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POLICY ISSUE (Notation Vote)

October 7, 1999

SECY-99-244

FOR: The Commissioners
FROM: William D. Travers
Executive Director for Operations
SUBJECT: LOCATION OF THE NRC'S TECHNICAL TRAINING CENTER AND
APPROPRIATE NUMBER OF SIMULATORS

PURPOSE:

The purpose of this paper is to provide the Commission with a recommendation on consolidating agency training resources in the Washington area and the appropriate number of simulators for regulatory and technical training of reactor program staff.

BACKGROUND:

In April 1998, the Executive Council formed a Training Review Group (TRG) 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. In its final report issued in September 1998, the TRG proposed seven recommendations. In SECY-98-291, "Plan for Improving the Effectiveness of NRC's Training Programs," dated December 18, 1998, the staff addressed five of the seven recommendations. Recommendations 6 and 7 in the TRG report were "Consolidate Agency training resources in the Washington area" and "Reduce the number of simulators to 1 BWR and 1 PWR," respectively. SECY-98-291 indicated that there were programmatic, financial, infrastructure, staffing, and timing considerations which must be carefully evaluated so that an informed decision could be made on the optimum location of the Technical Training Center and the appropriate number of simulators. This paper provides

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information on these issues and provides options for Commission consideration.

The NRC's technical training program is managed by the Office of Human Resources (HR). The technical training staff is located at the NRC Technical Training Center in Chattanooga, TN, although it is part of the NRC headquarters (HQ) organization. The TTC provides training to meet the integrated NRC staff needs in the curriculum areas of reactor technology, probabilistic risk assessment, engineering support, radiation protection, fuel cycle, security and safeguards, and regulatory skills. A spectrum of classroom and simulator courses is provided to meet the cumulative regulatory and technical training needs of the NRC headquarters and regional staff.

Formal reactor technical training for NRC staff was initiated in 1972 when the Atomic Energy Commission obtained classroom and simulator training from the General Electric (GE) and Westinghouse reactor vendors. At that time, there was no requirement for licensee site-specific simulators, and nuclear power plant staff were trained using vendor-owned simulators. This arrangement continued until 1974 when the NRC decided to establish an internal training organization and provide the training using NRC staff instructors. A reactor training function was initially established in Bethesda, MD. Simulator time was purchased from the reactor vendors and/or the Tennessee Valley Authority (TVA), and simulator training was conducted using NRC instructors.

NRC mandated site-specific simulators for licensees in 1979. Subsequently, the reactor vendors decommissioned their simulators and dropped out of the simulator training business which made it necessary for NRC to look for alternatives to provide simulator training for NRC staff. In 1980, the Commission approved moving the reactor training organization from Bethesda, MD, to Chattanooga, TN, where it was established as the NRC Reactor Training Center (RTC). As described in SECY-79-622, "Improvements in the Inspection and Enforcement Training Program," the RTC was established in Chattanooga, TN, because of the proximity to simulators and reactor facilities, the perceived ability to attract and retain a highly qualified instructional staff, and the learning environment that could be established by having students attend classes away from their regular job duties.

Although the primary emphasis of the technical training organization continued to be reactor technology training, the RTC role was expanded to include a wide variety of additional curriculum areas to address the varied technical training needs of the NRC technical staff. In 1983, the RTC was redesignated as the Technical Training Center (TTC) to reflect its increasingly more diverse technical training responsibilities.

As utility training demands changed and sufficient time on the TVA simulators became increasingly unavailable, the NRC began acquiring simulators for GE, Westinghouse, Combustion Engineering (CE), and Babcock and Wilcox (B&W) to meet its training needs. The NRC simulation infrastructure was established by purchasing previously used simulators as surplus items from reactor vendors or canceled plants and upgrading them as necessary to meet NRC needs. This resulted in a capital investment of approximately \$10M with a replacement cost of approximately \$50M, and was the only method by which the simulation

infrastructure could be established within budget constraints. Information on the simulators acquired, used, and disposed of over time is reflected in the following table in addition to the acquisition, moving, and installation costs.

Simulator	Year Acquired	Acquisition, Moving, and Installation Costs	Major Upgrade Costs	Year Disposed
GE BWR/6 (Black Fox)	1986	\$2.70M	\$573K	1999
Westinghouse (SNUPPS)	1987	\$2.16M	\$537K	1997
B&W	1988	\$1.17M	\$524K	N/A
CE	1992	\$2.69M	\$0K (Part of procurement)	N/A
GE BWR/4 (Shoreham)	1994	\$468K	\$350K	N/A
Westinghouse (Trojan)	1995	\$892K	\$350K	N/A

Full-scope control room simulators modeling the GE BWR/4, Westinghouse, CE, and B&W reactor designs are currently installed at the TTC. Since the GE BWR/4 and Westinghouse designs represent the majority of the operating plants in the U. S., a decision to reduce the number of operational NRC simulators would logically retain the GE BWR/4 and Westinghouse designs.

