facilities and activities
- Conducting the principal U.S. Government research program on light-water reactor safety
- Conducting research to provide independent expertise and information for making timely regulatory judgments and for anticipating problems of potential safety significance
- Developing and implementing rules and regulations that govern licensed nuclear activities
- Investigating nuclear incidents and allegations concerning any matter regulated by the NRC
- Enforcing NRC regulations and the conditions of NRC licenses
- Conducting public hearings on matters of nuclear and radiological safety, environmental concern, common defense and security, and antitrust matters
- Developing effective working relationships with the States regarding reactor operations and the regulation of nuclear material
- Maintaining the NRC Incident Response Program, including the NRC Operations Center
- Collecting, analyzing, and disseminating information about the operational safety of commercial nuclear power reactors and certain nonreactor activities

Principles of Good Regulation

The NRC adheres to the following Principles of Good Regulation:

• Independence--Nothing but the highest possible standards of ethical performance and professionalism should influence regulation. However, independence does not imply isolation. All available facts and opinions must be sought openly from licensees and other interested members of the public. The many and possibly conflicting public interests involved must be considered. Final decisions must be based on objective, unbiased assessments of all

NRC Mission and Organization

information, and must be documented with reasons explicitly stated.

- Openness--Nuclear regulation is me public's business, and it must be transacted publicly and candidly. The public must be informed about and have the opportunity to participate in the regulatory processes as required by law. Open channels of communication must be maintained with Congress, other government agencies, licensees, and the public, as well as with the international nuclear community.
- Efficiency--The American taxpayer, the rate-paying consumer, and licensees are all entitled to the best possible management and administration of regulatory activities. The highest technical and managerial competence is required, and must be a constant agency goal. NRC must establish means to evaluate and continually upgrade its regulatory capabilities. Regulatory activities should be consistent with the degree of risk reduction they achieve. Where several effective alternatives are available, the option which minimizes the use of resources should be adopted. Regulatory decisions should be made without undue delay.
- Clarity--Regulations should be coherent, logical, and practical. There should be a clear nexus between regulations and agency goals and objectives whether explicitly or implicitly stated. Agency positions should be readily understood and easily applied.
- Reliability-- Regulations should be based on the best available knowledge from research and
 operational experience. Systems interactions, technological uncertainties, and the diversity of
 licensees and regulatory activities must all be taken into account so that risks are maintained at
 an acceptably low level. Once established, regulation should be perceived to be reliable and
 not unjustifiably in a state of transition. Regulatory actions should always be fully consistent
 with written regulations and should be promptly, fairly, and decisively administered so as to
 lend stability to the nuclear operational and planning processes.

Commission Offices

The NRC is headed by <u>five Commissioners</u> appointed by the President and confirmed by the Senate for 5-year terms. One of them is designated by the President to be the Chairman, serving as the principal executive officer and official spokesperson of the Commission.

- Chairman Dicus
- Commissioner Diaz
- Commissioner McGaffigan
- Commissioner Merrifield
- vacant

The staff, headed by the <u>Executive Director for Operations</u> carries out the policies and decisions made by the Commission.

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CHATTANOOGA AREA CHAMBER OF COMMERCE ECONOMIC DEVELOPMENT DEPARTMENT

> 1001 Market Street Chattanooga, Tennessea 34702 423/756-2515

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THE NRC is headed by five Commissioners (shown below) appointed by the President and confirmed by the Senate for 5-year terms. One of them is designated by the President to be the Chairman, serving as the principal executive officer and official spokesperson of the Commission.





Greta Joy Dicus

The Honorable Grein Joy Dicus was appeinded Chanman of the U.S. Nuclear Regulatory Commission by President Clinton, effective July 1, 1999. Commissioner Dicus served her first term as Commissioner from February 15, 1996 until June 30, 1998, and was re-nominated by President Clinton in May 1998, beginning her secondterm in October 1998. In the interim between her first and second terms, she cerved as an outside expert to the U.S. Defense Nuclear Facilities Safety Board.

Commissioner Dicus is a radiation biologist. Before joining the NRC, Ms. Dicus was confirmed by the U.S. Senate as a member of the Board of Directors of the U.S. Enrichment Corporation (USEC). She served on the USEC Board from March 1994 to February 1995.

From 1930 to 1995, Ms. Dicus worked at the the Division of Radiation Control and Emergency Management at the Arkansas Department of Health, serving as the Director of the Division for nine years. Concurrently, from 1991 to 1993, she served as Chairman of the Central Interstate Low-level Radioactive Waste Commission. She also served on the Advisory Committee on Transportation of Radioactive Materials for the Southern States Energy Board (SSEB), as well as on the SSEB TRU Working Group. Among other appointments, Ms. Dicus has served as the Arkansas Liaison with the NRC, the Commissioner of the Central States Low-Level Waste Compact Commission, and a member of the Governor's Low-Level Radioactive Waste Advisory Group.

For 16 years, from 1961 to 1977, Ms. Dicus conducted research in radiation health effects at Harvard Medical School, Rice University, and the University of Texas Southwestern Medical School.

An Arkansas native, Ms. Dicus was educated in Texas. She graduated with a Bachelor of Arts degree in biological sciences from Texas Women's University in 1961, and earned a Master's Degree in radiation biology from the University of Texas Southwestern Medical School in 1967.

Ms. Dicus is a member of the Health Physics Society, Sigma Xi, and the Conference of Radiation Control Program Directors.

July 1999

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Nils J. Diaz

r. Nils J. Diaz was sworn in us a Commissioner of the Nuclear Regulatory Commission on August 23, 1996, after a distinguished career spanning a quarter century as an educator, research scientist, consultant and entrepreneur in such fields as nuclear engineering, nuclear power sources in space and medical and industrial applications of radioisotopes.

Before joining the NRC, Dr. Diaz was a professor of nuclear engineering at the University of Florida and director of the Innovative Nuclear Space Power and Propulsion Institute, a national consortium of universities and industry, which he founded. He also

was president of Florida Muclear Associates, Inc., a high technology research and consulting firm.

For one year, in the early 1980's, he served abroad as the principal consultant to Spain's Nuclear Regulatory Commission, and has consulted for the governments of Mexico, Venezuela, Brazil and Argentina.

Dr. Diaz received a Bachelor of Science degree in Mechanical Engineering from the University of Villanova, in Cuba, and both a Master of Science and PhD degrees from the University of Florida in nuclear engineering sciences. From 1971-1933, he held a senior nuclear reactor operator's license from the NRC and worked on Medical Physics at Vanderbilt University and the University of Miami hospitals, among others.

Before joining the NRC, Dr. Diaz was actively involved in research of power sources in space, advanced energy conversion, advanced space propulsion, and in developing gamma ray spectroscopy for the detection and location of flaws in materials.

September 1996

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Edward McGaffigan, Jr.



DWARD McGaffigao. In was swown as a Commissioner of the Nuclear Regulatory Commission on August 28, 1996. Prior to that time, he was a senior policy advisor to Senator Jeff Bingaman (D-NM), and on the Senator's staff since February 1983. Throughout the thirteen and one-half years, he supported the Senator's work on defense policy, technology policy, personnel and acquisition reform, and nonproliferation and export control policy.

joining Senator Bingaman's staff. From February 1981 to February 1983 he served as a senior policy analyst and then assistant director in the White House Office of Science and Technology Policy, where he oversaw international scientific cooperation and export control matters. During much of this period he held a dual appointment on the Mational Security Council staff.

Previously, Mr. McGaffigan had carried out various assignments within the State Department dealing with U.S.-Soviet relations and politico-military issues. In his only overseas assignment he was stationed as a science attache in the U.S. Embassy in Moscow from July 1978 to April 1980. He reported on Soviet energy and atomic energy developments and managed bilateral science cooperation in those and other areas. He was at the time proficient in Russian.

Prior to joining the Foreign Service in May 1976, Mr. McGaffigan worked at the RAND Corporation on evaluating Japanese science and technology and at the Arms Control and Disarmament Agency on strategic arms control issues.

Mr. McGaffigan grew up in Boston, where he attended Boston Latin School and became valedictorian of his graduating class. He majored in physics at Harvard, where he received his bachelor's degree in 1970 (summa cum laude). He was elected to Phi Beta Kappa his junior year. He holds master's degrees in physics from California Institute of Technology (1974) and in public policy from Harvard's Kennedy School of Government (1976). He won a Harvard National Scholarship, a Sheldon Travelling Fellowship, a National Science Foundation Fellowship, a Woodrow Wilson Foundation Fellowship, a Millikan Fellowship, and a Harvard National Graduate Fellowship during his academic career.

Mr. McGaffigan is married and has two children. He has been active in coaching youth soccer and basketball.

September 1996

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Jeffrey S. Merrifield



HE Honorable Jeffrey S. Merrifield was sworn in as a Commissioner of the Nuclear Regulatory Commission on Oct. 23, 1998. Prior to assuming that post, he had served for several years as a senior counsel and legislative assistant to two United States Senators and as a Washington, D.C., attorney, specializing in environmental and regulatory issues.

Immediately before joining the MRC, Mr. Metrifield was Majority Counsel and Staff Director of the Senate Subcommittee on Superfund, Waste Control and Risk

Assessment under the chairmapship of Sen. Robert Smith (P-NH). During nearly four years in that assignment, he drafted legislation dealing with solid and hazardous waste disposal and cleanup regulation. In addition, he advised Senator Smith, who was also chairman of the Subcommittee on Strategic Forces, on environmental matters involving facilities of the Departments of Defense and Energy.

From September 1992 to January 1995, Mr. Merrifield was an associate of the Washington, D.C., law firm of McKenna & Cuneo, where he represented a broad range of clients on environmental, contracting and regulatory issues.

In earlier service on Capitol Hill, Mr. Merrifield was a legislative assistant, first to Sen. Gordon Humphrey (R-NH), from January 1987 to December 1990, and subsequently to Senator Smith, from December 1990 to July 1992. He focused primarily on environmental, energy, transportation and agriculture issues.

Mr. Merrifield, a native of Antrim, N.H., majored in political science and history at Tufts University, where he received his Bachelor of Arts degree, magna cum laude, in 1985. While an undergraduate, he organized and supervised a direct mail and telemarketing campaign that raised over \$4 million for the university. He received his Doctor of Jurisprudence degree from Georgetown University Law Center in 1992.

Mr. Merrifield is married and has two sons. He is a member of the bar of both New Hampshire and the District of Columbia.

October 1998

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Agreement State | Letter of Intent to Become an Agreement State Received From Governor. |

Alabama 📈

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Kirksey E. Whatley, Director Office of Radiation Control The Alabama Department of Public Health		Kirksey E. Whatley, Director Office of Radiation Control The Alabama Department of Public Health
The RSA Tower, Suite 700 P.O. Box 303017		The RSA Tower, Suite 700 P.O. Box 303017
Montgomery, AL 36130-3017 PH (334)206-5394 FX (334)206-5387 INET: <u>kwhatley@adph.state.al.us</u>		Montgomery, AL 36130-3017 PH (334)206-5391 FX (334)206-53 INET: <u>kwhatley@adph.state.al.us</u>

Alaska

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	Clyde E. Pearce,	Doug Dasher

	Radiological Health Specialist Radiological Health Program Snue Public Health Laboratory 517 East 4th Alzenos, Suite 7 Auchorage, AK 99501-2613 PH (907)269-7911 FX (907)269-6290 PJET: clyde_pearce ghealth,STATE AS US	Department of Environmental Conversation Northern Regional Office 610 University Avenue Fairbanks, Alaska 99709-3643 PH (907)451-2172 FX (907)451-21
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Arizona

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Aubrey V. Godwin, Director Arizona Radiation Regulatory Agency		Aubrey V. Godwin, Director Arizona Radiation Regulatory Ager
4814 South 40th Street Phoenix, AZ 85040 PH (602)255-4845 ext. 222 FX (602) 437-0705 INET: <u>agodwin Warta state.az.us</u>		4814 South 40th Street Phoenix, AZ 85040 PH (602)255-4845 ext. 222 FX (60) 437-0705 INET: agodwinwarra.state.az.us

Arkansas

Agreement State Director	Non-Agreement State Director	State Liaison Officer
David Spellings, Director Division of Radiation Control &		David Snellings, Director Division of Radiation Control &
Emergency Mgmt		Emergency Mgmt
Department of Health		Department of Health
4815 West Markham Street, Slot 30		4815 West Markham Street, Slot 3(
Little Rock, AR 72205-3867		Little Rock, AR 72205-3867
PH (501)661-2301 FX (501)661-2468		PH (501)661-2301 FX (501)661-24
INET:		INET:
dsnellings@mail.doh.state.ar.us		dsnellings@mail.doh.state.ar.us

California De

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Edgar D. Bailey, C.H.P., Chief Radiologic Health Branch Division of Food, Drugs, and Radiation Safety California Department of Health Services P.O. Box 942732 Sacramento, CA 94234-7320 PH (916)322-3482 FX (916)324-3610 INET: chailey@dhs.ca.gov		California Energy Commission 1516 Ninth Street Sacramento, California 95814 PH (916)654-5000 FX (916)654-4-4

http://www.hsrd.ornl.gov/nrc/asdirectr.htm

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Colorado

Agreement State Directors	Non-Agreement State Director	State Liaison Officer
Robert M. Quillin, Director Laboratory & Radiation Services Division Department of Public Health & Environment 8100 Lowry Boulevard Deriver, CO 80220-6928 PH (303)692-3038 FX (303)343-3697 INET: robert.quillin cistate.co.as		Robert M. Quillin, Director Laboratory & Radiation Services Division Department of Public Health & Environment 8100 Lowry Boulevard Denver, CO 80220-6928 PH (303)692-3038 FX (303)343-36 INET: robert.guillinv/state.co.us
Donald Simpson Hazardous Materials & Waste Management Division (HMWMD- USP-B2) Department of Public Health & Environment 4300 Cherry Creek Drive South Denver, CO 80246-1530 PH (303)692-3419 FX (303)759-5355 INET: don.simpson@state.co.us		

Connecticut

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	Dr. Edward L. Wilds, Jr., Director Division of Radiation Department of Environmental Protection 79 Elm Street Hartford, CT 06106-5127 PH (860)424-3029 FX (860)424-4065 INET: edward wilds à po. STATE.CT.US	Dr. Edward L. Wildes, Jr., Director Division of Radiation Department of Environmental Protection 79 Elm Street Hartford, CT 06106-5127 PH (860)424-3029 FX (860)424-40 INET: edward.wildes@po.STATE.CT.US

Delaware

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	Allan C. Tapert, Program Administrator	Dr. Harry W. Otto, Manager
	Office of Radiation Control	Environmental Services Section
	Division of Public Health	Division of Water Resources
	Plan Review, Permitting and Enforcement	Department of Natural Resources &
	P.O. Box 637	Environmental Control
	Dover, DE 19903	P.O. Box 1401, 89 Kings Highway
	PH (302)739-3787 FX (302)739-3839	Dover, Delaware 19903
	INET: atapertia state de as	#302/739-5726 (Fax: 302/739-3491
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District of Columbia

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	Norma Jenkins Stewart, Acting Chief Bureau of Food, Drugs and Radiation Protection Department of Health 614 H Streets, N.W., Room 1016 Washington, DC 20001	
	PH:(202)727-7218 FX: (202)727-7728	

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Florida

Agreement State Director	Non-Agreement State Director	State Liaison Officer
William A. Passetti, Chief		William A. Passetti, Chief
Bureau of Radiation Control		Bureau of Radiation Control
Florida Department of Health		Florida Department of Health
2020 Capital Circle, SE, Bin C21		2020 Capital Circle, SE, Bin C21
Tallahassee, FL 32399-1741		Tallahassee, FL 32399-1741
PH (850)487-1004 FX (850)487-0435		PH (850)487-1004 FX (850)487-04
INET: bill_passetti@doh.state.fl.us		INET: bill_passetti@dcf.state.fl.us

Georgia 🗸

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Thomas E. Hill, Manager Radioactive Materials Program Department of Natural Resources		James Setser, Chief Program Coordination Branch Environmental Protection Division
4244 International Parkway, Suite 114 Atlanta, GA 30354 PH (404)362-2675 FX (404)362-2653		Department of Natural Resources 205 Butler Street, Suite 1152 East Tower
INET: thill@mail.dnr.state.ga.us		Atlanta, Georgia 30334 PH (404)656-4713 Fax: (404)651-5

Hawaii

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	Russell S. Takata, Supervisor Radiation Section Noise, Radiation and Indoor Air Quality	James K. Ikeda, Chief Environmental Health Services Division
	Branch	State Department of Health
	Department of Health	P.O. Box 3378
	591 Ala Moana Boulevard	Honolulu, Hawaii 96813
	Honolulu, HI 96813-4921	PH: (808)586-4576 FX (808)586-40
	PH (808)586-4700 FX (808)586-5838	
	INET: nriaq@keystroke.net	

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Idaho

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	Douglas Wells, Radiation Physicist INEEL Oversight Program 900 N. Skyline, Suite C Idaho Falls, ID 83402 PH (208)528-2600 FX (208)528-2605	Douglas Wells, Radiation Physicist INEEL Oversight Program 900 N. Skyline, Suite C Idaho Falls, ID 83402 PH (208)528-2600 FX (208)528-26

Illinois 🛱

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Thomas W. Ortciger, Director		Thomas W. Ortciger, Director
Illinois Department of Nuclear Safety		Illinois Department of Nuclear Safe
1035 Outer Park Drive		1035 Outer Park Drive
Springfield, IL 62704		Springfield, IL 62704
PH (217)785-9868 FX (217)524-4724		PH (217)785-9868 FX (217)524-47
INET: ortciger à idns state il us		INET: orteiger à idns.state.il.us