Technical training courses that are dependent on the TTC infrastructure, such as the simulators, are presented at the TTC. Technical training courses that are dependent on specific contractor facilities and specialized equipment are presented at contractor sites. Technical training courses that are not dependent on specialized infrastructure or equipment are routinely presented at locations near the majority of the students (i.e., in NRC headquarters or at a regional office).

Stakeholder views were solicited from program office and regional management and TTC students through written surveys. These views have been incorporated in the appropriate sections of the paper. Attachment 1 provides composite results for the management survey. Attachment 2 provides composite survey results for TTC students. Attachment 3 provides the views of the HR TTC Labor-Management Partnership Committee Labor Partners. Attachment 4 provides additional views of National Treasury Employees Union (NTEU) personnel.

DISCUSSION:**Programmatic Considerations for Number of Simulators**

Formal training required to support training and qualification programs is provided for certain categories of NRC staff personnel, including reactor inspectors, headquarters operations officers, reactor operator licensing examiners, and TTC instructors. The largest program is Inspection Manual Chapter (IMC) 1245 "Inspector Qualification Program for the Office of Nuclear Reactor Regulation Inspection Program." Two weeks of vendor-specific simulator training are currently required for initial inspector qualification, and two weeks of vendor-specific simulator refresher training are currently required every three years to maintain inspector qualification in the assigned reactor technology. Simulators are also used to support reactor technology classroom courses for each reactor vendor design. Historically, the CE and B&W designs, including their systems design, transient response, and emergency procedures, were deemed to be sufficiently different from the GE and Westinghouse designs that separate vendor-specific simulator training programs were warranted. Attachment 5 provides detailed information on the use of simulators to support the reactor technology training program.

The fixed costs to operate and maintain the CE and B&W simulators have already been reduced to the minimum considered necessary to maintain their availability for training use. The number of students who attend CE and B&W simulator training has averaged 36 per year and 18 per year, respectively, and has generally declined in recent years. The cost per student and the number of students for each reactor technology area for FY 1998 were:

	Westinghouse	GE	CE	B&W
Cost per Student	\$2.3K	\$3.5K	\$5.5K	\$18.4K
Number of Students	118	82	31	10

Student comments regarding CE and B&W simulator training were solicited during the 1997 and 1998 CE and B&W cross-training courses. Students were clear in their belief that vendor-specific simulator training is necessary in all PWR designs. Further insights from these student comments can be seen in Attachment 2.

Management stakeholders believe that vendor- and plant-specific knowledge and skills are necessary for successful job performance including the risk-informed baseline inspection program, characterization of the risk significance of inspection findings in the assessment process, and use of risk information matrices for inspection planning. However, they believe that an adequate level of knowledge and skills can be obtained through enhanced classroom training and on-the-job training and that the added value of CE and B&W simulator training is not sufficient in comparison with the relatively high cost per student. Additionally, management stakeholders feel that NRC staff observation of licensee site-specific simulator training can be used to supplement CE and B&W classroom training in the absence of NRC CE and B&W simulators.

Programmatic Considerations for TTC Location

The primary benefit of the remote location of the TTC is that it provides an environment where all of the students (headquarters and regions) are away from their normal work environment. This lessens job and family pressures and provides an improved learning environment and more available study time for students during the intensive reactor technology training courses. If the TTC were moved to headquarters, management attention and administrative controls would need to be established and implemented to ensure students are not called out of class or otherwise drawn to their normal duties in order to avoid disruptions and maintain the effectiveness of the technical training program. Program office and regional management endorse and would support management controls for this purpose. The possibility of partial day courses would exist if the technical training organization were in headquarters. This would tend to alleviate the problems of class disruption. However, this would require significant curriculum modification and would have to be weighed with consideration of regional needs.

The TTC staff has established and maintained a high quality technical training program from the Chattanooga, TN, location for nearly 20 years. However, relocation of training staff to headquarters with HR management, program offices, and contract management staffs would achieve some effectiveness and efficiencies. Based on stakeholder surveys of agency management, a headquarters TTC location would increase use of simulators and instructors for review and investigation of technical issues, provide better access to program offices for updating training materials and program office subject matter experts' involvement in course development and instruction, and potentially result in more movement of technical staff between program offices and the technical training organization. Since the majority of specialized technical training (i.e., PRA, radiation protection, engineering support) is provided through contracts, the contracting process may gain some efficiency having the TTC project managers and the Office of Administration (ADM) Division of Contracts and Property Management personnel co-located.

A geographically separated workforce is always more difficult to manage, particularly when most of the resources are at the remote location. Application of training provider resources to address multiple training challenges would be more efficient with a geographically centralized training organization. The ability of HR to reprogram staff to address new or changing agency priorities would be enhanced with the training resources geographically consolidated. Additionally, a centrally located headquarters training staff would routinely be more aware of current agency activities and perspectives which could then be more easily incorporated within training courses.