Indiana

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	John H. Ruyack, Director	Howard W. Cundiff, P.E., Director
	Indoor & Radiologic Health Division	Consumer Protection
	State Department of Health	Indiana State Department of Health
	2 N. Meridian Street	2 North Meridian Street, 5D
	Indianapolis, IN 46204-3003	Indianapolis, Indiana 46204
	PH (317)233-7146 FX (317)233-7154	PH (317)233-7182 FX (317)383-67
	INET: JRUYACK@ISDA.STATE.IN.US	

Iowa

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Donald A. Flater, Chief Bureau of Radiological Health Iowa Department of Public Health Lucas State Office Building Des Moines, IA 50319		S. Parveen Baig Utilities Division Iowa Department of Commerce Lucas State Office Building, 5th Flo Des Moines, Iowa 50319 PH (515)281 8644 EV (515)281 53
INET: <u>dflater@health.state.ia.us</u>		FR (515)201-0044 FX (515)201-55

Kansas 🖈

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Vick L. Cooper, Chief		Vick L. Cooper, Chief

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Radiation Control Program		Radiation Control Program
Kansas Department of Health &		Kansas Department of Health &
Environment		Environment
Bureau of Air & Radiation		Bureau of Air & Radiation
Forbes Field, Building 283		Forbes Field, Building 283
Topeka, KS 66620		Topeka, KS 66620
PH (913)296-1561 FX (913)296-0984		PH (913)296-1561 FX (913)296-09
INET: uskanxgn@ibmmail.com		INET: uskanxgn@ibmmail.com

Kentucky 🛱

Agreement State Director	Non-Agreement State Director	State Liaison Officer
John A. Volpe, Ph.D., Manager Radiation & Toxic Agents Control		John A. Volpe, Ph.D., Manager Radiation & Toxic Agents Control
Branch		Branch
Cabinet for Health Services		Cabinet for Health Services
275 East Main Street		275 East Main Street
Frankfort, KY 40621-0001		Frankfort, KY 40621-0001
PH (502)564-3700 FX (502)564-6533 INET: jvolpe1/ā,mail.state.ky.us		PH (502)564-3700 FX (502)564-65 INET: jvolpe1/@mail.state.ky.us

Louisiana 🛱

Agreement State Director	Non-Agreement State Director	State Liaison Officer
William H. Spell, Administrator		Ronald L. Wascom, Administrator
Radiation Protection Division		Radiation Protection Division
Office of Air Quality & Radiation		Office of Air Quality & Radiation
Protection		Protection
Department of Environmental Quality		Department of Environmental Qual
7220 Bluebonnet Road, P.O. Box		7220 Bluebonnet Road, P.O. Box
82135		82135
Baton Rouge, LA 70884-2135		Baton Rouge, LA 70884-2135
PH (225)765-0160 FX (225)765-0220	· ·	PH (225)765-0160 FX (225)926-19
INET: bill_s@deq_state_la_us		INET: ron_w@deq_state.la.us

Maine 🔀

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Jay Hyland, Acting Program Manager Radiation Control Program Division of Health Engineering 10 State House Station Augusta, ME 04333 PH (207)287-5698 FX (207)287-4172 INET: jay.hyland@state.me.us		W. Clough Toppan, P.E., Director Division of Health Engineering Department of Human Services 10 State House Station Augusta, Maine 04333 PH (207)287-5686 FX (207)287-41

Maryland X

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Roland G. Fletcher, Manager Radiological Health Program Air and Radiation Management		Merrylin Zaw-Mon, Director Air and Radiation Management Administration Mandand Department of the
Administration Maryland Department of the Environment		Environment 2500 Broening Highway
2500 Broening Highway Baltimore, MD 21224		Baltimore, Maryland 21224 PH (410)631-3927 FX (410)631-31
PH (410)631-3300 FX (410)631-3198 INET: <u>rfletcher@mdc.state.md.us</u>		

Massachusetts 🛱

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Robert M. Hallisey, Director		A. David Rodham, Assistant Secret
Department of Public Health		One Ashburton Place
174 Portland Street, 5th Floor Boston MA 02114		Boston, Massachusetts 02108 PH (617)727-7775 FX (617)727-47
PH (617)727-6214 FX (617)727-2098 INET: <u>hallisey@world.std.com</u>		

Michigan

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	David W. Minnaar, Chief	Flint C. Watt, Chief
	Radiological Protection Section	Drinking Water & Radiological
	Drinking Water & Radiological Protection	Protection Division
	Division	Michigan Department of
	Michigan Department of Environmental	Environmental Quality
	Quality	3423 N. Martin Luther King Jr.
	3423 N. Martin Luther King Jr.	Boulevard
	Boulevard	CPH Mail Room P.O. Box 30630
	P.O. Box 30630	Lansing, MI 48909-8130
	Lansing, MI 48909-8130	PH (517)335-9218 FX (517)335-82
	PH (517)335-8204 FX (517)335-8706	
	INET: MINNAARD@STATE.MI.US	

Minnesota

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Judith Ball, Manager Section of Asbestos, Indoor Air, Lead		Krista L. Sanda, Commissioner Minnesota Department of Public
and Radiation Division of Environmental Health		Service 121 7th Place, Suite 200

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Dick Nelson, Director	David P. Schor, MD, MPH, FAAP
Department of Regulation and	Low-Level Radioactive Waste Prog
Licensure	HHS Regulation and Licensure
Nebraska Health and Human Services	P.O. Box 95007
System	Lincoln NF 68509-5007
P.O. Box 95007	PH (402)471-0784 FX (402)471-08
Lincoln, NE 68590-5007	
PH (402)471-8566 FX (402)471-9449	

Nevada

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Stanley R. Marshall, Supervisor Radiological Health Section Health Division Department of Human Resources 1179 Fairview Drive, Suite 102		Robert R. Loux, Executive Director Agency for Nuclear Projects 1802 N. Carson St., Suite 252 Carson City, Nevada 89701 PH (702)687-3744 FX (702) 687-52
Carson City, NV 89701-5405 PH (775)687-5394 ext. 276, FX (775) 687-5751 INET: <u>smarshal@govmail.state.nv.us</u>		

New Hampshire

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Diane E. Tefft, Administrator Radiological Health Bureau		Woodbul y P. Fogg, P.E. Director New Hampshire Office of Emergen
Division of Public Health Services		Management
Health and Welfare Building		State Office Park South
6 Hazen Drive		107 Pleasant Street
Concord, NH 03301-6527		Concord, NH 03301
PH (603)271-4588 FX (603)225-2325		PH (603)271-2231 FX (603)225-73
INET: teff100w@wonder.em.cdc.gov		

New Jersey

Agreement State Director	Non-Agreement State Director	State Liaison Officers
	Jill Lipoti, Ph.D., Assistant Director Radiation Protection Programs Division of Environmental Safety, Health & Analytical Programs	Robert C. Shinn, Jr., Commissioner Department of Environmental Protection CN-402

Department of Environmental Protection, P.O. Box 415 Trenton, NJ 08625-0415 PH (609)984-5636 FX (609)633-2210 INET: JLIP <u>OTI & DEP_STATE.NJ.US</u>	Trenton, New Jersey 08625-0402 PH (609)292-2885 Deputy SLO: Jill Lipoti, Ph.D., Assistant Director Radiation Protection Programs Division of Environmental Safety, Health & Analytical Programs Department of Environmental Protection, P.O. Box 415 Trenton, NJ 08625-0415
	Trenton, NJ 08625-0415 PH (609)984-5636 FX (609)633-22 INET: JLIPOTI@DEP.STATE.NJ.

New Mexico

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Benito Garcia, Chief		Benito Garcia, Chief
Bureau of Hazardous & Radioactive		Bureau of Hazardous & Radioactive
Materials		Materials
Water and Waste Management	· ·	Water and Waste Management
Division		Division
Department of Environment		Department of Environment
2044 Galisteo Road		2044 Galisteo Road
P.O. Box 26110		P.O. Box 26110
Santa Fe, NM 87502		Santa Fe, NM 87502
PH (505)827-1557 FX (505)827-1544		PH (505)827-1557 FX (505)827-15
INET:		INET:
benitogarcia@eidhub.state.nm.us:smtp		benitogarcia@cidhub.state.nm.us:si

New York

Agreement State Directors	Non-Agreement State Director	State Liaison Officer
Rita Aldrich, Principal Radiophysicist		F. William Valentino, President Ne York State Energy Research &
Radiological Health Unit		Development Authority
Division of Safety and Health		Corporate Plaza West
New York State Department of Labor		286 Washington Avenue Extension
New York State Office Campus		Albany, NY 12203-6399
Building 12, Room 134A		PH (518)862-1090 FX (518)862-10
Albany, NY 12240		
PH (518)457-1202 FX (518)485-7406		
INET: raldrich@emi.com		
John P. Spath, Director		
Radioactive Waste Policy and Nuclear		
Coordination		
New York State Energy Research &		
Development Authority		

http://www.hsrd.ornl.gov/nrc/asdirectr.htm

Corporate Plaza West	
286 Washington Avenue Extension	
Albany, NY 12203-6399	
PH (518)862-1090 ext.3302 FX (518)	
862-1091	
INET: jps:a;nyserda.org	
Paul J. Merges, Ph.D., Director	
Bureau of Pesticides and Radiation	
Division of Solid and Hazardous	
Materials	
Department of Environmental	
Conservation	
50 Wolf Road, Room 402	
Albany, NY 12233-7255	
PH (518)485-8981 FX (518)485-8390	
INET: pjmerges@gw.dec.state.ny.us	
Karim Rimawi, Ph.D., Director	
Protection	
New York State Department of Health	
New Fork State Department of Health	
547 River Street	
Troy, NY 12203	
PH (518)402-7590 FX (518)402-7554	
INET: kxr01@health.state.nv.us	
Gene Miskin, Director	
Bureau of Radiological Health	
New York City Department of Health	
Two Lafayette Street, 11th Floor	
New York, NY 10007	
PH (212)676-1556 FX (212)676-1548	
INET: nychealth9@erols.com	

North Carolina

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Richard M. Fry, Director Division of Radiation Protection Department of Environment & Natural		Billy Cameron, Director Division of Emergency Managemer 116 W. Jones Street
Resources 3825 Barrett Drive Raleigh, NC 27609-7221 PH (919)571-4141 FX (919)571-4148 INET: <u>mel_fry@ncmail.net</u>		Raleigh, North Carolina 27611 PH (919)733-3867 FX (919)733-28

North Dakota

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Dana K. Mount, P.E., Director Division of Environmental		Dana K. Mount, P.E., Director Division of Environmental
Engineering		Engineering
North Dakota Department of Health	1	North Dakota Department of Health
1200 Missouri Avenue, Room 304	- - -	1200 Missouri Avenue, Room 304
P.O. Box 5520		P.O. Box 5520
Bismarck, ND 58506-5520		Bismarck, ND 58506-5520
PH (701)328-5188 FX (701)328-5200		PH (701)328-5188 FX (701)328-52
INET: <u>dmount û</u> state.nd.us		INET: dmount ä state.nd.us

Ohio

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Roger L. Suppes, Chief Bureau of Radiation Protection Ohio Department of Health 35 East Chestnut Street Columbus, OH 43266 PH (614)644-7860 FX (614)466-0381 INET: rsuppes@gw.odh.state.oh.us		James R. William, Chief of Staff Ohio Emergency Management Age 2855 West Dublin-Granville Road Worthington, Ohio 43235-2206 PH (614)889-7150 FX (614)889-71

Oklahoma

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Mike Broderick, Environmental Program Administrator		H.A. Caves, Assistant Division Director
Radiation Management Section		Hazard Management Waste Service
P.O. Box 1677		Environmental Quality
Oklahoma City, OK 73101-1677 PH (405)702-5157 FX (405)702-5101		P.O. Box 53551 Oklahoma City, Oklahoma 73152
INET: mike.broderick@deqmail.state.ok.us		PH (405)271-5221 FX (405)271-84

Oregon

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Ray D. Paris, Manager		David Stewart-Smith, Administratc
Radiation Protection Services		Energy Resources Division
Oregon State Health Division		Oregon Office of Energy
800 N.E. Oregon Street, Suite 260		625 Marion Street, NE
Portland, OR 97232 PH (503)731-4014 ext. 660 FX (503)		Salem, Oregon 97310 PH (503)378-6469 FX (503)373-78

731-4081 INET: ray <u>d paris @state or us</u>

Pennsylvania

Agreement State Director	Non-Agreement State Director	State Liaison Officer
David Allard, Director		David Allard
Bureau of Radiation Protection		Bureau of Radiation Protection
Department of Environmental		Department of Environmental
Protection		Protection
Rachel Carson State Office Building		Rachel Carson State Office Buildin;
P.O. Box 8469		P.O. Box 8469
Harrisburg, PA 17105-8469		Harrisburg, PA 17105-8469
PH (717)787-2480 FX (717)783-8965		PH (717)787-2480 FX (717)783-89
INET: Allard.David@dep.state.pa.us		INET: Allard David a dep state pa.1

Puerto Rico

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	David Saldana, Director Radiological Health Division G.P.O. Call Box 70184 Rio Piedras, PR 00936 PH (787)274-7815 FX (787)274-6829 dsaldana@gov.pr	Hector Russe Martinez, Chairman Puerto Rico Environmental Quality Board P.O. Box 11488 San Juan, Puerto Rico 00910 PH (809)767-8056

Rhode Island

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Marie Stoeckel, Chief Division of Occupational & Radiological Health Department of Health 3 Capitol Hill, Room 206 Providence, RI 02908-5097 PH (401)222-2438 FX (401)222-2456 INET: marieS@doh.state.ri.US		Peter Todd Radiological Technician Rhode Island Emergency Managem Agency 645 New London Avenue Cranston, RI 02920 PH (401)421-7333 FX (401)751-08

South Carolina

Agreement State Directors	Non-Agreement State Director	State Liaison Officer
Virgil R. Autry, Director Division of Radioactive Waste		Virgil R. Autry, Director Division of Radioactive Waste
Management Bureau of Land and Waste		Management Bureau of Land and Waste
Management		Management
Department of Health &		Department of Health &

http://www.hsrd.ornl.gov/nrc/asdirectr.htm

Environmental Control		Environmental Control
2600 Bull Street		2600 Bull Street
Columbia, SC 29201	r 	Columbia, SC 29201
PH (803)896-4244 FX (803)896-4242 INET:		PH (803)896-4244 FX (803)896-42 INET:
autryvr/acolumb34.dhec.state.sc.us		autryvr@columb34.dhec.state.sc.us
T. Pearce O'Kelley, Acting Chief		
Bureau of Radiological Health		
Department of Health &		
Environmental Control		
2600 Bull Street		
Columbia, SC 29201		
PH (803)737-7400 FX (803)737-7412		
INET:		
okelletp@columb54/dhec.state.sc.us		

South Dakota

Agreement State Director	Non-Agreement State Director	State Liaison Officer
	John Robertson, Medical Facilities Engineer Office of Health Care Facility Licensure & Certification Systems Development and Regulations 615 East 4th Street Pierre, SD 57501-1700 PH (605)773-3356 FX (605)773-6667 INET JOHNR@DOH STATE SD US	Bob McDonald, Environmental Pro Scientist Department of Environment and Natural Resources Ground Water Quality Program 523 East Capital Avenue Pierre, SD 57501 P ¹¹ (605)773-32906 FX (605)773-4

Tennessee

Agreement State Director	Non-Agreement State Director	State Liaison Officer
Michael H. Mobley, Director Division of Radiological Health Tennessee Department of Environment		Michael H. Mobley, Director Division of Radiological Health Tennessee Department of Environn
and Conservation		and Conservation
L&C Annex, Third Floor		L&C Annex, Third Floor
401 Church Street		401 Church Street
Nashville, TN 37243-1532		Nashville, TN 37243-1532
PH (615)532-0360 FX (615)532-7938 INET: <u>mmobley@mail.state.tn.us</u>		PH (615)532-0360 FX (615)532-79 INET: <u>mmobley@mail.state.tn.us</u>

Texas

Agreement State Directors	Non-Agreement State Director	State Liaison Officer
Alice Rogers, Section Manager		John Howard

Agreement State Director	Non-Agreement State Director	State Liaison Officer	
	David A. Finley, Administrator Solid & Hazardous Waste Division Department of Environmental Quality	David A. Finley, Administrator Solid & Hazardous Waste Division Department of Environmental Qual	
	Herschler Building, 4W	Herschler Building, 4W	
	Cheyenne, WY 82002 PH (307)777-7753 FX (307)777-5973 INET: dfinley <i>a</i> misse state wy us	Cheyenne, WY 82002 PH (307)777-7753 FX (307)777-59 INET: <u>dfinley@missc.state.wy.us</u>	

Conference of Radiation Control Program Director, Inc.

Charles M. Hardin, Executive Director Conf. of Radiation Control Program Director, Inc. 205 Capital Avenue Frankfort, KY 40601 PH (502)227-4543 FX (502)227-7862 NET: <u>chardin007@aol.com</u>

Send or E-mail corrections to: Gwen Davis, Office of State Programs, U.S. Nuclear Regulatory Commission Washington, DC 200555 gxd@nrc.gov

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SECY-98-291 December 18, 1998 Plan for Improving the Effectiveness of NRC's Training Programs



CHATTANOOGA AREA CHAMBER OF COMMERCE ECONOMIC DEVELOPMENT DEPARTMENT

> 1001 Market Street Chattanooga, Tennessee 34702 423/756-2515

SECY-98-291

December 18, 1998

FOR: The Commissioners FROM: William D. Travers /s/ Executive Director for Operations SUBJECT: PLAN FOR IMPROVING THE EFFECTIVENESS OF NRC'S TRAINING PROGRAMS

PURPOSE:

To inform the Commission of the staff's plan for improving the effectiveness of NRC's training programs.