Currently, the regions are the primary users of simulator training in support of formal qualification requirements for reactor inspectors. Regional personnel will have to travel for simulator training whether the TTC is located in Chattanooga or in headquarters. Benefits of a headquarters TTC location for regional staff would be more opportunities to interact and network with NRC management and headquarters personnel. The use of reactor technology training by headquarters offices would most likely increase if the TTC were located at headquarters in that

managers would be more likely to encourage their staff to attend training which did not require out-of-town travel. Additional benefits of a headquarters TTC location for headquarters offices would include less travel time and costs and the ability to provide substitute students for last-minute cancellations in courses.

Financial Considerations for TTC Location

The Office of the Chief Financial Officer (OCFO) contracted with Grant Thornton LLP to perform an estimate of the costs of relocating the Technical Training Center and personnel in the vicinity of the NRC headquarters. In addition to estimating the costs of such a move, the analysis included a comprehensive cost estimate for maintaining and operating the TTC in Rockville, MD, versus Chattanooga, TN, as well as preparing a break-even analysis to identify the amount of time it would take the NRC to recoup the relocation costs. Cost models for four separate scenarios were developed based on the number of simulators (i.e., four, three, two, or one) that would hypothetically be moved. Grant Thornton delivered the final report on September 7, 1999. Using the assumptions that are documented in the report, the Grant Thornton report concluded that (1) the cost to the Nuclear Regulatory Commission to establish the Technical Training Center in Rockville, MD, would be between \$3.9 million and \$4.2 million dependent on the number of simulators being moved; (2) only a small percentage of the cost of establishing the Technical Training Center in Rockville, MD, would be recovered; and (3) there would be no break-even points for any of the scenarios within the ten-year life cycle. Attachment 6 provides a summary of the Grant Thornton cost study.

The methodology and cost variation options used in the Grant Thornton report proved to be sound and valuable in the follow-on process. Data in the Grant Thornton report were utilized by NRC staff to analyze the costs associated with various options beyond those considered in the Grant Thornton report. It would be less costly to operate the technical training function with two simulators either in Chattanooga, TN, or in Rockville, MD, in comparison with the status quo of four simulators in Chattanooga, TN. The cost savings for the Chattanooga, TN, location would principally result from reduced simulator hardware maintenance costs. The cost savings for a Rockville, MD, location would principally result from a reduction in space needed in Rockville, MD, for a simulator training facility since the TTC instructors and the majority of the classrooms could be located within existing space in NRC headquarters.

The Grant Thornton report assumed that 38,000 square feet of space would be necessary in Rockville, MD, for a four simulator facility and 32,168 square feet of space would be necessary for a two simulator facility. Based on further analysis, the staff determined that only 21,000 square feet of space would actually be necessary for a two simulator facility and recalculated the one-time and annual operational costs with the appropriately sized square footage using the Grant Thornton models. This reduction in space rental costs for a Rockville, MD, simulator training facility would result in larger annual operational cost savings than the Grant Thornton report indicated with the original assumptions. Specific cost data for various options are discussed in detail in later sections of the paper.

Infrastructure Considerations for TTC Location

The staff considered using existing space to accommodate a hypothetical move of the TTC. However, the column spacing every 20 feet in the White Flint complex and the size and required orientation of the simulator control panels and peripherals preclude placement of the simulators within either OWFN or TWFN. The Grant Thornton study determined, however, that office facilities that could accommodate the simulators could be located within five miles of NRC headquarters. Other possibilities include the NRC warehouse, land immediately adjacent to the parking garage entrance to OWFN, and other space as may be available through GSA. A simulator training facility for the GE BWR/4 simulator and the Westinghouse simulator would require approximately 21,000 square feet of space. This facility would also include space for two small classrooms; office space for simulator instructors; office space for three simulator engineers; and office, work space, and spare parts storage for simulator maintenance technicians.

Office space for 23 TTC staff would be established in the White Flint complex. A total of three technical training classrooms of sufficient size would be established in the White Flint complex. These classrooms could be equipped with audiovisual and multimedia equipment that is currently installed in the classrooms at the TTC. One large technical training classroom has already been constructed in OWFN as part of the ongoing restack effort. The most effective arrangement of geographically consolidated training resources would locate all training classrooms and related space in the vicinity of the existing Professional Development Center. Inclusion of these non-simulator related spaces within the White Flint complex is one key factor in the overall cost computation since no incremental cost would be incurred because the NRC is already paying rent for the space.