BACKGROUND:

During the past few years the staff has undertaken a number of actions to identify, define, and resolve issues related to management and implementation of agency training activities. In response to an Executive Director for Operations (EDO) request that the technical training staff provide recommendations for better integration of regulatory knowledge, skills, and abilities (KSAs) into the technical training and qualification program to improve the regulatory skills of the staff, a staff paper titled "Regulatory Skills Training Integration Plan" was completed in February 1998. It included a number of recommendations intended to improve the quality and consistency of reactor operations inspector regulatory training. Similar improvements were recommended for other inspector disciplines and reactor program staff.

Job task analyses (JTAs) for positions in the Regional Divisions of Reactor Projects and the Nuclear Reactor Regulation (NRR) Divisions of Reactor Projects were completed in August 1997 and July 1998, respectively.

Contact: Paul E. Bird, HR (301) 415-7516

Kenneth A. Raglin, AEOD/TTD (423) 855-6500

In March 1998, the EDO requested that the Office of Human Resources (HR) devise a means for planning, prioritizing, and scheduling all agency training. A prototype of an automated integrated calendar for scheduling training, which can be accessed by all employees on the NRC Internal Home Page, was developed.

In April 1998, the Executive Council designated a team of senior managers and subject matter experts from the Offices of NRR, Nuclear Material Safety and Safeguards (NMSS), Nuclear Regulatory Research (RES), and Region II, led by Jack W. Roe, NRR, to review the agency's training activities in order to identify ways to improve the effectiveness and efficiency of the agency's training function in preparing NRC employees to perform their duties. The team presented their preliminary findings and recommendations to the Executive Council in August 1998, and delivered a written report in September 1998. This report is provided as an appendix to this paper.

DISCUSSION:

In its final report issued in September 1998, the Training Review Group proposed a number of recommendations. The group's specific recommendations and the staff's plan for improving the effectiveness of agency training activities are provided below. The <u>attachment</u> provides a list of the

major staff actions discussed in this paper and associated milestones. As indicated in the responses to the specific recommendations and in the listing of major staff actions, the staff intends to prioritize training and development resources as necessary to address systematically the highest priority agency training needs. This includes optimizing the opportunities for improving the regulatory culture and regulatory skills of the staff consistent with established programmatic guidance. Additionally, the staff plans to establish an infrastructure through the Executive Resources Board to provide a forum for agency-wide discussion and coordination of training and development activities.

Recommendation 1: Combine existing providers of formal training into a single organization, reporting to a single Deputy EDO, with the responsibility and authority to effectively manage the agency's training function.

Many managers interviewed by the Training Review Group stated that there should be a single group to manage, oversee, and coordinate Agency training activities. Those interviewed recommended that the responsibility for Agency training should be at a level with adequate decision making and budgeting authority to ensure that training contributes appropriately to the accomplishment of the Agency's mission and goals.

The Technical Training Division (TTD) of the Office for Analysis and Evaluation of Operational Data (AEOD) and the Human Resources Development staff of the Office of Human Resources (HR) will be combined in the Office of Human Resources. Since training and development are integral parts of human resources management, placing the new, consolidated organization in HR under the Deputy Executive Director for Management Services is a logical choice. The rationale for consolidating the training function within HR is further developed and discussed in <u>SECY-98-228</u>, "Proposed Streamlining and Consolidation of AEOD Functions and Responsibilities."

Efficiency and effectiveness will be enhanced by placing all training and development activities in one organization under one Deputy Executive Director. This organization will have responsibility and authority for management, coordination, oversight, program planning and budgeting, performance measurement, approval, scheduling, and implementation of all agency training and development activities.

Recommendation 2: Integrate the budget for all training-related activities to ensure that the Agency can monitor, prioritize, and control the use of training funds to develop and maintain staff competencies.

It is important that the Commission and agency senior management have accurate and reliable training and development cost data and can consider these costs systematically during budget reviews. The Training Review Group report articulates the difficulty the team encountered with quantifying agency costs for training and development activities. Under the current structure, separate budgets and operating plans for training and development managed by HR and technical training managed by AEOD are prepared and presented to senior management. Additional training and development costs incurred by the agency by other offices and regions which sponsor training as well as the costs (FTE and \$) to attend training are not factored into either of these two budgets. A consolidated training organization will enable necessary cooperation with program offices and regions and will facilitate the capture of information pertaining to agency costs for training activities.

As agency resources decline, careful monitoring and prioritizing of training funds are essential. Consolidation of training and development activities will enhance management's ability to weigh priorities judiciously so that the training and development activities that are most important for accomplishing the agency's mission and performance goals are supported. The consolidated training organization will be responsible for development and implementation of policy and process changes required to ensure effective and efficient management, coordination, and oversight of agency training and development. Additionally, the infrastructure established through the Executive Resources Board will provide a forum for agency-wide discussion, coordination, and prioritization of training and development activities.

Reactor technical training, materials technical training, and professional training and development will be managed and controlled as one integrated training program. The Agency's training budget will reflect this integration. Planned accomplishments and milestones will be structured according to the phases of the systems approach to training (needs analysis, design and development, implementation, and evaluation). Over time, training activities not currently under the purview of AEOD/TTD or HR will be identified, included in the planning framework, and evaluated for consolidation in HR's operating plan.

Recommendation 3: Improve the processes used to approve, develop, and implement training ensuring: the use of a standard, systematic approach to determine what training is needed as well as to determine the appropriate training audience; the use of objective criteria to obtain approval for making training a requirement; and the involvement of agency training professionals to guide key phases of training development and evaluation.

This recommendation is consistent with requirements imposed on NRC licensees. <u>10 CFR 50.120</u>, "Training and qualification of nuclear power plant personnel," requires licensees to establish, implement, and maintain a training program derived from a systems approach to training. <u>10 CFR 55.4</u>, "Definitions," states: "Systems approach to training means a training program that includes the following five elements: (1) systematic analysis of the jobs to be performed; (2) learning objectives derived from the analysis which describe desired performance after training; (3) training design and implementation based on the learning objectives; (4) evaluation of trainee mastery of the objectives during training; (5) evaluation and revision of the training based on the performance of trained personnel in the job setting."

The systems approach to training is a comprehensive, standard multi-phase program that includes training needs analysis, training program design and development, implementation of training, and program evaluation. A more detailed description of each of these elements follows.

The training needs analysis phase consists of identification of training needs and of knowledge, skills, and abilities (KSAs) and competencies needed for job performance. The purpose of the design phase is to convert the competencies and/or KSAs that were selected for training during the analysis phase into training objectives, and to sequence these training objectives into a training plan for initial and continuing training. The purpose of the development phase is to produce the materials (such as course manuals, graphics, lesson plans, examinations, etc.) needed for implementation of the training program. This includes development of new materials, as well as maintenance and upgrade of existing course materials. Training implementation is the conduct of training using the materials and lesson plans developed during earlier phases. This includes maintaining a qualified instruction staff and adequate training facilities and equipment. The purpose of the evaluation phase is to determine the effectiveness, efficiency, and impact of the training program and to identify whether and where revisions or improvements to the training are needed to maintain or improve the quality of job performance. This includes collecting and evaluating written feedback from students at course completion and, for selected courses, from students after working for a time in their assigned job functions, from the line management of students regarding the effectiveness and relevancy of the technical training curriculum as evidenced by employee performance, providing project management and technical oversight of contractors for contracted courses to ensure contractor courses are evaluated and improvements made in accordance with contract requirements, and conducting post-course reviews to evaluate feedback with course instructors.

Both HR and AEOD currently provide training using the principles of the systems approach to training. Examples of agency training success stories include the modifications to the PRA curriculum during FY 1996 and FY 1997 and development and implementation of the Field

Techniques and Regulatory Processes course. These instances were successful primarily because the training needs were defined and training requirements established systematically. Closely coordinated efforts between the agency's subject matter experts and training professionals resulted in defining the audience and appropriate learning objectives, design, development, and validation of the training materials, and implementation of the courses including involvement of instructors and program office subject matter experts during course delivery. These instances will be used as benchmarks for defining and documenting an agency process for practical usage of the principles of the systems approach to training for all training and development activities provided by contractors and agency staff. HR will serve as consultants to Offices on using this systems approach to training.

Recommendation 4: Review, evaluate, and formalize staff training activities, including those proposed in the "Regulatory Skills Training Integration Plan," using a standard, systematic approach to the training process to ensure acquisition and maintenance of regulatory, technical, professional, and management skills, as appropriate, for job positions and functions in support of the Agency mission and goals.

The consolidated training organization, in conjunction with line managers, will be responsible for systematically and methodically reviewing the knowledge, skills, and abilities needed for effective job performance, and formalizing staff qualification and training requirements, as appropriate. In August 1997 and July 1998, Job task analyses (JTAs) were completed for Regional and NRR Divisions of Reactor Projects positions, respectively. Staff is currently in the process of reviewing the JTA contractor training recommendations and JTA results and formulating actions to address the recommendations. The JTA contractor's recommendations generally follow the standard systems approach to training methodology and, therefore, the majority of the recommendations are valid and are being considered for implementation by the start. For example, the JTA results confirmed a training gap (i.e., inadequacy in or lack of skills) associated with tasks and KSAs related to regulatory processes, procedures, and skills.

An integrated assessment of training needs for reactor projects staff is in progress and includes JTA insights as well as insights from other pertinent inputs including the Training Review Group Report, the Regulatory Skills Training Integration Plan, and regulatory process changes currently being designed in accordance with the EDO's tasking memo. Once resulting revisions to the training and qualification programs are completed for reactor projects staff, training requirements for other regional inspector positions, NMSS positions, and other agency technical and non-technical staff positions will be examined. The staff does not currently plan to perform any further formal JTAs. However, the data from the NRR JTAs can and will be extrapolated for application to other agency technical positions. In addition, as the core competencies/skills assessment information is collected, it will also serve as a foundation on which to build appropriate training programs and requirements for agency staff positions. A balanced approach between regulatory, technical, and professional training will continue to be sought, and is especially important at this time as the NRC strives to change its corporate culture and define its appropriate regulatory role in a changing political environment.

Recommendation 5: Use Agency training professionals to revise Management Directive 10.77 "Employee Development and Training" to delineate and require a standard, systematic approach to the training process for need determination, approval, development, implementation, and evaluation of all agency training activities.

Management Directive 10.77, "Employee Development and Training," currently delineates the agency's policy, organizational responsibilities and delegations of authority, and processes for providing, approving, and attending NRC sponsored training and development activities. The management directive is currently silent regarding any specific processes required for needs analysis, approval, development, prioritization, implementation, or evaluation of training activities. The

management directive will be revised to delineate required implementation of the

standard systems approach to the training process for needs analysis, approval, development, implementation, and evaluation of all agency training activities. Changes would be discussed with management and bargaining unit representatives, as appropriate. The revised management directive will incorporate applicable material from existing TTD Policy Document 2, "Technical Training Program," which requires that technical training courses developed for the NRC by the TTD staff or contractors be developed and maintained using the systems approach to training principles and describes the process currently used to develop and maintain technical training courses.

In addition, the revised management directive will include the following specific elements:

- 1. New organizational responsibilities and delegations of authority for the consolidated training organization within the Office of Human Resources.
- 2. A process for planning, approving, and scheduling all training and development activities through the training organization.
- 3. A process for identifying new training needs and formally communicating them to the training organization.
- 4. A process for determining the most effective and efficient method to develop and deliver the training.
- 5. A process for reviewing and approving training and development activities.
- 6. A process for prioritizing and scheduling new training activities.
- 7. A process for incorporating new training activities into the appropriate qualification, training, and development programs.
- 8. A process for developing, implementing, managing, and overseeing staff qualification and development programs.
- 9. Methods for evaluation and performance measurement of training and development activities.

Recommendation Consolidate Agency training resources in the Washington area. 6:

A decision to move the Technical Training Center facility to the Washington area must be done deliberately and only after taking into consideration a number of factors. Such a move would have to be planned well in advance and carefully sequenced. There are programmatic, financial, infrastructure, timing, and staffing considerations which must be carefully evaluated. The Office of the Chief Financial Officer has developed a Statement of Work to examine costs, and the Office of Administration is looking at the space requirements and space availability for relocating the Technical Training Center at headquarters. HR will examine programmatic, timing, and staffing issues.

Recommendation 7: Reduce the number of simulators to 1 BWR and 1 PWR.

The Training Review Group obtained opinions from senior managers on their perceptions regarding the need for vendor-specific simulator training. These senior managers felt that NRC could provide adequate inspector training using 1 BWR and 1 PWR simulator. Simulator training is an integral part of providing both reactor technology and regulatory skills training within the inspector qualification and training programs. Vendor-specific simulator training is a highly effective method for developing and maintaining skills related to performance-based regulatory safety assessment of control room configuration, vendor-specific design and operation, integrated systems operation for all plant modes, plant transient and accident response, and application of emergency procedures and severe accident guidelines necessary to support inspection, licensing, assessment and enforcement decisions.

The programmatic need for vendor-specific simulator training will be determined within the context

of the integrated assessment of training needs discussed previously for Recommendation 4. Based on the results of the integrated assessment, actions will be developed to ensure that appropriate training is implemented to provide the technical and regulatory foundation necessary for reactor projects staff to effectively and efficiently execute their tasks in support of NRC mission, policy, and goals. The issues of cost-benefit of multiple simulators and location of simulators will be considered in the cost and space requirements study to address Recommendation 6. A decision to dispose of two additional simulators should be made deliberately given the replacement costs of \$10-14M per simulator.

RESOURCES:

The actions to address Recommendations 1 through 5 will be accomplished with existing agency resources. Evaluation and development of resulting action plans to address Recommendations 6 and 7 will be accomplished with existing resources.

COORDINATION:

The Office of the General Counsel has reviewed this Commission paper for legal implications and has no legal objection.

The Office of the Chief Financial Officer has reviewed this Commission paper for resource implications and has no objections to its content.

William D. Travers Executive Director for Operations

Attachment: As stated

ATTACHMENT

Table of Agency Training Action Items

No. Action Item		Assigned	Date Due
	Establish consolidated training organization.	DEDM	1/99
2	Develop actions to address contractor training recommendations resulting from JTAs for Regional and NRR DRP positions.	HR/NRR	1/99
3	Establish infrastructure through ERB for discussion and coordination of training activities.	HR	5/99
4	Develop action plan and milestones for development of qualification and training program modifications resulting from NRR JTAs.	HR	6/99
-5	Identify support offices and support office activities necessary to support and manage agency training activities.	HR	6/99
6	Coordinate with support offices to add training support activities to office operating and performance plans.	HR/ Program Managers	FY 1999 Third Quarterly Update
7	Develop consolidated agency training and development operating and performance plan.	HR	FY 1999 Third Quarterly Update
8	Revise Management Directive 10.77 to include the process for identification, development, implementation, management and oversight of training activities.	HR	9/99
9	Revise Management Directive 10.77 to include guidance for inclusion of staff development and training planned accomplishments and performance measures in office operating and	HR	9/99

		performance plans.		
	10	Provide staff recommendation on consolidating agency training	HR	9/99
		resources in DC area based on evaluation of programmatic,		
Į		tinancial, infrastructure, timing, and statting considerations.		
	11	Provide staff recommendation on the appropriate number and types	HR	9/99
		of simulators based on an integrated assessment of training needs.		

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<u>Chattanooga TTC Special Edition Newsletter</u> <u>1992</u> <u>Program highlights, features on various</u> <u>instructors, various support materials for the</u> <u>Chattanooga TTC</u>



ECONOMIC DEVELOPMENT DEPARTMENT

1001 Market Street Chattanooga, Tennessee 34702 423/756-2515



THE NRC'S TECHNICAL TRAINING CENTER is located just on the outskirts of Chattanooga, Tennessee, in an allmirrored building that's easy for visitors to spot. It's convenient to a variety of motels and restaurants, yet is isolated enough so students can devote plenty of time to study.

What's in NR&C?

Everything about the TTC and its people. See the organization chart, with pictures, beginning on Page 8, and see the index on Page 2.

Take Note

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Plan Ahead

September 13. Fun Fest Barbecue 92. Annual Family Picnic. Sponsored by EWRA, and this year put on by ADM and IRM. Smokey Glen at the Potomac Polo Grounds.

November 19. Shear Madness. At Kennedy Center. 8 pm. Sponsored by EWRA. For information or reservations, call 504-1732.

April 1993. Guys and Dolls. At Kennedy Center. Sponsored by EWRA. For information or to get on the waiting list, call 504-1732.

May 1993. Memorial Day Cruise to Bermuda. Call 504-1732 for information.

June 1993. Phantom of the Opera. At Kennedy Center. Sponsored by EWRA. For information or to get on the waiting list, call 504-1732.

Camaraderie and Learning



THE BANNER ON THE WALL congratulating TTC instructor Ralph Jones pretty much defines life at the TTC, with its emphasis on learning and its atmosphere of friendship. Ralph had been away on a business trip that had included time out for him to take – and pass – the New York State Regent's exam, completing work on his bachelor's degree.

The NRC's Technical Training Center is located in the Osborne Office Center, just off Brainerd Road, on the outskirts of Chattanooga, Tennessee. Since 1980, it has been the focal point of NRC's technical training, and, with four nuclear power plant control room simulators in place, it has become a training facility that is unique in the world. It offers reactor technology training, as well as specialized technical training in engineering support, health physics, safeguards, and inspection and examination techniques, as well as other specialized training requested to meet specific agency needs.

During fiscal year 1991, the TTC conducted or coordinated a total of one hundred and fifteen courses in the reactor technology area, and eighty-two more in the specialized training areas. A total of two thousand, two hundred and sixty-six students attended TTC-sponsored courses during the year (although a number of students attended more than one course). These courses represent a total of two hundred and forty-four course weeks, one hundred and forty-six of which were associated with reactor technology training and ninety-eight of which were associated with specialized technical training.



NUREG/BR-0066 Ann Thomas, Editor Min Kim, Editorial Assistant

NR&C is your newsletter, designed to publish information of interest to all NRC employees and retirees. Please send your news, suggestions, and comments to Ann Thomas, NR&C, OEDO, 17G21, or call 504-1732. The deadline for submitting material is the 15th of the month for the next regular issue. The staff reserves the right to edit all material submitted. Extra copies of each issue of NR&C are usually available upon request. Please call 504-1732.



KEN RAGLIN, DIRECTOR OF THE TTC, WITH SOUVENIRS OF HIS WORKING GROUP TRIPS

NRC's Technical Training Center at Chattanooga Is a Lean Organization With Broad, Complex Functions

The Technical Training Center (TTC) is part of the Headquarters organization (within the Office for Analysis and Evaluation of Operational Data), but it is located at a site remote from Headquarters, in Chattanooga, Tennessee. This has allowed the development of successful programs and has necessitated solutions to special problems.

"The TTC has always had a lean organization, yet the complexity and scope of work associated with the TTC have increased dramatically over the years," says Ken Raglin, Director of the NRC Technical Training Center.

"To be responsive to the many demands imposed on the TTC, we have had to think in terms of high-technology solutions," he continues.

"I see my job as constantly challenging and one of the most interesting and important in the Agency. Through what we do here, we try to enable the rest of the staff to do its job better," he notes.

In many cases achieving this goal has meant moving the TTC into a high-technology environment and increasing office automation there. In other cases it has meant actively seeking the resources necessary for the TTC to carry out its mission.

It also has meant, in some instances, that to meet its goal, the TTC has had to find the means necessary to acquire major capital

equipment (such as the four reactor simulators) within an existing budget.

"Clearly the Agency has made a major commitment to the technical training of the NRC staff," Mr. Raglin continues. "The TTC has about one percent of the Agency resources, but we like to think we have more than a one percent impact."

The TTC currently occupies about 35,000 square feet of space on four different floors of a modern office building on the outskirts of Chattanooga.

In addition to several classrooms and reactor simulators, the facility includes an array of hardware components configured as training aids, audio and video equipment, and two local area networks -- one associated with the simulators and the other for office automation.

The facility and staff have been established to provide NRC

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INSTRUCTOR BOBBY EATON talks to a class at the Training Center.

Ken Raglin and the TTC

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employees a variety of reactor technology training in the four vendor designs — General Electric, Westinghouse, Combustion Engineering, and Babcock and Wilcox — as well as specialized technical training in the areas of engineering support, health physics, safeguards, and inspection and examination techniques.

The TTC now manages, maintains, and operates three full-scope nuclear plant control room simulators, representing the GE, Westinghouse, and B&W reactor vendor designs.

These simulators were acquired over the last few years, because acquiring them for NRC was the most cost-effective way to provide the simulator training required for the technical qualification of many NRC employees.

When the fourth simulator, representing the CE design, is delivered in September of this year, the TTC will be the only known facility to be equipped with simulators representing four different reactor designs.

But while the simulators may be the showpieces of the TTC, it is the array of personal computers that keeps the center going. When you take a tour of the TTC facility, it is easy to understand what that statement means. Both inside the classroom and out, the TTC is, perhaps, the Agency's most computer-literate organization, as well as one of the most advanced and comprehensive training facilities of its kind in the world.

"I consider the personal computer an extremely important tool that allows me to do my job much better than would otherwise be possible," Mr. Raglin says. "This philosophy has much to do with the current structure and staffing at the TTC.

"I consider myself a power user. Not everybody has to be a power user. However, they do have to be competent PC users in order to succeed at the TTC."

This is particularly true, he explains, since tasks that are often considered primarily clerical and administrative in other organizations are spread across the entire TTC staff.

"Around here, there is no such thing as a hand-written draft," notes Mr. Raglin.

"Staff members here have an extraordinary number of collateral duties.



A TYPICAL CLASS AT THE TTC WAITS FOR THE ARRIVAL OF THE INSTRUCTOR.

"Many training centers in the U. S. and around the world have some staff members who are only simulator instructors, different staff members who are classroom instructors, different ones who develop courses, other staff members who produce the graphics and manuals, and still others who provide quality control over the various processes.

"We simply do not have that luxury here. We must have a very versatile technical staff here in order to meet Agency needs."

TTC instructors are involved in all phases of the life cycle of course activities such as curriculum development, course manual development (both text and graphics), presentations in both classroom and simulator situations, examinations, and course maintenance (that is, revisions and updates) based on feedback or new information.

Mr. Raglin also points out that perhaps not many people realize that activities at the TTC go far beyond the instruction offered in the classrooms and on the simulators.

"We're not just a teaching institution," he says. "We also provide a considerable amount of technical support. "By this I mean we are involved in activities where the TTC staff's expertise is used but which are not directly related to courses."

For example, the TTC staff recently played the role of operating crews for a series of operator requalification examination scenarios that were demonstrated to Agency senior managers.

In the last couple of years, the TTC has felt the impact of changes in the qualification and training requirements for the NRC staff. This, coupled with the surge in hiring of technical interns that occurred during 1991, has stressed the training processes. Both of these developments have meant that more people are required to take the "main line" reactor training courses the TTC offers.

"We are running at capacity, and yet there are students who cannot get into some courses, particularly in the Westinghouse design," Mr. Raglin says.

Class sizes are larger (now at twenty-four students for the classroom courses), and, with an increasing variety of student experience in any given class, teaching has become more challenging for the instructors.

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WATCHING THE DUCKS in the pond outside the TTC can be an interesting diversion from classwork.

Ken Raglin and the TTC

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Because instructors have to devote more of their time to providing these required full-course series (seventy percent of the total reactor technology effort), the TTC has less capability to respond to other training requests that might arise.

"Today we are trying to manage transition years of everincreasing expectations on the part of our 'customers,' coupled with a continuing need to maintain what we were previously able to provide," he says.

The TTC's "customers" are its students and the management of the Offices and Regions that send the students to TTC training in a number of different areas.

Being responsive to customer needs is an important part of Mr. Raglin's job.

"We want to ensure we are meeting the needs that are important to senior management, those that are important to first-level supervisors, and those that are important to the individual students," he says.

"At times that can be difficult."

Moreover, he continues, "The TTC is clearly a service organization, but it is not exclusively so. Besides trying to meet our customers' needs, we also have a role, like that of a university, in using our judgment to determine if a curriculum or course is adequate.

"We have to consider both quantity and quality."

Mr. Raglin also notes that those who have never been to the TTC for training may not realize just how intense the courses there are.

"There is always much material to be covered in a limited amount of time, and students here have to put in a considerable amount of time outside the classroom," he says.

(For those who want to know more about what the TTC offers, Mr. Raglin says there is a wealth of information in the *Syllabus of the Courses* (NUREG/BR-0017), which is issued to all NRC employees.)

As to the operation of the facility, management of a remote facility that is part of the Headquarters organization is more of a challenge than many people realize.

"Speaking in terms of facility management, we have to do many of the same things that a Regional Office does and all of the same things that training centers throughout the world have to do," Mr. Raglin says.

"It takes a considerable amount of time and effort."

Although operating a remote facility does present some special challenges, Mr. Raglin says he believes the Chattanooga location

is a good one.

"I would certainly argue against moving the TTC because it's been so successful here," he says.

As he explains, the primary reason for moving the TTC from Bethesda in 1980 was to have it in a location where students would be out of town, away from their jobs and the home environment. That means fewer work-related disruptions during the day. It also means that students are more readily able to study at night. This is important because most courses at the TTC require substantial out-of-class effort, which, typically, can be difficult to accomplish at home.

(Reasons for initially selecting Chattanooga as the TTC site include its relatively low per diem and its relatively low cost of living, the ability to attract and maintain a quality staff there, and its proximity to TVA simulators, which the TTC used before acquiring its own.)

In addition to handling an increasing number of students, Mr. Raglin says the TTC is also receiving an increasing number of visitors. In early September of this year, it will host a major international conference of nuclear regulatory inspection and training organizations.

The reactor simulators, a multi-part showcase of technology at the TTC and necessary training tools, require a considerable effort to maintain and improve. There is the constant need for hardware and software maintenance to ensure that they are available when needed for training. There is also a massive upgrade program, now underway, to improve their performance.

"We see the simulators at the TTC about in the middle of the pack in terms of performance capabilities," Mr. Raglin says. "When the upgrades have been completed, we feel we will be near the front of the pack."

That's all part of the TTC's continual movement toward a hightechnology environment, inside and outside the classroom.

"We're also moving to the forefront in terms of workstation simulation," he says. "We will be incorporating classroom simulations, using high-fidelity thermal hydraulic codes, into the reactor technology curriculum.

"This will allow us to show events and parameters that are not conveniently displayed on simulators. It should also allow us to greatly enhance the reactor transient analysis sessions in the advanced courses."

As a further evolution of simulator programs, the TTC intends to develop and implement a Multiple Advanced Reactor Simulator (MARS), which will be capable of simulating both conventional and advanced reactor designs. These latter developments in particular, Mr. Raglin feels, will help place the TTC in a position to meet the future training needs of its NRC customers, including those associated with the next generation of plants.

Mr. Raglin joined the NRC in 1977, as a BWR training instructor, when the training organization was located in Bethesda. He and his family moved to Chattanooga when the TTC (then the Reactor Training Center) was established there in 1980. He also advanced, over the years, to Senior Instructor, BWR Technology Branch Chief, and, finally, TTC Director in 1986.

A graduate of the U. S. Naval Academy as an applied mathematics major, Mr. Raglin received his nuclear training at Navy Nuclear Power School in Bainbridge, Maryland, and at the Nuclear Prototype in Windsor, Connecticut. He served as a nuclear-trained officer aboard the USS Enterprise, USS Nimitz, and USS California.

He notes proudly that he and his wife, Jane, are both Hoosiers by birth and both still keep up with Indiana high school basketball, particularly at State tournament time.

("Hoosier Hysteria," he calls it, adding, "Nobody does it like Indiana!")

The two Raglin sons are now in college. Jeff will be a senior at Rice University in Houston, Texas, majoring in biochemistry and biology. Chris has just finished his freshman year at 'Auburn University, in Auburn, Alabama, majoring in mechanical engineering.

Jane is active in the Chattanooga Women's Club and for several years has done volunteer work at the Family Violence Services Shelter for abused women and their children. She also does volunteer work at the Siskin Foundation, a rehabilitation hospital and pre-school.

Away from the office, when he's not working on his computer at home, Mr. Raglin says he enjoys listening to music, following sports, especially basketball and football, and doing word search puzzles and logic problems. He also says he enjoys reading science fiction — but doesn't find much time for it these days.

In addition to his work as the TTC Director, Mr. Raglin is also the U. S. Co-Leader of Working Group 9 of the US/RF Joint Coordinating Committee on Civilian Nuclear Reactor Safety (JCCCNRS). Mr. Raglin's work group has focused on Diagnostics, Analysis Equipment, and Systems for Supporting Operators. In his role as Working Group Co-Leader, Mr. Raglin made trips to Russia in December 1989 and September 1991 and will make another in October 1992.

During his tenure at the TTC, Mr. Raglin has seen tremendous improvements in the facilities there.

Is there anything more he would like?

"If we were starting over, I'd like a better overall design for the facility, including an auditorium for large classes," he says.

As it has grown over the years, the TTC has added space as needed -- and as available -- with the result that the facility is located on parts of four floors of a building it shares with a number of other tenants.

"I would also like to see instructional design and technical editing expertise on the TTC staff," he says.

And what else can he say about his responsibilities at the TTC?

"It's doing whatever is needed to get the job done," he says. (See related articles throughout this issue)









STEVE SHOWE at his computer, a familiar place for TTC employees

Having well-qualified and well-trained reactor technology instructors at the TTC starts with the hiring process, says Steve Showe, the Chief of the PWR Technology Branch.

The branch is the largest at the TTC and includes a Westinghouse Section with a Section Chief and five instructors, a Combustion-Engineering/B&W Section with a Chief and six instructors, and three simulator engineers.

"When we look for people, we look at people with varying backgrounds, as our staff shows," Steve says.

"We have instructors who were NRC inspectors and examiners, some who were instructors for utilities, some reactor operators, some who worked for reactor vendors, and some who were involved with the Navy's nuclear power program. By the time they get here, they all have a great deal of knowledge, even though their specific expertise is different."

To make sure that all the Reactor Technology Instructors bring the same knowledge base into the classroom, the TTC has a training and qualification program not unlike the qualification program NRC's inspectors undergo. And, it generally takes a year for a new TTC RTI to become fully qualified in one reactor technology.

Many new instructors have had some teaching experience, but if they haven't, they will receive some instructor training from a source outside the TTC. Some also will have taken the TTC's full-series, seven-week training program in the reactor technology they're slated to teach. If they haven't, they'll go

through that course as a student. (Although the normal passing grade for the course is 70, the instructors-to-be have to make an 80.) Even if they are very well-versed in reactor technology and in teaching techniques, new instructors have a lot to learn.

"It's important that they learn the NRC perspective on the issues," Steve says.

During their year of training, as part of that training, new RTIs will do practice lectures in front of their peers. Both their teaching techniques and the technical information they present will be up for scrutiny. Through the practice lectures, they also will get the benefit of their colleagues' experiences teaching at the TTC, where class composition is often widely varied.

"A class these days might include both recent college graduates who are new to the NRC and some with Ph. D.s, who have been at the Agency for a decade," Steve notes.

"That's a real challenge to instructors. No one can appreciate how varied class makeup can be until he or she has stood in front of a class at the TTC.

As new instructors progress through their training, they will begin to teach select modules of given courses.

"Because we have such a small staff, we cannot afford to wait a year to use them in a classroom," Steve says. "So we try to work them in as soon as possible."

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Steve Showe

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As the final step of the qualification process, prospective instructors have to go before a qualification board that consists of one supervisor and two qualified instructors.

Each member of the board prepares questions on each of the more than twenty different qualification areas. There is a primary questioner and a secondary questioner in each area.

The board typically lasts between three to five hours, and to pass, an instructor-to-be has to answer at least eighty percent of the questions successfully.

"Most people pass the board because they have prepared so thoroughly for it," Steve says. "Actually, if the qualification program itself is good, the board is just a check."

To complete the final step in the qualification process, the new instructor must find the answers to any questions missed before the board and submit the answers to the board members.

When the process is complete, instructors receive a qualification certificate.

Once an PWR instructor is qualified in one technology, he or slow will then study to become qualified in a second technology. That qualification process generally takes only six months, instead of a year. There will be another oral board, but this one will last only two or three hours.

All PWR instructors are expected to qualify in two PWR technologies, and so far, one has qualified in all three. But that's the exception, and, in reality, no one is expected to remain current in three technologies.

The RTI positions are graded at the grade 13/14 level. Prospective instructors (with experience) are generally hired at the 13 level, and after they have formally qualified in two technologies, they will be promoted to a grade 14. Occasionally NRC staff members from other Offices or Regions receive lateral transfers to the TTC at the grade 14 level; they too must complete the entire qualification process.

The turnover rate for instructors is fairly low.

"People do come and go, perhaps about one a year," Steve says. "When they leave, they may go to a Region or to Headquarters, and some have left the Agency."

But most stay as instructors for a long time, and those who do really enjoy teaching.

"They enjoy the interaction with the students, along with the technical aspects of their jobs," Steve says.

"It's definitely a job where you have to like people."

It's also a diverse job, he points out.

"Our people have to do all types of training," he says. "We are

not big enough for people to specialize, and that makes the job more interesting and more challenging. We also find this way is more efficient."

Each instructor teaches about twenty-five weeks a year, and spends the rest of the time in related course-administrative work and course development.

Typically the week before a class is spent in preparation; the week after in grading exams. In between classes, some time might be spent on developing new courses, but more frequently it is spent in making sure the content of existing courses is kept up to date.

Material has to be added to reflect changes in the industry as a result of new information or operational events, or it may be added to reflect changes in regulations. There also has been an effort to incorporate probabilistic risk analysis material into reactor technology training, and doing that has meant having the instructors themselves trained on PRA issues.

The major classroom courses have three assigned instructors; each simulator course has two. This means that even when they are teaching a course, instructors normally don't have to spend the entire day before the students.

While most of the reactor technology instruction is done at the TTC, occasionally instructors teach short courses at Headquarters and elsewhere. Over the years, Steve and others have had the opportunity to teach courses overseas, in Brazil, China, Egypt, Korea, Mexico, Taiwan, and Yugoslavia. Needless to say, these are considered prime assignments. They are usually arranged through the International Atomic Energy Agency and are usually two weeks long — longer than the course would take at home because of the language differences.