Staffing Considerations for TTC Location

The current TTC staffing level is 26 FTE including 22 technical staff, 2 administrative staff, and 2 managers/supervisors. The TTC organization consists of two components, each headed by a chief. The Reactor Technology Training (RTT) component includes the reactor technology instructional staff (12 FTE) and the simulator engineers (3 FTE). The RTT staff primarily develop and conduct reactor technology and regulatory skills training in the classroom and simulators and maintain the simulators and simulation infrastructure. The Specialized Training and Support (STT) component includes senior health physicists (3 FTE), technical training program managers (4 FTE), and the administrative support staff (2 FTE). The STT staff primarily develop and conduct radiation protection and regulatory skills training, manage contracts for a wide range of contracted specialized technical training, and provide administrative support for the TTC and technical training programs. These staff resources have been necessary to develop and implement the technical training required by agency formal training and qualification programs within the nuclear reactor safety, nuclear materials safety, and nuclear waste safety areas.

A formal qualification program is in place to ensure the qualification and competencies of the TTC training staff. This program parallels the programs currently in place for inspectors, operator licensing examiners, headquarters duty officers, and other positions with formal qualification requirements.

Reactor technology instructors have normally qualified in two reactor technologies sequentially. Initial staff qualification in one technology has normally been completed within one year of assignment, and qualification in the second technology has normally been completed within two years of assignment to the TTC. Consistent with other NRC formal qualification programs, the final determination of successful completion of the TTC staff qualification program has been demonstrated by successful completion of an oral qualification board. The qualification program for other TTC technical staff has typically been completed within one year of assignment.

Historically, the TTC workforce has been relatively stable with an average attrition rate of less than one per year. The established process for posting vacant positions and filling them through the normal selection procedures has been adequate to maintain sufficient staffing to meet programmatic needs.

An informal survey of the TTC staff was conducted in FY 1999 regarding projected retirement age and most likely personal decisions for a number of scenarios. This informal survey was conducted to determine personnel impacts as well as staffing problems that might result from geographical relocation of the technical training function. The table below provides information regarding staff age and projected staff retirement dates for calendar year 2001 for scenarios where the TTC remains in Chattanooga, TN, or relocates to headquarters. It should be noted that the retirement data provided are best faith projections provided by the individuals in response to a hypothetical situation and are not firm commitments. This data does not include potential losses of staff who might choose not to move for reasons other than retirement.

Staff Age and Projected Retirements

Calendar Year	1999	2001 (TTC in Chattanooga)	2001 (TTC in Headquarters)
Number > 55	4	10 of 26	10 of 26
Projected Retirements	0	0	8 of 26

The staff believes that at least 8 of 26 positions would be vacated if the TTC staff is moved to headquarters. Significant time would be required to qualify replacement instructors. Although the staff hopes that all current TTC staff members would relocate to headquarters if a decision to relocate the TTC to headquarters were made, some contingency planning was necessary. For planning purposes only, the staff is assuming that 8 TTC staff members would retire based on their own projections and that it would be necessary to overhire and begin the qualification process for the new hires at least one year before a move of the TTC staff is effected in order to maintain technical training program continuity.

Timing Considerations

In order to maintain the current quantity and quality of technical training, assuming a move of the TTC to the Washington area and the projected simultaneous retirement or resignation of multiple TTC personnel, a plan for overhiring and qualifying replacement staff would have to be developed and implemented at least one year in advance of the move. A plan would also need to be developed and implemented in advance to establish staff offices, headquarters classrooms, and the simulator training facility and to schedule training in the appropriate locations before, during, and after the various pieces of the technical training infrastructure were moved.

It is estimated that at least one year would be necessary to decommission the CE and B&W simulators and to enhance the classroom and on-the-job training to replace the simulator portion of the reactor technology training programs without simulator support. A complete move of the TTC facility and staff to headquarters is projected to take 2 years and 8 months from initial approval and planning to completion. This takes into consideration space procurement, design, and construction as well as simulator disassembly, move, installation, and testing.

The earliest that funding could be budgeted for a move of the TTC through the normal budget process is FY 2002.

OPTIONS:

Options for TTC location and appropriate numbers of simulators are discussed below. These options take into consideration the programmatic, financial, infrastructure, staffing, and timing considerations discussed in the paper. Each option is discussed as a stand-alone option, but Option 3 builds on the logic for Option 2, and Option 4 builds on the logic for Options 2 and 3.

For each option, the one-time costs, 11-year total costs, and net present value of the 11-year total costs are shown in Attachment 7. As indicated in the table of Attachment 7, the 11 year total costs of the options are not significantly different. There is a difference of approximately \$3M (3.3%) between the 11-year total costs of the options and approximately \$2M (3.5%) in the net present value of the 11-year total costs of the options. Since there are small differences in total costs, the discussion that follows indicates the effectiveness and efficiency improvements while noting the cash outlay benefits associated with each option.

Option 1: Maintain 4 simulators and the whole TTC staff in Chattanooga, TN.