The two PWR Section Chiefs each teach about half the usual course load, with the rest of their time spent on supervisory and administrative duties. Branch Chiefs also teach occasionally.

"We don't teach as much as we would like, but we do teach some," Steve says.

As a Branch Chief, Steve says it's impractical for him to teach a three-week course — there's too much likelihood of interruption, and even if he's one of the instructors for a one-week course, he's apt to be called out of class.

"The other instructors would just as soon not see my name on the teaching assignment list," he says with a laugh.

Classroom sessions are held during the day, but some of the simulator classes are held evenings.

"Even with our own simulators, it's the only way we can fit everyone in," he says. "The maximum number of students for a simulator class is six, so if we did all the simulator training during the day, it would take two months to train the students in each course series."

So, while the regular class hours are 8 am to 4 pm, some of the simulator classes will meet from 4 pm until midnight.

"We don't have any classes from midnight to 8 am," he says. "No one is efficient learning or teaching at that time." Now, he says, he thoroughly enjoys living in the Chattanooga area. He says his son, who now is sixteen, is practically a native

In addition to their work that is directly related to the courses they teach, all the instructors have other "discretionary" duties, which cover a wide range of responsibilities. For instance, one instructor may be responsible for all the material for a course, or for maintaining the manual for a course.

"For efficiency, we've designated certain people as responsible for the graphics for each of the different reactor types," he explains. "That way, not everyone has to become a graphics expert." (See the related stories on desktop publishing at the TTC and on Don Nelson beginning on Page 32.)

Steve notes that the NRC has had an inhouse technical training organization since 1974. Before that, the Agency "bought" its reactor training from Westinghouse and General Electric.

When the training was moved in house, NRC hired some of the instructors from Westinghouse and GE who had been responsible for the NRC training. Steve was among them.

At that point, he recalls, the training unit was in the Lugenbeel Building in Bethesda (long since vacated by NRC), and then it moved to East West Towers.

"We trained only reactor inspectors in those days," he says. "When we moved to East West Towers, we had two rooms, one for BWR training and one for PWR training."

Several factors influenced the TTC's move to Chattanooga in that suffered heat, smoke, and water damage in a fire. 1980.

First was the advantage of training at a remote location, where students would be removed from the pressures of their day-to-day jobs and could concentrate on their training.

The second was the availability of the simulators owned by the work," Steve says. Tennessee Valley Authority in the Chattanooga area.

"We rented time on those simulators, but we could only rent time when TVA wasn't using the simulators, and that could be in the middle of the night, from midnight until 8 am," Steve says.

Now that the TTC has its own simulators, that reason for the Chattanooga location is gone, but, Steve says, Chattanooga is still a great place for the training center. It still offers the advantages of a remote location, and because the cost of living there is low, the cost of sending students there is lower than it would be most other places.

A native of Williamsport, Maryland, Steve initially left the area to join the Navy where he served in the nuclear power program.

While in the Navy, he was stationed at a number of different bases. He had his first assignment as a classroom instructor for the Navy at a reactor prototype in Idaho Falls, Idaho.

When he left the Navy, he went to work for Westinghouse as an instructor and then came to NRC in Bethesda in 1974.

Now, he says, he thoroughly enjoys living in the Chattanooga area. He says his son, who now is sixteen, is practically a native and his wife, who plays a lot of tennis, really enjoys the climate. (Their daughter lives in Orlando, and they have two granddaughters there, too.)

"I wouldn't mind retiring here," he says. "In fact, I can't think of any place I'd rather be. I like the people and I like the relaxed, small-town atmosphere.

"If you want city things, you are less than a two-hour drive from Atlanta.

"For a training center, this is an ideal location."

But even though the pace of Chattanooga is relaxed, Steve points out that many people would find jobs at the TTC stressful.

"Most of us don't find it so," he says, but, he adds, when you are teaching, you have to be on your toes all the time. And even when you finish your work with one class, you're faced with a deadline to get materials ready for the next one."

Outside the office, Steve says he's a real nostalgia buff. He buys and refurbishes old juke boxes, and he collects Lionel trains.

He's given one juke box to his daughter and one to his son, but he still has four operational juke boxes at home, and another four that are being refurbished.

His biggest current project is restoring a 1954 Wurlitzer model that suffered heat, smoke, and water damage in a fire.

He says that once juke boxes are restored, they don't fail often, "just always during a party." He finds the records for his juke boxes, mostly with music of the 1950s and 1960s, at flea markets.

"It takes a lot of time, but it's a lot of fun, and it's different from work," Steve says.

Steve also spends some of his free time working on his motherin-law's 1966 Chevrolet Impala convertible, now the vehicle of choice for his 16-year-old son.

"That's another big nostalgia item that takes a lot of work," he says, and, he says, it also would refute tales about getting a bargain on a car that was owned and driven by a little old lady.

"Little old ladies aren't big on preventive maintenance on their cars," he says.

Steve says that about the only thing he does miss living in Chattanooga is Maryland blue crabs.

As to the future, Steve foresees a double challenge for the TTC.

In the next five to ten years, he points out, a lot of the present TTC staff will be eligible for retirement, a situation that will be true throughout the Agency as a whole. That means that not only will the TTC have a substantial number of new employees to train, it will have to ensure that it has the qualified staff to do so.

Len Reidinger: Joe's Friend from



TWO SERIOUS PENN STATE FANS AT THE TIC – LEN REIDINGER AND HIS "FRIEND" JOE PATERNO

Len and Joe are quite a pair at the TTC.

That's Len, as in Len Reidinger, the new Chief of the TTC's BWR Technology Branch. And Joe, as in Joe Paterno, coach of Penn State's Nittany Lion football team.

Of course it isn't the flesh-and-blood Joe, but a life size photographic cutout of the coach, that has a habit of turning up just about everywhere at the TTC.

"Joe goes to parties, he monitors exams, and sometimes, I'm not sure how, he takes off for a few days," Len says.

Those mysterious disappearances might somehow have the same cause as last winter's interesting event — about the time Penn State played Tennessee in the Fiesta Bowl — when Joe was found hanging from a TTC ceiling, a noose around his neck! Joe has even been party to a few dirty tricks around the office.

The way the TTC is arranged, upon arrival, a visitor is first confronted by a locked door, a door bell, and a not-too-visible television camera. When the visitor rings the bell, Management Support Staff personnel, located some distance away, can see the visitor on a monitor, ask for identification, and then press a button that unlocks the door.

Of course, the picture on the monitor isn't that good, and on one occasion not too long ago, when the bell rang, one of the staff repeatedly asked the "gentleman" standing at the door, "Can I help you, Sir?"

It took a few minutes for the somewhat irritated staffer to realize that the unresponsive "gentleman" was Joe and his "friends" were around the corner, enjoying a good laugh. In fact, the laugh was so good, they repeated the stunt sometime later, when they knew Management Support Staff Chief Irene Parker would respond to the bell. She too was totally taken in.

Besides being a great conversation piece, Joe is a reflection of Len's loyalties to Penn State.
Pennsylvania (State, that is) at the TTC

degree from Penn State. Some years later he went on to earn his bachelor's degree from the University of Tennessee at Chattanooga, so, he says, "The Penn State - Tennessee game was tough for me, but in the end I rooted for Penn State."

Len has been with NRC since 1979, first working for the training center at the East-West Towers and then moving with the TTC to Chattanooga as a PWR instructor. There were only three PWR instructors then, he recalls, compared to thirteen today.

The move South was a big change for Len but, he says, the rolling, tree-covered countryside around Chattanooga reminds him a lot of central Pennsylvania where he grew up, except that the winters are milder. Len also likes the outdoor activities available in the Chattanooga area, many of them involved with scouting. Several years ago he became actively involved in Boy Scouts, along with his son, who is now fourteen.

"We became involved when I realized that he was growing up and I would have little more time to spend with him," Len says. "Today scouting is something we can be involved in together."

This summer they went go on a ten-day backpacking trip with the scouts at the National Scout Reservation in Cimmeron, New Mexico, and, he says proudly, by the end of the year his son will have earned scouting's highest award, the Eagle Scout rank.

He is also proud that, at least for now, his son indicates he'd like to follow in his father's footsteps and go to Penn State.

Len and his wife, who is from the same part of Pennsylvania, both have a lot of relatives in the Keystone State and, he says, they may well decide to return there someday.

Len left Pennsylvania initially after he graduated from Penn State and took a job working for Xerox. From there he entered the Navy nuclear power program and, when his Navy tour ended, he went to work for Alabama Power Company at the Farley plant. While he was at Farley, working as a shift foreman and on procedure development, he met an NRC Regional inspector who talked about the Agency and convinced him to apply for a job.

After he submitted an application, he was called about a job as a Resident Inspector in Region I. But, he also got a call about the training center job. He had not done any significant training before, he says, but the idea seemed appealing and he took the job.

"And Hove it," he says. "Hove teaching, and Hove meeting new people all the time."

"Several years ago," he relates, "I was looking at the roster for an incoming class and I saw a listing for someone from Region III whose last name is the same as mine. He's Tim Reidinger, and he works in operator licensing in Region III. It turns out he is a distant cousin, also from the Shamokin area, but we'd never met. He and my wife even went to the same high school.

"Now I have new relatives I didn't know I had."

A native of Shamokin, Pennsylvania, Len earned his associate's As the number of reactor technology instructors in the PWR Branch grew, two Section Chief positions were created and Len was selected for one of them. At that time, it was anticipated that the Section Chiefs would spend about eighty percent of the time in the classroom and work on administration the other twenty percent.

> Things worked that way for about the first two years, Len says, but soon he found that he and his counterpart, Larry Bell, were teaching about half the time and spending the rest on administration. (An instructor will teach twenty-five to twentyseven full-time class weeks a year; as a Section Chief Len taught about thirteen. Now, as Branch Chief, teaching time may diminish even more.)

> "It's nice to move up," he says, "but I don't like giving up the class time because I really enjoy that."

> His out-of-class time includes a lot of course development work upgrading manuals, and developing specialized training.

> Len says, "Before Chairman Selin began his term he came to the TTC for a special one-day training program. Another staff member and I went to Headquarters to provide additional training We also did a special training program for for him. Representative Kostmeyer of Pennsylvania, and for Commissioner Curtiss and his staff. Commissioner de Planque also recently spent a day at the TTC for a program similar to that attended by Chairman Selin.

> Len says that the TTC als. provides training for media representatives about twice a year, with reporters and others spending two days at the center in classes and working on the simulators. In addition to their other work, he says, instructors also get involved on Incident Investigation Teams, diagnostic evaluations, and other special inspections conducted by other Offices in the Agency.

> "That comes because people recognize our operational expertise," he says.

> After the family settled in Chattanooga, Len completed work on his engineering management degree, earning a bachelor's degree with honors. He says he had about three-quarters of the credits he needed by the time he enrolled at the University of Tennessee at Chattanooga. He spent five years taking classes at night and occasionally during the day. For the last two semesters, he took, evenings and weekends, the equivalent of a full-time course load "just to get it over with." At the time, he says, their son was seven, and he wanted to finish studying while the boy was still young.

> "Now," he says, "I'll probably wait and get my master's after our son graduates from high school."

> Len's wife, a radiologic technologist, feels that once their son is in high school, she will go back to school and finish her degree.

> At present, she is working part-time in the office of an orthopedic surgeon, and she is also teaching a journalism course at the junior high their son attends, so she is not sure if she will study writing or social work



If it's not BWR training or PWR training, it probably is one of Russ Anderson's responsibilities.

That's a succinct way to describe the wide variety of training activities that fall under his purview as Chief of the Specialized Technical Training Branch at the TTC.

That specialized training may include courses in health physics, engineering support, safeguards, and inspection or examination techniques. They're all part of the training provided by the Branch, training that has expanded considerably over the past few years.

However, with the exception of some courses in the health physics and examination techniques areas, Russ explains that most of these courses are actually taught by contractor personnel, and he and his current staff of five spend much of their time dealing with contracted courses in one way or another.

As demands and requirements for specialized training have increased, the use of contractors and other outside training sources has been the only way to meet them, he says.

The staff of the Specialized Technical Training Branch includes three senior health physicists (one of them newly hired) and two technical program specialists.

Russ says that one of the staff members, Lee Miller, spends a considerable amount of time on operator-licensing-type activities. That is to say, he explains, "teaching our examiners the techniques of conducting operator licensing exams."

Staff members are also involved in teaching health physics

technology courses and site access training. They also spend considerable time monitoring contracted courses. But other than that, the duties of the branch generally lie outside of direct classroom instruction.

Staff members are involved with looking for courses NRC employees need that may already be available somewhere, or they may be working to develop courses or specifications for specific courses to be developed by contractors.

"To start at the beginning, there are four different ways that we provide training," Russ explains.

"First there are the courses that are taught at the TTC by TTC personnel.

"As I said, we do some of that, but relatively very little in the specialized areas, when you consider all the courses we handle. We spend most of our time outside the classroom, and most of that time is spent, one way or another, with the other three sources of training.

"These are the courses taught for NRC under contract by contractor personnel, courses taught elsewhere that we may have one or more students attend, and courses offered by other government agencies.

"They're all important sources of training.

"We have a lot of contractor courses, that is, courses that are taught by a person or firm under contract to the NRC to meet our specifications. Some of them are taught here, at the TTC,

of Specialized Training Programs at the TTC

and some are taught at the contractor's location, or elsewhere.

"If all that you need for a course is a classroom, we'll schedule it here. Sometimes, if it's more convenient, if everyone taking a course is from Headquarters or a particular Region, we may have the course taught at Headquarters or in a Regional Office. It can make a lot more sense and is obviously a lot cheaper for two instructors to go to Headquarters or a Region for a few days rather than have twenty students come to Chattanooga.

"On the other hand, if it's something like a welding inspection course, or a course related to nondestructive examination, it makes more sense to have it at the contractor's facility, where the students can get real hands-on training.

"When we know we have a long-term, continual need for a course that quite a few people will attend, we will contract for it. When we anticipate that demand for a particular kind of training is more limited, or more short term, we'll shop around to find if someone else — a commercial training source — is offering what our people need.

"When we find appropriate courses, we advertise them within the Agency. Those who want to take them request the training using a Form 368. If the request is approved, the Agency pays for the costs. It is more cost effective to send people to a commercial course than to do a customized course for only a few people."

The fourth source of training utilized by the TTC is other government agencies.

"We send a lot of security and safeguards people to training at the Department of Energy's Central Training Academy in Albuquerque, New Mexico, and we send people to the Federal Energy Management Agency facility in Emmitsburg, Maryland," Russ says.

Requests for training in security and industrial safety (through the Occupational Safety and Health Administration Training Institute in Des Plaines, Illinois) have been increasing in recent years, and Russ expects that trend to continue.

"So far we haven't had the number of requests to warrant much inhouse course development in that area," he says.

"For now we have linked up with DOE, but we have been working closely with the people in NRR and NMSS to define needs, and I expect that eventually we will develop an inhouse course that will be taught at the TTC."

Course development — whether by TTC personnel or contractors — is an important aspect of the work of the Branch, particularly in light of the expansion of the training it offers. No matter who develops the course, it's important that the course reflect the NRC position and include what NRC wants it to include.

"You have to be sure the course is tailored to the needs of the NRC," Russ says.

As a result, Russ explains, many of the courses that are taught by contractors include time for NRC personnel to come in and talk to the class about the NRC perspective.

"We do a lot of that in health physics courses in particular," he says, adding, "A contractor may be very technically competent, but often he or she can't really address the NRC's position.

"The contractor may be able to say how to do something, but the perspective of an inspector is different. By having NRC speakers come in, the students also learn what the current issues are, issues that may have changed somewhat since the course was developed."

That need for NRC perspective is one reason why specially designed, contracted courses are preferable to courses offered by other sources.

"If we contract for a course, we have control over its content, and we can add presentations by our people," Russ says.

"If we send people to an off-the-shelf course, we realize it may be only eighty-five or ninety percent applicable to NRC."

Sometimes, when it makes sense, Russ says, the TTC will combine course sources.

"We developed the Power Plant Engineering Course here, but we are now using contractor personnel to teach it," he says. "After the course was developed, we found it was impossible to make time for Reactor Technology Instructors to teach power plant engineering, so we started using contract personnel."

Typically, when the NRC contracts to have a course presented, the contract is for a maximum of five years, so the staff is concerned that the contract encompass all that it should. That includes provisions that allow the NRC to have the course changed or updated as needed, and today it generally will have a requirement that any manuals for the course be produced in a desktop-published format compatible with that used by the TTC in house.

"Of course, if a contractor already has a manual done in a format that works well, the TTC won't insist on the change," Russ comments.

"Every time you do a new contract, you learn something, and you spend a lot of time bringing new courses on line."

Occasionally contracts will be 'sole source' contracts with a particular training firm, generally if there is proprietary information involved, but for the most part the TTC's contacts are awarded on bids through an open competition.

"We know of some sources, but we also depend on people reading Commerce Business Daily to learn about what we want," Russ says.

A typical course contract runs for five years, but that's not long, considering the startup time involved and the fact that many courses are not offered more than once a year.

Most contracts are for specific courses, but there also are in place two task order contracts that allow the TTC to have specialized

Russ Anderson

Continued from Page 17

courses or seminars presented by an existing contractor without going through the normal, time-consuming contracting procedure.

"These have been of major benefit to us," Russ says. "We have one for specialized technical training and one for the radiation protection/health physics area."

The task order contracts give the TTC the flexibility it needs to be responsive to special training requests. Of course, these do have a dollar ceiling, roughly about \$500,000 over the five-year life of the contract.

"If we get a special request from a Region, we will try to determine the best way to get it." Russ says.

" If cost of the training is small enough, we may try to do it through a purchase order.

"About the most frustrating thing we encounter is when someone goes to a course through a commercial source (using an NRC Form 368 authorization) and returns really enthusiastic about it. Then the Region may want the company to present the course in the Region so everyone can attend and get the benefit.

"That may be a great idea in many ways, but with all the contracting constraints, it's not that simple to implement something like that."

Besides getting contracts in place with all the right clauses, Russ says, "We have to administer each contract and we monitor ninety percent of the courses taught in one way or another. We try to be as efficient as possible, so sometimes a Reactor Technology Instructor will attend a course as a student and monitor it at the same time."

A veteran NRC trainer, Russ can recount the many changes he's seen over the years.

"Originally we were part of the former Office of Inspection and Enforcement, and we were known as the Reactor Training Center, although we always did some additional specialized technical training.

"As we began offering more in the area of health physics, security, and inspection techniques, we became known as the TTC, and in the reorganization of 1987, we became part of the Office for Analysis and Evaluation of Operational Data.

"We've seen significant changes in the specialized technical training area since 1988.

"Until then it had been a two-man operation, Rick Hasselberg and me.

"But NRC recognized that we needed to be doing more, particularly in the health physics area. In fiscal year 89 we added our two Senior HPs to the staff." Rick was detailed into the PWR technology area at the TTC and now is at Headquarters, in the Office of Nuclear Reactor Regulation, but two other technical program specialists came into the branch, and a third Senior Health Physicist started work in February.

The TTC now is offering twenty-eight HP courses, more than twice what was available just a short time ago, and Russ anticipates the HP course offerings will expand even more.

One of the biggest projects facing the Branch today is providing training for Regional and Agreement State personnel on the changes to 10 CFR Part 20. Published last year, the new rule will be effective in January 1994.

Because there are significant changes throughout the new rule (regarding exposure limits, calculations, and the like), last August the TTC was given the responsibility for developing training for NRC and some Agreement State personnel.

"That effort took up eighty percent of Ted and John's time for a few months," Russ says (referring to John Ricci and Ted Allen, the two Senior HPs in the Branch).

"We developed the course in house between August and early January, including an eight-hundred-page training manual.

"Then, starting in January, they were on the road for five weeks straight, going around to the Regions to teach the course.

"And, in between teaching that course, they also did site-access training at Headquarters.

"Fortunately, in putting the course together, we got some help from the Office of Nuclear Regulatory Research, who gave us Part 20, recorded on disk, in a Word Perfect 5.1 format.

" There is also a NUREG that compares the old Part 20 with the new version.

"But for our purposes we had to do more."

As with virtually all of its manuals, the TTC created the Part 20 manual using desktop publishing.

"We feel that's important in this case, because we feel that this is very significant training, and the manual will be seen by a large audience," Russ notes.

In addition to the Part 20 training, TTC has been working closely with the Office of State Programs to help provide other training to Agreement State personnel.

"SP has the training responsibility in that area, but we jointly coordinate some work with them, and I see that as a continuing effort," he says.

Another ongoing training project is the site access refresher training. After taking an initial site access training course, those NRC staff members whose work takes them to plant sites are required to take refresher training annually. To help make that easier for both the trainers and the trainees, the TTC has acquired a self-taught program that can be installed on standard personal computers just about anywhere.

STARLING BRIDE HE HE SHILL

"All you need is a 286 PC, a color monitor, a color VGA card, and someone to administer the system," Russ says.

With the software in place, an employee who needs the training can go to the equipped PC and work at his or her own pace.

When the student feels ready to take the exam, a designated administrator will give the exam. There is a built-in data bank of exam questions, and, to ensure equity, the software is designed in such a way that each randomly generated exam will contain the same number of questions, with the same subject matter He served on nuclear-powered surface ships and seriously distribution.

It took about a year to develop this program, and the TTC staff gave it a dry run before it was made available elsewhere.

So far the program is available in Headquarters and in four of the five Regions, and the TTC has received positive feedback from people who've used it.

The TTC also has site licenses that will allow the program to be loaded on as many machines in a given area as are needed. The only limiting factor currently is being able to designate an exam administrator - someone who is PC proficient - for each program that will be installed.

"We've been contacting training coordinators to let them know it's available, so we expect to see use expanding," Russ says.

Russ says the aim at the TTC is to always try to balance requests for training with the TTC's available resources.

"When we get a request, we have to consider if it's a localized need or a general need, if it's a one-time need or a continuing need, and if it is required training or supplemental training.

"Fortunately, we seem to be able to satisfy most needs.

"The hardest part is budgeting for the unexpected."

Russ, who may be the NRC's only employee who is a native of Alaska, has been with the Agency since January 1980, when he ended an eleven-year Navy career.

"When I left the Navy, it was a quick decision, but, in hindsight, it was the right one," he says today.

He had grown up in Anchorage and gone "south" to Willamette University in Oregon where he earned a bachelor's degree in math and physics.

That was in the middle of the Vietnam War, and while he had applied to grad school, his draft deferment ended when he finished his undergraduate training.

Knowing that was going to happen, he applied for Navy Officers Candidate School, and was waiting to hear the results.

In the meantime, he married his high school and college sweetheart, and, when they got back from their honeymoon, he found that based on his background, he had been screened as a nuclear power officer candidate.

With little forewarning and even less idea of what to expect, he was flown from Anchorage to Washington for one of the infamous interviews with Admiral Hyman Rickover, the Father of the Navy's nuclear power program.

It was all quite a shock, he recalls, and like so many others, he got kicked out of the Admiral's office several times. But he was accepted into the program on Valentine's Day in 1969.

considered making the Navy his permanent career. Then he was assigned to duty with the Reserve Officer Training Corps Unit at Purdue University.

It was a great billet. He found he enjoyed teaching, and he found the time to earn his master's degree in nuclear engineering. He also decided it was time to leave the Navy.

He had known Ken Raglin in the Navy, and Ken, who had already left to join NRC, told him about an opening at Headquarters for a BWR instructor. Russ was selected for it and remained in that job for several years.

Russ moved into the specialized training area in 1984 when the job of senior program manager came open in what has now grown to be the Specialized Training Branch. He became staff chief when the unit was created in 1987.

Russ says that, being from Alaska, it took some time to get used to living in the South. But now, he says, "My blood has thinned, and I wouldn't look forward to those Alaskan winters."

Still, he says, he misses the frontier aspects of life in Alaska, and he has fond memories of growing up there.

He has a sister who lives near Anchorage, so he and his wife try to get to Alaska every four or five years for a visit, But, he says, he has no thoughts of moving back permanently.

"It's too isolated," he says. "It's a three-hour flight just to go from Anchorage to Seattle."

When he's not busy with work, Russ spends a lot of his time outside the office working with wood and stained glass. Last year, for instance, he added a four-hundred-square-foot deck to their home and replaced windows with an atrium door to it.

"My wife says I'm a frustrated carpenter," he says.

He's made stained glass inserts for some dividing doors at their home, and he's also done some stained glass work for others, but it's work for fun, not for profit.

"Stained glass is very labor intensive," he explains. "It's not a hobby you can do to make money. One project took me eighty hours to complete. I certainly couldn't charge for the time."

Want To Tour a Plant? Do It Via a TTC Computer

Interactive Laser Videodisc Technology Lets You "Walk Around" at Your Own Pace, Making Choices About Where You're Going

With a Monitor and a Joy Stick, You Can Get Close Up Views Of What You Need To See

4 4.

It's almost like the start of *Star Tours*, except that when you look at that big screen in front of you, you seem to be moving through a nuclear power plant, not a spaceship hanger.

And you're not on vacation at Disney World. You're taking a course at the Technical Training Center.

But in both cases, you're experiencing the benefits of advanced technology in creating an experience.

At Disney World, it's a make-believe ride through space with an inept robot as your pilot, and, without your leaving your seat in a stationary room, Disney provides the chills and thrills of an outof-control space ride by rocking your seat around and providing sound effects.

At the TTC, without leaving the classroom, you can visit a real, specific nuclear power plant. Without leaving your seat, you can stroll through the plant.

When you come to a corner, you can decide to turn right or left. To get a good view of a certain area, you can turn around in a circle, or you can take a closer look at something that interests you, whether it's at floor level or on the ceiling.

It's not magic that brings you this experience. It's interactive laser videodise technology.

It combines specialized software loaded on a fairly standard personal computer and a laser videodisc that holds between fifty and sixty thousand individual photographs of a power plant. The result is a powerful, state-of-the-art training aid.

Steve Roessler, Senior Project Manager, takes a visitor on a tour of the Pilgrim Nuclear Power Station almost a thousand miles away.

The plant tour starts with an aerial view of the facility and the surrounding country side, and then a stroll down the bridgelike walkway up to the main gate house.

While the visitor looks at the big screen at the front of the

elassroom, Steve is also looking at a plan of the plant on the PC monitor, a joy stick in his hand. With the joy stick, he moves a cursor around the monitor and makes a selection, and the visitor moves inside the plant.

"Where should we go now?" Steve asks.

If a visitor just wants to see a particular area, Steve can move his joy stick, click, and the tour moves there, skipping everything in between. The pictures can advance slowly, one at a time, or they can move rapidly, like a rowie.

The floor plan on the monitor gives more than location. If an area is colored yellow or gray, it means you can't go there.

A series of icons shown on the monitor indicates what kinds of specialized views are available. For instance, an eyeball icon on a particular spot on the floor plan means you can get a panoramic, 360-degree view at that location.

Steve "takes" the visitor into the control room, where they turn around and see the whole room.

"We can add graphics — captions — to the elements in these pictures, so we could label individual items in the control room for the students," Steve explains.

The captions could be created on the computer's hard drive, where the index and the data base reside, and they would match up with the pictures on the disc.

"We could also add other information, such as labelling areas where radiation would be a concern," Steve says.

"Right now we have the laser videodiscs for fifteen plants ready to use. We're working on more, and we intend to get videodiscs for as many plants as we can.

"But, not all of the utilities are planning to make them for their plants — they are expensive to create. And some of the utilities that do have them made don't want to make them available to outsiders, even the NRC."

and His Wife Fell in Love with Chattanooga

the shipyard materials license. Eventually he tired of the industrial atmosphere, and in the mid-1980s he started looking for other job opportunities.

A friend who had moved to NRC Region III a few years earlier talked him into applying there and he would probably still be there, except for two things: he had a son who was a senior in high school and didn't want to move, and their house didn't sell as quickly as hoped. So Ted spent just one year with Region III and then returned to the shipyard in Bremerton. But then, when his son finished high school, he put the house back on the market and applied to NRC again.

And that's when he and his wife came to Chattanooga for his job interview.

Herenthusiasm for the area was so great that for a while Ted was concerned about what would happen if he wasn't offered the job at the TTC!

Before he came to the TTC, Ted had taught while he was in the Navy and while he was at the Naval Shipyard. But, teaching at the TTC poses several different challenges, he says.

First, he says, because there is so much to know in the health physics areas and there are so many changes, there is the challenge of keeping oneself knowledgeable. And, he says, it's not enough to teach just health physics theory.

"You have to teach the theory in the regulatory framework, and you have to be sure you are up to date on the Agency's latest position on all the issues that come up," he says.

Another challenge comes in the area of course development — "trying to meet the high standards of NRC. We have some highly sophisticated students, and you can't just slide by."

At the same time, classes may also include some less experienced employees, and courses have to appeal to them, too.

In general, he says, the courses he teaches include three types of students, old and new employees who need health physics training as part of their overall training, and people who were involved in construction activities who are being converted into health physics specialists.

"It's hard to present a course that will mean something to all attendees," he says.

As an example, he cites a recent session of a health physics technology course.

"The Health Physics Technology Course (HP 201) is a fairly comprehensive course," he says.

"And in one class he had a Ph. D. who had been with the NRC for ten years, two new employees right out of college who had been with NRC only two or three months, and the Director of the Division of Radiation Safety and Safeguards from one of the Regions. It's tough to present material so the new people will understand it, and at the same time not bore the other students," he says.



TED ALLEN

While Ted feels well-equipped to teach health physics theory, sometimes, he feels some of his students can teach the NRC perspective better than he. In situations like this, Ted says, "We will ask the more experienced students to contribute to the class by talking about some of the things they have done."

As far as the Allens are concerned, the only downside of life in Chattanooga is the fact that the families are on the West Coast. Their children are in California and Washington, and their folks are in Spokane.

"It takes a long time to go to visit them all," Ted says. When they do travel West, they have to take big blocks of vacation time to fit everyone in.

Ted's major hobby, outside of gardening, is sports cars. He is the proud owner of a 1971 Fiat 124 Spider and a 1973 Datsun 240Z. He won the Western Washington sports car championship in his class eight times, and he says proudly that he was able to make the cars a family sport. His daughter on occasion was his navigator and together they won one championship, and both his sons did some. racing and won their classes.

Ted will retire form the Federal service at the end of this year.

Jan and Jim: The Griffins Make Up Quite a Team at the TTC

Most people you meet would emphatically state there is no way they would be able to work with their spouse.

But that's not the case for the TTC's Jim and Jan Griffin.

"We've been fortunate to be able to work together for the ten years of our married life, first with General Electric and now with the NRC," they say proudly.

Jim and Jan are two-thirds of the simulator engineering staff at the Technical Training Center.

Joe Lawson is the third NRC employee in the group, with contracted hardware maintenance assistance also available. This small staff is responsible for maintaining and upgrading the TTC's full-scope nuclear power plant control room simulators.

"Simulators are very complex machines," Jim says.

"Their purpose is to replicate an actual nuclear plant control room, using highly advanced computer systems to mathematically represent the various power plant systems."

He explains that the simulator computers are connected to the control room benchboards through high-speed input/output hardware. Each of the simulators uses color graphic CRT displays.

TTC instructors operate the simulators from an instructor station.

All of these hardware and software elements must work together, in real time, to achieve an accurate simulation, and that's the job of the simulator engineering staff.

Today TTC's main simulation computers are Encore 32/9780s.

"These computers are high-speed, super-mini computers, controlled by the MPX-3.5 real-time operating system," Jan says. to be replaced," Jan says.

capable machines that just didn't have the capacity to support supported on the newer computers." TTC's training needs."

With that description, she introduces one of the most significant elements of her and Jim's jobs - upgrading the simulators.

The TTC's three simulators were manufactured in the late 1970s and acquired by the TTC through lease-purchase agreements.

To increase their performance capabilities, all three simulators are being upgraded to add current state-of-the-art simulation.

The simulator upgrade projects have three distinct elements.

The first is the replacement of the original computer systems. This required the design of an all-new simulator executive system for the GE and B&W simulators (the Westinghouse simulator computer was upgraded by Westinghouse engineers).

"The executive system controls the overall operation of the simulator computers", Jim explains. "It determines which of the models are executed, and what the execution sequence is. It manages the flow of data between the control room hardware and the computer system. And it manages the operation of several independent software tasks.

"Designing an executive system that could use our existing models, while still taking full advantage of the features of the new computers, is easily the most challenging task I've done.

"We've also had to design a whole suite of utility software, such as debuggers, to go along with the new executive system."

The upgrade didn't stop with the new computers. In fact, that was just the start.

The second element to the upgrade project is the replacement of the instructor stations.

"The new computers meant that our instructor stations also had

"The original simulator computers were much slower, less "The original instructor stations used old hardware no longer



So, Jim and Jan designed a new Apple Macintosh-based instructor station for use on the B&W and GE simulators. These new instructor stations have been in use for about two years.

"The instructor station is the instructor's interface to the simulator," Jim explains. "It is used to start and stop the simulation, and to develop 'problems' for the students to respond to.

"We looked at the available technology and didn't find anything that met all of our needs. So, we designed one.

"The instructor stations are based on high-performance Macintosh computers, with 19-inch color displays. They were originally designed using Macintosh IIcx computers, and are now being upgraded to Macintosh Quadra 700s.

"Each instructor station uses a single Macintosh, connected to the Encore 32/978O simulation computer via Ethernet. The application was developed with SuperCard (a Macintosh development product)."

The instructor station highlights another challenge for the simulator engineering staff: staying fluent in several different computer languages and operating systems.

"SuperCard has a language of its own called SuperTalk," Jan says.

"The Encore software is written in Assembly language and FORTRAN. Our Encore equipment uses two different operating systems.

"The new CE simulator will use yet another operating system, a variant of UNIX, and some of the new equipment, manufactured

by Sun Microsystems, uses a different variant of UNIX.

"It's difficult to stay current on all of these different systems, but we manage.

"It also means bookshelf after bookshelf of technical documentation to wade through."

The last element in the simulator upgrade projects is to replace much of the software models with new, state-of-the-art models.

Through a contract with S3 Technologies, the RETACT thermal hydraulic code, STK three-dimensional core model, and a multinode containment model are being installed on the GE and B&W simulators.

"These new models will give us capabilities we didn't previously have," Jim explains.

"They are based on first-principle physics and thermodynamics.

"For example, the old models couldn't handle an Anticipated Transient Without Scram (ATWS).

"The new models will be able to cope with ATWS transients and really let us get more deeply into scenarios designed to exercise the Emergency Procedure Guidelines.

"The GE simulator is being upgraded first, and should be ready for training soon."

Jim is an electrical engineer who grew up in Oklahoma and attended the University of Oklahoma.

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Jan and Jim Griffin

Continued from Page 27

After undergoing nuclear training at the Navy's nuclear power school in Vallejo, California, and prototype training in Idaho Falls, Jim spent his active duty as an officer on the USS Virginia.