This option represents the status quo. In this option, the GE, Westinghouse, CE, and B&W simulators and the whole TTC staff would remain in Chattanooga, TN. This option would maintain the existing experienced and qualified TTC staff. Maintaining a geographically separated TTC facility and staff, however, does not achieve the effectiveness and efficiency gains desired by management. There would be no one-time costs associated with this option; however, the annual operating costs would be the highest of the options presented in this paper.

Option 2: Decommission the CE and B&W simulators in FY 2000 but maintain the TTC and the whole TTC staff in Chattanooga, TN.

This option would decommission the CE and B&W simulators but would maintain the GE and Westinghouse simulators and the whole TTC staff in Chattanooga, TN. Decommissioning the CE and B&W simulators would be based on programmatic considerations and overall cost-benefit. The staff believes that an adequate level of vendor-specific knowledge and skills necessary for successful job performance can be obtained through enhanced classroom training and on-the-job training. Additionally, the added value of CE and B&W simulator training is not considered high enough in comparison with the relatively high cost per student to justify continued operation of the CE and B&W simulators. This option would maintain the existing experienced and qualified TTC staff. Maintaining a geographically separated TTC facility and staff, however, does not achieve the effectiveness and efficiency gains desired by management.

The one-time costs which would be incurred if this option were adopted are \$0.2M. These would be the costs to dispose of the CE and B&W simulators and reconfigure TTC space. Of all the options involving two simulators (i.e., Options 2, 3, and 4), the one-time costs for this option would be the lowest while the annual operating costs would be the highest.

Option 3: Decommission the CE and B&W simulators in FY 2000; maintain a small staff in Chattanooga, TN, for implementation of simulator training (approximately 8 FTE); and move the other TTC staff members (approximately 18 FTE) to headquarters by mid-FY 2001.

This option would decommission the CE and B&W simulators for the reasons discussed in Option 2 and maintain the GE and Westinghouse simulators and a small staff to conduct simulator training in Chattanooga, TN. This option would move the TTC staff not directly tied to simulator training and maintenance to headquarters by mid-FY 2001 and would require reconfiguring the White Flint complex to accommodate TTC staff offices, classrooms, and other space. This option would achieve most of the effectiveness and efficiency gains desired by management resulting from a geographically consolidated training organization. It would not, however, achieve any of the benefits identified by senior management stakeholders that require the simulators to be in close proximity to the headquarters staff or the headquarters classrooms. This option would necessitate overhire and qualification of personnel to replace TTC staff who would retire or choose not to move. This would result in paying salaries and benefits for both overhires and incumbents for approximately 5 positions for a period of approximately 12 months. It was further assumed that 13 staff members would relocate to headquarters.

The one-time costs which would be incurred if this option were adopted are \$2.6M. These would be the costs to dispose of the CE and B&W simulators, reconfigure TTC space, reconfigure TWFN space, relocate TTC personnel, and relocate and train replacement personnel. The annual operating costs for this option would be slightly less than those for Option 2 and about the same as those for Option 4.

Option 4: Decommission the CE and B&W simulators in FY 2000; maintain a small staff in Chattanooga, TN, during FY 2001 - FY 2002 for implementation of simulator training (approximately 8 FTE); move the other TTC staff members (approximately 18 FTE) to headquarters by mid-FY 2001; and move the GE and Westinghouse simulators and remaining TTC staff members to headquarters by the end of FY 2002.

This option would decommission the CE and B&W simulators for the reasons discussed in Option 2, move the TTC staff not directly tied to simulator training and maintenance to headquarters by mid-FY 2001 as discussed in Option 3, and move the GE and Westinghouse simulators and remaining TTC staff to Rockville, MD, in FY 2002. This option would require establishing a simulator training facility in the Rockville, MD, area and reconfiguring the White Flint complex to accommodate TTC staff offices, classrooms, and other space. This option would achieve all of the effectiveness and efficiency gains desired by management resulting from a geographically consolidated training organization. This option would necessitate overhire and qualification of personnel to replace TTC staff who would retire or choose not to move. This would result in paying salaries and benefits for both overhires and incumbents for approximately 8 positions for a period of approximately 12 months. It was assumed that 18 staff members would relocate to headquarters.

The one-time costs which would be incurred if this option were adopted would be \$4.3M. These would be the costs to dispose of the CE and B&W simulators, reconfigure TTC space, reconfigure TWFN space, relocate TTC personnel, relocate and train replacement personnel, move the GE and Westinghouse simulators and other equipment, and establish a simulator building lease. As indicated above, the annual operating costs for this option would be about the same as those for Option 3.

RESOURCES:

The FY 2000 appropriation and the FY 2001 budget request to OMB is based on Option 1. Therefore, funds are not included in FY 2000 or FY 2001 to cover the one-time costs associated with Options 2, 3, or 4. The incremental funds needed (i.e., total funds needed less total funds already budgeted for the technical training function) for FY 2000 and FY 2001 for each option are shown below.