Following his Navy duty, Jim went to work for General Electric at the newly-opened BWR/6 Training Center near Tulsa, Oklahoma, in 1980. This facility was home to the Perry and Black Fox BWR/6 simulators.

Then, after he received initial Senior Reactor Operator certification and served a short stint as an instructor, Jim took on simulator engineering responsibilities for the Perry and Black Fox simulators in 1981.

While with GE, Jim designed a simulation of the Emergency Response Information System (ERIS), GE's Safety Parameter Display System.

The ERIS simulation was applied to the Perry and River Bend simulators, and was also added to the Black Fox simulator (now at the TTC) following its relocation to the TTC.

Jim also supervised the technical aspects of moving the Black Fox and Perry simulators from the BWR/6 Training Center to the TTC and Perry plant site, respectively.

Jim obtained his NRC Instructor Certification in 1983, and joined the NRC in 1989.

"Working on simulators is very satisfying," he says.

"You get to cover a broad range of hardware and software issues, and there's always some new problem to tackle. You get instant feedback on your work - if some new piece of software doesn't work as it should, you find out right away."

Jan also joined the NRC in 1989 after extensive experience in the commercial nuclear power industry. Upon graduation from the University of Michigan in 1977 with a B. S. E. degree in environmental sciences engineering, Jan started her career as the utility's Environmental Engineer at Enrico Fermi 2.

In 1981, Jan began working for General Electric as a Startup Test Engineer at the Shoreham Nuclear Power Station. During that assignment, she was the first woman to successfully obtain a Senior Reactor Operator Certification from GE's BWR/6 Training Center.

After leaving Shoreham, she transferred to the BWR/6 Training Center (located in Oklahoma) as an instructor, where she taught the theory and operation of nuclear power plants to utility and GE personnel.

While she was at the Training Center, Jan obtained her NRC Instructor Certification.

In 1984, Jan moved with the Perry Simulator from Oklahoma to the Perry Nuclear Power Plant in Ohio, where she was the program manager for GE's Perry Simulator Project.

She was responsible for scheduling all training and maintenance on the simulator, and she administered the simulator lease contract between GE and the utility. She also supervised the GE staff of instructors.

In 1986, Jan became the program manager for GE's Black Fox Simulator Project at the TTC. She was responsible for scheduling all training and maintenance on the simulator, and she administered the simulator lease contract between GE and the NRC.

After attending applicable training courses, Jan also began performing modifications and upgrades to simulator hardware and software.

During this assignment, the lease contract was expanded to include the responsibility for maintenance on the Westinghouse and B&W simulators as well. In 1987, Jan obtained her Professional Engineer's license.

"Programming simulators is as challenging as teaching on them," Jan says.

"In fact, the knowledge I gained while teaching has been extremely helpful in analyzing simulator response and determining where modeling errors are located. Experience as an instructor also gives me insight into what features are needed on the Instructor Station to make it user-friendly.

"Sometimes, simulator engineering can almost be as challenging as raising our two-year old son."

Jan goes on to say, "Robert's arrival has certainly changed our lives. He has made it much easier to leave 'work' at the office we don't talk about it at home nearly as much as we used to."

Jim and Jan are both actively involved in their church. Jim is currently serving a three-year term as church treasurer and has computerized the church accounting process. Jan is just starting to develop a computerized, detailed data base of the church membership.

Jim and Jan enjoy yard work, gardening and, of course, playing with Robert.

Jim dabbles with photography. Jan likes to do counted crossstitch. However, they have trouble finding much time for either of these activities.

"Robert always wants to take pictures, too," Jim notes.

Robert also enjoys playing with the Macintosh that Jim and Jan have at home -- particularly the keyboard.

Maybe the next addition to TTC's simulator engineering staff will be truly home grown.

The TTC's Management Support Staff-It's Lean and Up-to-Date



IRENE HAYCRAFT PARKER

The Management Support Staff at the Technical Training Center is unusual in several ways.

First of all, is the size. There are only three people on the staff, which provides administrative support for the thirty-fivemember TTC staff and the many students who attend TTC courses each year.

Then there is the range of responsibilities that includes travel, record-keeping, procurement, contracts, and publishing the TTC's many and massive manuals using desktop publishing.

And then there's the fact that TTC has no secretaries.

The Management Support Staff is made up of Irene Haycraft Parker, the Chief, Management Support Staff, and Sharon Roberson and Jan Patterson, who are Office Automation Assistants.

Those Office Automation Assistant titles are accurate, because, like everyone else in the TTC, the Management Support Staff is heavily automated. The staff uses computers for virtually everything.

"I use a computer program to manage the computer-based administrative support and travel budgets as well as a computerbased accounting tracking system to keep up with our many blanket purchase orders," Irene explains. "Sharon and Jan are becoming more involved with these programs so they can back me up"

"They also have become proficient in desktop publishing, and they routinely assist the technical staff in producing the training material here.

"We have a tremendous administrative work load. It seems we're never through, because we're always getting ready for another class.

"Fortunately, [TTC Director] Ken [Raglin] has convinced the staff members to do much of their own administrative work to lessen our administrative work load. These days almost everyone on the staff does his or her own original typing, so our group only has to put it in final form.

"We are truly a support staff."

As a relatively small staff, the TTC has some unusual administrative arrangements. For example, although the TTC is a Headquarters organization, for convenience, TTC purchase orders are handled out of the Region II office in Atlanta, which is about ninety miles away. However, travel tickets and money are handled out of Headquarters.

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SHARON ROBERSON

The Management Support Staff

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"We send the requests to Headquarters via express mail, and the travel unit in Maryland sends the tickets down to us," comments Jan.

Even though the staff produces the camera-ready copy for the manuals it needs, unless there is an extremely short turnaround time, the material is sent to Headquarters for printing.

Irene, who has been with the TTC since just a few months after it moved to Chattanooga in 1980, is a real Agency veteran.

"I started to work for the Atomic Energy Commission when I was right out of high school," she says. "I was a typist-stenographer in Germantown."

She moved to NRC when it was formed in 1975, and served in a variety of administrative posts at Headquarters. But, when the opportunity to move to Chattanooga came up, she took it.

Being from Maryland, Irene says that at first Chattanooga seemed like quite a change.

But now, she syas, "I really love this area, and I'd hate to move back. I like the weather, the atmosphere, and the people.

And, she adds, "I met my husband here."

About the only thing she finds missing from the Chattanooga area is Redskins football.

"I'm a Redskins fan from the word go," she says, and she professes no surprise that the team won the Super Bowl this year. "I predicted they would," she says.

A devoted fan, she has an extensive collection of Redskin memorabilia that she often displays during football season, and she has a complete desk set made of burgundy plastic that helps keep the 'Skins in mind year round.

Irene says she makes about two trips a year to the Washington area for training, while Sharon and Jan typically make about one annual trip each.

"When I think of the changes that have taken place here over the years, it's really mind-boggling," Irene says.

In addition to being pleased with the many changes in the way the TTC does business, Irene is also proud of the way the TTC staff has come to support the Combined Federal Campaign in the Chattanooga area.

Although Steve Showe headed the campaign last fall, Irene remains active and interested, and she recalls how she and Steve may have laid the groundwork for TTC's enthusiastic participation in the CFC several years ago.

In conjunction with a campaign at that time, she and Steve were invited to spend some time visiting Signal Center, a school for handicapped children.

"We brought back a video tape on the school that we showed, and we were able to tell the people first hand about where their money goes," she says. "That personal touch really turned it around. 1 think we've had a hundred percent participation just about every year since then."

In her spare time, Irene loves to go boating and fishing.



JAN PATTERSON

fish," she says, chuckling at the obvious pun.

She also loves to travel, and besides frequent trips to Florida, where her husband has a house, she and her husband took a month off in late spring to drive to the West Coast and back.

They visited Little Rock, drove through the Dakotas, saw the Black Hills and Mount Rushmore, took a side trip to Jackson Hole, drove down the California Coast, and returned to Chattanooga by way of Texas.

"It was a belated honeymoon," says Irene, who was married July 3, 1991.

"We took only a few days off then to go to the Outer Banks and Kitty Hawk, North Carolina, and I warned Ken that this summer I'd want time off for a real honeymoon."

Sharon and Jan, who kept the administrative work going in Irene's absence, are an especially close team.

They both started work at the TTC on the same day ten years ago, and were sworn in at the same time.

For the first six months, Sharon worked as a secretary and Jan was the receptionist, but when a former secretary left, Jan got that job, and the two women have been sitting side by side ever since.

(If their photos accompanying this article were in color, you would see that they were wearing the same color blouses, a not infrequent coincidence.)

They have essentially the same duties, and they've both kept up with the technological advancements that are so prevalent at the TTC, moving from the world of secretaries into the world of computers. Recently they both got promoted on the same day.

There's a lot of good-natured teasing between them, and with the you can be proud of.

"You might say I got hooked on fishing when I caught my first rest of the staff, and they say they've gotten to the point where one can tell what the other is thinking.

> Sharon has two sons. The older one graduated from college last fall and has his sights set on becoming a writer. The younger one recently graduated from high school and will go away to college in the fall, an event Sharon seems to be anticipating with somewhat mixed feelings. She is from Crossville, Tennessee, about an hour-and-a-half drive from Chattanooga, and she says she and her husband like living in the Chattanooga area.

> To hear some of her colleagues talk, one of the things Sharon enjoys most about the area is the shopping. In honor of her "hobby," someone has created a sign that hangs near her desk and reads, paraphrasing Julius Caesar, "Veni, Vidi, Visa, or, I came, I saw, I shopped."

> Jan, who has lived in Chattanooga for nineteen years, is also fond of living there and passed up opportunities to move away. She has two daughters, a 19-year old who is studying to be a nurse, and a 16-year old who is in high school.

> Jan says outside the office she likes to play golf, but hasn't had the time to do so in a while. She also likes to read, history in general and about the Civil War in particular. She says she read Scarlett, the much publicized sequel to Gone With the Wind, but adds that she didn't particularly enjoy it.

> Jan and her husband recently celebrated their ninth anniversary.

In January, on her birthday, he came to the office to take her out to lunch, and surprised her with a gold bracelet. In typical fashion, the rest of the staff had already seen that she was provided with cake, funny cards, signs, and a balloon.

With the warm and friendly atmosphere coupled with all of the advanced technology and procedures that are in place, it's no wonder that Irene says, "This is a great place to work. It's a place

Desktop Publishing: A Flourishing Art Form at the TTC

Desktop publishing is alive and well -- in fact it's flourishing -- looking document. at the TTC.

Forced by time and distance to produce many required documents without Headquarters support, the TTC staff has turned a minus into a plus to become a model for efficient document production using such software programs as WordPerfect, PageMaker, and Claris CAD.

The way it works is this: Individual staff members will write their assigned portion of a course manual or other document on their own PCs, using WordPerfect.

Once the text has been corrected and revised as necessary, it will be communicated, via the TTC LAN, to the lead staff member for the document, who will move the material into PageMaker.

Other staff members already have designed a PageMaker template for the document, establishing page layout and type size for text and headings.

Figures and equations - produced via Claris CAD and other special programs -- are added. The final polishing is done by a member of the technical staff or by one of the Office Automation Assistants, and the camera-ready copy is prepared in Macintosh format and printed on a PostScript printer.

The process greatly reduces the time required to produce a good-

In general, documents are produced in a two-column format, using a 12-point Times proportional font with automatic point leading.

As a result, according to Len Reidinger, Chief of the BWR Technology Branch, "We have been able to reduce the size of our documents by sixty percent (compared to producing the same material using the former standard one-column format and Letter Gothic font), and the documents are more readable."

Both the two-column format and the Times font produce improvements in readability. In the two-column format, the reader's eyes can absorb all the material in a four-inch wide column at once; in an eight-inch-wide format, the reader's eyes will have to shift across the page.

Unlike the Letter Gothic font, the Times font, very similar to the type used for NR&C, is what is called a serif type. That is, it has little feet at the bottom of the downstrokes of each letter. Those little strokes, or serifs, link the letters in the word together, so the eye absorbs the letters as a word, speeding up the reading process.

The smaller size of current course manuals provides many benefits, including saving printing costs, saving shipping costs, requiring less storage space on the part of the TTC and the students, and using less paper.

With Lots of Computer Graphics Support

Don Nelson says he would rather teach "than anything else," but these days, when he's not busy in the classroom, he is spending much of his time at a graphics computer.

In keeping with the TTC's discretionary duties policy, Don has become deeply involved with desktop publishing and computer graphics, and he is an inhouse expert on the CAD (computeraided design) software.

He is in charge of the manual for the Westinghouse 304 Technology course, and for all of the graphics for all of the Westinghouse technology courses.

He uses the CAD program on a graphics computer (an Apple

MacIntosh) to do drawings for the manuals as well as vugraphs.

He has already completed and stored so many different drawings that when its time to generate another, he no longer has to start from scratch.

"I can take a simple drawing that I have stored on the computer, rename it, and then add extra components, either new ones, or ones I borrow from other stored drawings," he says.

It's simple and it's fast, and the CAD program allows graphics to be exported and moved between many different publications.

If a drawing has to be changed for a course, it can be done in a





Desktop Publishing

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For instance, John Ricci designed a special format for the 750page manual used to teach NRC personnel and others about the changes made to 10 CFR Part 20.

Pages that discuss specific changes have shadowed boxes in adjacent columns showing the old version of Part 20 on the left and the new on the right. An additional box running the width of the page on the bottom is designated "Notes."

(See the illustration of a typical page from the manual reproduced on Page 33.)

After John designed that format, he and Ted Allen put together the information needed for the manual, and John and Jan Patterson did the final text placement and polishing.

Because of the success of desktop publishing at the TTC, contractors who develop courses for the TTC are now generally being required to put any course materials into a desktop publishing format. That means that in the future, the TTC staff and others will be able to readily modify sections of any manuals as necessary.

Getting the TTC's course manuals into a desktop publishing format has been a major effort, but soon all the existing manuals will have been converted and the TTC's desktop publishing will be more of a maintenance operation.

But, always looking ahead, staff members say that they are beginning to find many other ways in which their desktop publishing expertise can be used to produce other materials the TTC needs.

Don Nelson

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When talking about the advantages of living in Chattanooga, he says, "The commute here is so short, the people are friendly, and the parking is free."

"Living in Chattanooga has really helped us as a family," he says, and he means it. "There are so many more opportunities here for children."

"We're able to spend more time together as a family (because so much less time has to be spent commuting), and we can afford to do more."

One of the things they were able to do in Tennessee that he says they couldn't do in Maryland was join a country club -- and that activity paid off. Their daughter is at Old Miss on academic and golf scholarships, and their son hopes to follow in her footsteps and play golf for Clemson.

(Don points out, however, that the academic scholarship pays more toward tuition than the golf scholarship.)

Don says that after eight years in Chattanooga, he went back to Bethesda for the first time in 1988.

"Things had changed so much," he says. "I was trying to find the Hyatt Regency in Bethesda and ended up stopping at the gas station practically next door to ask for directions."

Then, because of all the new one-way streets in downtown Bethesda, he had to drive around several blocks to get back to the entrance of the Hyatt Regency.

Bobby Eaton: The TTC's "Young Pup"



BOBBY EATON AND HIS FAMILY with some of their pet ferrets

Bobby Eaton has been with the NRC for just over five years, but at the TTC, where many of the instructors have been with the TTC since before it moved to Chattanooga in 1980, he's often referred to as "the young pup."

Bobby graduated from the U. S. Naval Academy in 1979 and spent about five-and-a-half years on active duty, serving in the Navy's nuclear power program. But, he decided he preferred the civilian life, and took a job with Westinghouse as an instructor in Zion, Illinois. After about two years of putting up with the cold weather, a reduction in force helped him to make up his mind to move back to the Southeast, and, as you can quickly tell by his drawl, the TTC in Chattanooga was practically home territory. So, the job as a reactor technology instructor in the PWR Technology Branch was a natural when he joined the NRC in 1985.

Now he and his wife, their two daughters, and a son are quite settled in the area, with a menagerie in their home that includes three big dogs, one miniature dachshund, two cockateels, two rabbits, and, probably the pride of their collection, five ferrets.

Each of the ferrets is quite distinctive. One is sandy colored; one is an albino female, one has a brown mask and is, appropriately, called *Bandit*; one is a very large albino male; and the fifth is similar to *Bandit* but likes *Coca Cola* and is named *CoCo*.

The whole family is enthusiastic about ferrets as pets, with their antics providing a constant source of amusement. However, because they are able to slither into almost anywhere, Bobby strongly suggests that any would-be ferret owners also invest in ferret collars with bells on them. The Eatons also have leashes for their ferrets and take them for occasional walks. Last fall they took them, on their leashes, to a local fair, where they were as big a hit as some of the fair's planned attractions.

"Everyone wanted to have their pictures taken with them," Bobby recalls, and the Eatons were happy to oblige.

(By the way, ferrets are illegal to have as pets in parts of the Washington area because they are considered to be wild and exotic pets, so check local laws carefully before you consider a purchase.)

Besides the menagerie at home, Bobby also has several shelves full of animals — these stuffed — decorating his office. They range from an *Energizer Rabbit*, to two *Pillsbury Doughboys*, and a *Captain Crunch*. He's collected them all, he says, by saving and redeeming special advertising offers.

Also decorating his office is a stuffed largemouth bass, which he caught in nearby waters.

When Bobby's not talking about his pride in his family and his animals, he is likely to be talking about his "new" car, a sleek, metallic sand-colored Corvette, which he bought from Goodwill Industries at a fraction of its retail value.