	FY 2000	FY 2001
Option 1	N/A	N/A
Option 2	\$0.1M	N/A (Net savings)
Option 3	\$0.8M	\$1.1M
Option 4	\$0.8M	\$1.1M

The staff could accommodate the funds needed under Option 2 by reallocation of funds budgeted for the technical training program.

If the Commission adopts Option 2, the staff would fund the approximately \$0.1 million in incremental cost from available FY 2000 funds for the technical training program. Funds to meet the additional needs under Options 3 or 4 for FY 2000 could potentially come from reallocating the FY 2000 appropriation and using prior year carryover. The staff would use carryover to fund the incremental costs if sufficient carryover were known to be available. However, the amount of carryover that could be used for this purpose is uncertain at this time given other high priority agency demands (e.g., pay raise) for these funds. Because of these uncertainties, a decision to use carryover funds should not be made until mid-year FY 2000. Reallocation of the budget request for FY 2001 is the only option given that the carryover for FY 2001 is unknown.

Staff actions necessary to implement Options 2, 3, or 4 would be done within existing FTE resources by delaying or eliminating other currently planned work. For Option 2, these actions would include establishing and managing a contract for elimination of the CE and B&W simulators and subsequent TTC space restoration, and resources to enhance the CE and B&W classroom and on-the-job training to replace the simulator training. For Option 3, actions include those listed for Option 2 plus actions necessary to effect a move of the TTC staff, overhire replacement staff, and reconfigure the White Flint complex to establish TTC staff offices, classrooms, and other training space. For Option 4, actions include those listed for Options 2 and 3, plus actions to establish and manage a contract for a headquarters simulator training facility and to establish and manage a contract for moving the remaining 2 simulators and TTC equipment to headquarters.

RECOMMENDATION:

The staff recommends that the Commission approve implementation of Option 4. With respect to the number of simulators, the added value of CE and B&W simulator training does not justify the relatively high costs to maintain these simulators. An adequate level of knowledge and skills for the CE and B&W reactor technology areas can be obtained through enhanced classroom training and on-the-job training. Adoption of this option would achieve the programmatic efficiencies identified by agency senior managers, and allow better overall utilization of training staff resources to address agency needs while costing about the same as Options 2 and 3. Having the TTC function in headquarters would improve program effectiveness by making the simulators and instructors more available to the program offices and providing better access by the training organization to managers and subject matter experts in the program offices. A higher overall utilization of simulators and technical training courses would likely result since headquarters personnel would not have to travel to attend training currently conducted at the TTC.

As with Options 2 and 3, Option 4 would result in long-term savings compared to the status quo (Option 1), primarily as a result of eliminating simulators and reduced space occupancy costs.

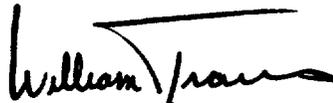
While additional near-term costs must be incurred, the total 11-year costs of Option 4 would not be significantly different from those in Options 2 and 3 which also would involve operating two simulators. In order to complete Option 4 within the time frames discussed, the staff would need to begin in early FY 2000.

The staff recommends funding the incremental costs of \$0.8 million for FY 2000 by using available carryover and, if necessary, reallocating FY 2000 appropriated funds. Specifics would be determined during the FY 2000 mid-year resource review and the Commission will be informed. To provide the additional \$1.1 million in FY 2001, the staff would reallocate the FY 2001 budget during the development of the FY 2002 budget for Commission review.

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 and concurs with the resource discussions.



William D. Travers
Executive Director
for Operations

Attachments: As stated

Commissioners' completed vote sheets/comments should be provided directly to SECY by c.o.b. Wednesday, October 27, 1999.

Commission staff office comments, if any, should be submitted to the Commissioners NLT Wednesday, October 20, 1999, with an information copy to SECY. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

1. What do you perceive would be the benefits to your office or region if the TTC remained in Chattanooga?

A most obvious benefit for the TTC to remain in Chattanooga, or some location other than headquarters, is the reduction of student distractions from normal office duties and home responsibilities, allowing full concentration on the training curriculum and study outside of class which is essential for intensive technology series courses. Preservation of the TTC in Chattanooga, with 2-4 simulators in operation, allows for adequate training for staff both in headquarters and the regions and continued access to a well-qualified training staff and the simulator training tools. **(NRR)**

However, the advantages of maintaining the status quo must be weighed against the disadvantages discussed below. Appropriate management controls to avoid disruptions and maintain the effectiveness of technical training courses in headquarters could effectively preserve the quality of the learning environment. On balance, it may be more beneficial to locate the TTC at headquarters. **(NRR)**

None. **(NMSS)**

The benefit would be the ability for attendees to devote undivided attention to intense technical training efforts and avoid distractions due to demands of their jobs and homes. **(NMSS)**

Offsite training facilitates concentrating on class work and the exam, including being able to study and complete homework assignments undisturbed, which is extremely important for technical courses. **(NMSS)**

No long-term benefit, but for the short-term it would mean there was no interruption of or loss of availability of the training facility. **(NMSS)**

Small. **(RES)**

None. It has required management commitment since training required out of area travel. **(OSP)**

None, compared to the other options. **(RI)**

The benefit of Chattanooga is primarily the lower travel costs for Region II travelers. **(RII)**

Possible reduction in the distractions due to being a remote site. However, distractions can be minimized in HQs with the proper guidance. **(RIII)**

Total travel costs would be cheaper; better environment for training; fewer distractions than HQ; more convenient; and less competition for spaces in courses. **(RIV)**

Ability for students to "IMMERSE" themselves in a training environment. **(IRO)**

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

2. *What do you perceive would be the disadvantages to your office or region if the TTC remained in Chattanooga?*

For headquarters offices, the primary disadvantage is the expense in terms of travel time and costs. Travel connections to Chattanooga are difficult from both headquarters and most regions, and travel for short courses seems wasteful. Further, remote location may discourage employees from taking advantage of training opportunities, as well as making it more difficult to react to schedule conflicts and arrange for substitutes. **(NRR)**

Disadvantages would be the cost of travel and per diem for attendees to travel to Chattanooga for courses given there and not in HQ. (The perceived disadvantage is travel costs, but this is only applicable if the TTC were relocated to HQ, not if it were moved elsewhere.) **(NMSS)**

Travel time and travel cost. **(NMSS)**

Added travel time and cost. **(RES)**

Travel time and costs. Any new location should consider proximity to hub airports and local travel/lodging/meal accommodations for those traveling from out of town (specifically Agreement State staff). **(OSP)**

Travel time and inconvenience. Also, relative lack of movement of experienced tech staff into instructor positions and vice versa. **(RI)**

No disadvantages. **(RII)**

Travel arrangements are not as flexible as they are for HQs. Also, although there is the potential for distractions in HQs, there is a significant benefit from the exposure of new regional staff and staff who rarely go to HQs to HQs staff, managers agency perspective and the overall operation and atmosphere in HQs, which they cannot get in Chattanooga. **(RIII)**

Travel connections to get to Chattanooga. **(RIV)**

Many staff members resist or can't travel for extended times for training. **(IRO)**

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

3. *What do you perceive would be the benefits to your office or region if the TTC were located at HQ?*

A significant benefit to locating the TTC at headquarters would be the savings in travel time and costs for course attendance. In addition, more direct access to instructors and simulators would enhance reviews and investigations of technical issues, as well as providing better access to program office staff for updating training programs with the latest information. **(NRR)**

A local training facility would be more convenient for headquarters staff and would facilitate arrangements for substitutes when conflicts arise. **(NRR)**

Ease of travel. **(NMSS)**

Ability to offer training on a partial-day basis. **(NMSS)**

Estimated 30% reduction in cost for training, travel and per diem. **(NMSS)**

The ability to provide substitutes for last minute cancellations. **(NMSS)**

Easier to fill low attendance classes if located here at HQ. **(NMSS)**

Increased flexibility and reduced costs. **(RES)**

Lower travel costs as well as ease of last minute substitutions, when necessary. Although HQ lodging costs are higher for those coming from out of town, this would be offset by the number of HQ staff that would commute to training without any travel or per diem expense. **(OSP)**

First, convenience. Secondly, ability of our students to network with HQ staff at lunch and in evenings, if needed. And perhaps most importantly, over the years, the Agency would likely see more movement of staff between the Program offices and the technical training staff, which would improve the regulatory perspective of the training staff; likewise, individuals with technical training experience will be assets to the program office tech staffs. **(RI)**

No additional benefit. **(RII)**

RIII prefers the option of moving the TTC and the simulators to HQs. Better travel options, a central location for all training not conducted in the regions, better access to training services, tools, equipment, staff and other resources and more exposure to the agency and how it works. There would be better access to the experienced agency personnel to provide responses to questions regarding agency perspective as opposed to just being limited to the training staff in Chattanooga. Also it will provide networking opportunities for the regional staff during off training periods. **(RIII)**

I would expect a significant increase in requests for training from HQ staff and for research time on simulators. The ready availability of the simulators would allow immediate research in

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

response as well as development of expected responses to plant conditions and accident scenarios. **(IRO)**

More opportunity to interact and network with HQ personnel. (This comment applies only if the training location is very near to OWFN/TWFN.) **(RIV)**

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

4. *What do you perceive would be the disadvantages to your office or region if the TTC were located at HQ?*

There should be none if management ensures that students remain free of work-related responsibilities while in a training status. **(NRR)**