"I was lucky," he says. "A doctor had donated it, probably to get an income tax deduction, and it was in very good shape."

Bobby is also a puzzle fan. He regularly submits answers to the NR&C Puzzlers, and recently contributed a Puzzler on the TTC. He also is the author of the special TTC crossword puzzle featured on the next two pages. It's the largest crossword puzzle NR&C has printed, and Bobby promises that it will be one of the most challenging.

Kathy Halvey Gibson: The TTC's Only Female Instructor

"I can't believe I've been here two years! The time has really gone fast."

That's how Kathy Halvey Gibson feels about the time she's spent at the TTC where she is the first and still the only female instructor.

She continues, "I really like this job. It's technical, but it also has people contact, and I like people. It's fun to come to work."

Kathy has been with NRC since February 1986, when she started work as a reactor engineer in Region I. That summer she moved to the Salem plant as a Resident Inspector, and there, in December 1988, she became the NRC's first female Senior Resident Inspector. (Linda Smith, recently named the Senior Resident at ANO-1, is the second.)

"I liked being a Resident because there was always something different technically going on in the plant, and I liked the interaction with the people," she says.

But, to her the downside of a Resident's job is the NRC requirement that Residents move to another plant every five years (a requirement imposed to help ensure that Residents maintain their objectivity about the plant to which they are assigned).

Kathy feels that moves can be difficult when you have children who are in school, and children are a very important part of Kathy's life.

Kathy and her husband had one child when she came to NRC, and their second was born while she was at Salem. (The third was born after she came to the TTC.) After their second child arrived, Kathy soon found that sometimes the hours of a Resident presented challenges, particularly when both she and her husband had to work late. (At the time, he was working at the Peach Bottom plant, which was going through a period when long hours were common.)

It was particularly difficult, she says, because they didn't have any family in the immediate area to help. Fortunately, there to fill in the family gap, was Kathy Venuto, the Resident Office Assistant at Salem. Days when both Gibsons had to work late, Kathy Venuto would pick up the children at day care and look To fill the house, the Gibsons are considering adoption. after them until one of them was free.

(Despite the move to Tennessee, their friendship with the Venutos continues. The Gibsons visit the Venutos when they go North to visit family, and the Venutos traveled to Tennessee to meet the newest addition to the Gibson family.)

The decision to move to the TTC in January 1990 was "almost spur of the moment," she says. "The job possibility came up, and three months later we were here."

Spur of the moment or not, the job of teaching at the TTC fits well with what Kathy learned earlier in an NRC-sponsored careercounseling program.

After she took a career interest test, the counselor commented that the results were somewhat unusual. Kathy's interests seemed to be evenly split between social skills and technical skills. (The counselor indicated that people usually lean heavily to one or the other type of skill.)

The counselor's advice was for her to seek jobs that gave her the opportunity to utilize both. Being an instructor at the TTC certainly fills the bill.

When the Gibsons decided to move to Chattanooga, her husband, who has a degree in business administration, gave up his job, but he was able to find a new one, in sales, in the Chattanooga area.

Both Gibsons feel that the move to Chattanooga was a good one. With three children — a girl seven, a boy four, and a girl two they say they like the Chattanooga area as a place to live. The weather is great and there is always something to do. Also, Chattanooga's central location is advantageous for traveling. But they say they didn't find the cost of living in Chattanooga lower than it was up North (Kathy says the cost of child care is high, and food and clothing seem more expensive than they are in Pennsylvania or New Jersey).

"But here you get more house for your money," she says.

They have purchased a 3000-square-foot house in a pleasant suburban community, of which, Kathy says, "The house is big enough for our families when they visit - we had twenty overnight guests for our daughter's baptism - and for the overnight guests the children already invite."

The Gibsons also would like to fill it with more children on a permanent basis.

"I like the idea of a houseful of children," Kathy says. "I have two brothers and two sisters. I grew up in a large family, and nothing beats brothers and sisters. They are always there for you."

"Most of the children available today are "special needs kids," or you can adopt a sibling group of three or more," Kathy explains.

A sibling group seems like a good idea (such a group would most likely have come from a family where the children had been abused or neglected) to the Gibsons. However, Kathy says, in general child-raising specialists say that you shouldn't adopt children who are older than your oldest birth child.



KATHY HALVEY GIBSON at work, with pictures of her family in the background

Therefore, since there aren't many very young sibling groups available for adoption, the Gibsons may have to wait a few years, until their own are older, to find the right match.

Kathy has always tried to stay close to her children. She relates that the first time she took a class at the TTC was the first time she left her children over night. Unlike most students, she flew back home (to Pennsylvania) for the weekends, instead of staying in Chattanooga, just so she could be with the children, and after that, whenever she travelled, she would take the children with her.

"My mom, husband, in-laws, or sister would come along to watch the children," she says.

Today their older daughter is in first grade and the younger two children are at a Kindercare Learning Center near their home while their parents are at work.

How do you feel about day care, Kathy was asked.

"Once you find a good program, it works out very well," she replies. "My children are in a program that takes them somewhere different — bowling, skating, to the zoo, or to a movie - every few days. That actually gives them more opportunity for growth and fun than they might have otherwise."

Of course, there can be some less-than-easy times, as in January of this year when the children came down with the chicken pox.

"When the kids are sick, my husband and I pow wow to decide whose work will be less impacted by taking time off," she says. "Sometimes we even split the day, with one of us going to work in the morning and the other in the afternoon.

"Our supervisors and managers have always been As for her long-range plans, "That's hard to say" she says. understanding."

Their relatives in Pennsylvania were surprised when the Gibsons moved to Tennessee, but they travel North frequently for visits.

"It's about a ten- to twelve-hour drive," Kathy says, "but we travel at night and our van has a TV and a VCR in it to keep the children happy."

Kathy earned her undergraduate degree in chemistry and biology at Indiana University of Pennsylvania and did graduate work in nuclear science and engineering at Carnegie Mellon University in Pittsburgh. In 1989, Indiana honored her as a distinguished alumna, and that year she was included in the first edition of Who's Who in Science and Engineering. Before coming to NRC she worked for Duquesne Light Company, spending five years at the Shippingport plant and two at the Beaver Valley facility.

At the TTC, she first qualified to teach Westinghouse technology, and in March she completed her qualification in CE technology.

Outside of work, she teaches an infant baptism preparation course for new parents at her church, and she was homeroom mother for her daughter's first-grade class. When it's time to help out with class parties or drive for field trips, she'll take a few hours of annual leave to do so.

The Catholic school her daughter attends has instituted a PIP, that's a Parents' Involvement Program, which requires each child's parents to volunteer at least eight hours a year to the school. (The program keeps the parents involved with their child's school teacher. It also saves the school — and ultimately the parents — a lot of money because the parents are doing some of the things that the school would otherwise have to hire someone to do.)

"If I'm not at work or at home, I'm probably volunteering at school or at the church," she says.

"Maybe someday, when the kids are all in college, I'll go back to school myself, but if I do, it will be for something completely different.

The Simulators: The Showpieces of the TTC



MOVING DAY — AND IT WASN'T EASY — when the GE simulator was moved onto an upper floor of the TTC in Chattanooga. Here a section of the wall has been removed, and a section of a control panel, held by a crane, is being slipped through the opening, much like threading a giant needle and thread.

The mainstay showpieces of the NRC's Technical Training Center in Chattanooga are its simulators, full-scale replicas of nuclear power plant control rooms.

Through these simulators, NRC students can see not only what a control room looks like, they can also see how it is supposed to run — and what does and should happen when something goes wrong.

Simulators have always been an important part of TTC training. In fact it was the proximity of TVA-owned simulators that led to the TTC's move to Chattanooga in 1980. Students got their classroom instruction at the TTC and then journeyed to the TVA facilities where NRC instructors conducted the simulator training. But even though the TVA simulators were nearby, there were still major drawbacks to using them.

First were the hours. As renters, not owners, NRC students did not get prime time. NRC students could use the simulators when TVA wasn't using them. That meant that often as not simulator training was conducted sometime between midnight and 8 am, no one's peak time for learning or teaching. Then there was the everincreasing cost of renting simulator time.

Today's rental rates average about \$700 an hour. NRC needs about 4000 hours of simulator time a year to accommodate all of its students. That would equate to rental fees of \$2.8 million a year, far beyond what the budget could stand.



WHAT'S IN AND WHAT'S OUT? It's hard to tell with the mirrored walls, as a Westinghouse simulator panel is slid into the building through a ground floor window.

Purchasing new simulators for TTC use also seemed out of the question. They cost, new, approximately \$10 to \$14 million each, and the TTC needed four, one for each of the four different reactor technologies. Another budget impossibility.

Then procurement creativity entered the process.

Since the effort to procure simulators for the TTC began in earnest, the NRC found simulators that were available for acquisition, either because they were for cancelled or deferred plants or because they were owned by reactor vendors who no longer needed them.

Because purchasing even these simulators would be beyond budget limits for any given year, the NRC was able to arrange lease-purchase or other financing mechanisms that allowed payment to be spread over several fiscal years.

The first simulator acquired was the General Electric simulator for the cancelled Black Fox plant.

Next came the Westinghouse simulator. It is a SNUPPS-type simulator that was owned by Westinghouse when Westinghouse

was providing training for its reactor customers. This particular unit was used for training at the Westinghouse Training Center in Zion, Illinois. Now that utilities have their own site-specific simulators, Westinghouse no longer provides the training and no longer needed the simulator.

The third simulator to arrive was the B&W simulator from WNP-1, a plant where construction is officially on hold. The simulator had been delivered to that site, but was never used.

The fourth simulator, being acquired from ABB-Combustion Engineering, is due to arrive at the TTC in September.

Based on the Calvert Cliffs plant, this simulator is one of the first ever built, and, as such, will get a major upgrade before it is put into use.

(Over the years, the other three simulators have been upgraded considerably, and the upgrading continues to ensure that they can emulate an increasing number of postulated transients and accidents.)



NO, THAT'S NOT A REAL CRISIS. Just an instructor startling some of his colleagues by simulating simultaneous emergencies on the control panel, as shown above. The instructor and the instructor work station are shown in the photo below.

Simulators

Continued from Page 41

The costs have varied.

The Westinghouse simulator cost about \$2 million, including installation, while the B&W model cost several hundred thousand dollars less. The GE cost more, but the initial GE leasepurchase agreement included the space the simulator occupies and maintenance.

In fact, GE actually opened an office at



the TTC to run and maintain the simulator. Because of all its upgrades, the CE simulator will cost about \$2.5 million.

The first three simulators were bought on lease-purchase agreements that allowed payment to be spreadover three to five year terms.

(NRC now fully owns the B&W and GE simulators, and the W estinghouse simulator will be fully paid for in 1993.)

The CE simulator will be bought with progress payments that also will spread the cost over several years.

(In addition to the cost of purchase and major upgrades, each simulator costs about \$25,000 annua!!y for spare parts and routine maintenance.)

Beyond the problems of the acquisition itself, getting a new simulator into the TTC is a really major effort.

Simulator panels just won't fit through doors or on elevators, so, getting a simulator inside the TTC building means removing sections of the building wall and lifting the panels up and in with a crane.

When the CE simulator arrives in September, moving it into the building will probably take about two days.

Setting it up and installing and testing it will probably take another two weeks.



THE SIMULATORS ARE IMPORTANT TO LEARNING. Above a student changes the electrical lineup on the Westinghouse simulator, while below students attend a class on the GE simulator.



Welcome to Chattanooga, Tennessee

The Home of NRC's Technical Training Center

by Sharon Roberson Office Automation Assistant TTC Staff

Chattanooga is an Indian name meaning "Rock coming to a point".

Chattanooga is a beautiful city. You won't just hear that Chattanooga is full of beautiful places, because you will see them for yourself -- such as the renowned Lookout Mountain's Point Park that overlooks the magnificent Tennessee River with its fantastic views steeped in history.

Spring and fall are definite seasons of distinct beauty here. Visitors also enjoy the small-town friendliness and southern hospitality. They don't mind the mild elimate either. Summers are long and warm; winters are short and cool.

VIEW FROM THE TOP

At daybreak on a clear morning, stand at the top of Lookout Mountain and look to the east through the rising mists. Just beyond historic Missionary Ridge and its tunnels, the rising sun clears the gorgeous Appalachian Mountains and reflects off the modern all-glass Osborne Building at Eastgate Shopping Center near the interchange of Interstates I-24 and I-75.

This building houses the Nuclear Regulatory Commission's Technical Training Center with its nuclear power generating plant simulators and Training Center staff.

Northeast, beyond the TTC, across the Chickamauga Lake and power-producing dam, the reddish orange sunrise will backlight the shapes of twin concrete cooling towers at the Tennessee Valley Authority's Sequoyah Nuclear Plant. The TTC is within a three-hour drive of five nuclear power plants, four of which are on the Tennessee River.

If you look to the south end of Lookout Mountain and to the eastern side, you can see Chickamauga Battlefield and National Military Park, the Nation's first and largest military park. This was the site of one of the largest and most decisive battles of the Civil War, and is only a few miles from the site of the last battle of the Revolutionary War.

Downtown you can see the famous *Chattanooga Choo Choo* which is a grand historical landmark in itself. It was a magnificent railroad terminal in its heyday; now it is a unique restaurant and hotel. The Terminal Station with its domed ceilings and arched windows still reflect echoes of busy travelers, train whistles, and cries of "all aboard."



THE VIEW FROM THE TOP of Lookout Mountain is well worth the trip. On a clear day, you seem to be able to see forever. But other times, you can – as Confederate troops once did – find yourself above the clouds. The Confederate artillery was encamped atop the mountain, intending to rain shells down on the Union troops and prevent their moving through the gap and into Georgia. But the morning of the battle was foggy. The Confederate troops were "above the clouds," and their efforts to try to find and stop the Union forces were futile. And thus began General Sherman's march through Georgia to the sea – and the end of the Civil War. The Lookout Mountain Battle is still referred to as "The Battle Above the Clouds."

LOCATION

Chattanooga and the Training Center are within one day's drive of fifty percent of the population of the United States. It is a twohour drive up I-75N to Knoxville, Tennessee (home of the UT Volunteers) or to the nuclear facilities at Oak Ridge National Laboratory. It is a two-hour drive down I-75S to Atlanta, home of the National League Champion Braves. Guess how far it is to Nashville to the West? Yep, it is a two-hour drive to the *Grand Old Opry* and all that country music.

You can depart Chattanooga's Lovell Field Airport with its brand new copper-topped terminal and arrive at Atlanta International Airport in thirty minutes. Did the new airport's dome remind you of a grand old railway terminal?

ANNUAL EVENTS AND ATTRACTIONS

You know summer has officially begun in Chattanooga when the popular "Riverbend Festival" gets underway at Ross's Landing on the banks of the Tennessee River. For ten nights music floats up from Ross's Landing on the river -- country, jazz, classical, bluegrass, rhythm and blues, and rock. For a more relaxing evening, you may want to take a sightseeing tour on the *Southern Belle* Riverboat.





SPEND AN EVENING IN THE PAST — in a bedroom in a restored *Chattanooga Choo Choo* car, with an atmosphere that hearkens back to the Victorian era



WHAT A LOBBY! The former train station now houses the hotel registration desk. Note the spectacular windows and ceiling.



GOING UP -- OR DOWN -a ride on the incline railway on the side of Lookout Mountain is a real treat, but not for the faint of heart. The railway scales (or descends) the mountain at a seventy-five-degree angle, and you really have to hold on to your seat to keep from sliding off. It's been around for a long time, however, and it's listed as a place of interest by none other than the American Society of Mechanical Engineers.

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In the fall you can take the "Fall Color Cruise" sightseeing procession down the Tennessee River to enjoy the height of the breathtaking fall foliage display.

Raccoon Mountain Park offers the world's first and only hang-gliding simulator where novice adventurers can try the sport. Don't forget some of the more popular attractions that Chattanooga has to offer: Rock City, Ruby Falls, and the Lookout Mountain Incline Railway.

Another exciting step toward Chattanooga's future attractions is the nation's first freshwater Aquarium. Both an architectural and aquatic showplace, it is something no one should miss.

If shopping is your "bag," then you will want to take a drive out to Hamilton Place Mall, one of my favorite attractions. It is Tennessee's largest mall with more than a hundred shops, located off of I-75 within eight minutes of the TTC. Downtown you will find Warehouse Row, a redevelopment of warehouses, designed for more unique shopping experiences.

NEARBY ATTRACTIONS

You might want to take a drive up to Cherokee National Forest for an exciting "white water rafting" trip down the Ococe River.

You can visit the Great Smoky Mountains National Park, Gatlinburg with its in-season snow skiing, Pigeon Forge with its outlet malls, and *Dollywood*.

Some visitors may even want to "sample" Lynchburg, Tennessee. You know, the home of the world famous Jack Daniels Distillery. But it's just for a sample. After all, the distillery is located in a "dry" county.

The kids will love Huntsville's Redstone Arsenal and Space Camp. The women might want to sneak in some additional shopping at a "whole town-full" of shopping outlets in nearby Boaz, Alabama -- "since we are going that way anyway."

For those who don't mind a little extra time in the car there is always Ashville, North Carolina, with the Biltmore Estate to envy.

Chattanooga natives tend to have triple doses of pride and independence -- arising from their Indian heritage, major participation in the Civil War, and earned nickname of "Volunteers" during the War of 1812. Chattanoogans value work, play, family, community, and earing -- the foundation on which this City was built.