Ease of dropping out of training to do something else. **(NMSS)**

The inability of attendees to devote undivided attention to intense technical training efforts because of interruptions by management, co-workers, and demands of the job. **(NMSS)**

A negative impact on office space and the quality of instructors if the TTC staff would not transfer to HQ. **(NMSS)**

Potential absence from class or reduced attention due to normal assignments. **(RES)**

The ease that staff may be requested to conduct regular work during the training session. Lodging/per diem costs in HQ are significantly higher than TTC. However, the travel costs (airfare) are significantly higher for TTC over HQ. Depending on the duration of the course, these costs may be higher or lower for given courses. These cost considerations are significant for the Agreement State staff attending the NRC courses. **(OSP)**

None. **(RI)**

Again, the increased travel cost, and possibly increased travel time. **(RII)**

If the distractions are controlled then there aren't any disadvantages. **(RIII)**

Total travel costs higher; more distractions being in HQ; disruption of training service during move; and the potential loss of experienced instructors. **(RIV)**

When I've been at the TTC, I've been in class for about eight hours a day. To do reasonably well in a course, I've had to study another eight hours a day outside of class. That is, virtually all of my waking hours were devoted to the class or to homework. I suspect this is true for most students. I believe this kind of commitment is necessary to succeed with the classes' current pace and content, and that the only reason this is possible is that students are away from home while studying at the Center. If the Center is relocated to Headquarters, and students return home at the end of the day, I believe most will find it very hard to put in this much time. If the agency chooses to relocate the Center, I believe we'll have to either extend the number of days devoted to a course or simplify the course's content to keep the courses as effective as they are today. I think this may be the most significant impact of relocating the Center to Headquarters. **(DEDMRS)**

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

Students in classes at HQ regularly miss class due to becoming involved with ongoing work or being "recaptured" by their offices before course completion. This disrupts the class and interferes with the student's ability to complete courses. **(IRO)**

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

5. Please rate the following considerations in order of importance to you (1=most important, n=least important) in the decision whether to relocate the TTC to the Washington area?

	RI	RII	RIII	RIV	NRR	NMSS	RES	OSP	IRO	Composite
Quality of learning environment	1	1	1	1	1	4	2	3	1	1
Convenience to students	6	3	6	2	2	2	3	2	3	3
Personal impact on TTC staff	6	6	6	6	6	5	5	5	2	5
Training program disruption for a period of time	6	6	6	5	3	6	6	6	6	6
Proximity of TTC staff to program offices	6	6	6	4	5	3	4	4	5	4
Cost	6	2	6	3	4	1	1	1	4	2

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

6. *Given the tendency of students in headquarters to be called out of class by their managers or otherwise drawn to their normal duties, would you support management controls to avoid disruptions and maintain the effectiveness of technical training courses in headquarters?*

NRR would support and endorse management controls to avoid disruptions and maintain the effectiveness of technical training in headquarters. **(NRR)**

Yes, some sort of management control would be in order. Perhaps this could be in the form of monitoring, so that excessive abuse of class interruptions by management would become apparent and accountable, but the opportunity for a limited amount of such interruptions would be seen as an advantage of having the TTC at HQ. Perhaps, some courses could be designed to be conducted "part-time," so that only a part of the employee's day is taken up with training classes. This would be feasible if TTC were at HQ, and it might minimize interruptions of the students' participation in classes. **(NMSS)**

Yes. **(RES)**

Yes. **(OSP)**

Yes, certainly. **(RI)**

Yes. **(RII)**

RIII would support reasonable controls consistent with the mission. **(RIII)**

Yes, but leaving training at TTC would be more effective, because management controls have a way of being ignored or overridden. **(RIV)**

Yes, but a well understood agency policy would need to be created. **(IRO)**

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

7. How do you perceive that relocating the simulators to the Washington area would affect your office's or region's usage of simulator training? Please choose one:

	RI	RII	RIII	RIV	NRR	NMSS	RES	OSP	IRO
Increase significantly			X			X	X		
Increase slightly	X				X				X
No change		X		X				X	
Decrease slightly									
Decrease significantly									

From the data above, 2/3 of management stakeholders perceive that the use of simulator training would increase if the simulators were in the Washington area. No stakeholders thought the use would decrease.

What is the basis of your perception?

There would be a greater willingness on both managers and staff (PMs changing plant designs) to attend simulator training due to less impact on life and work. **(NRR)**

Staff and management would be more likely to use the facilities for routine issues if it were easily accessible. **(NRR)**

If the simulators were relocated closer to the program offices, it would have little impact on region personnel, but the HQ staff would be more likely to include simulator courses in their voluntary training activities. **(NRR)**

If the simulators were located in headquarters, shorter courses could be developed to give staff a greater sense of plant response to demonstrate lessons learned from recent events. **(NRR)**

I would provide reactor training to NMSS staff who participate in reactor emergency response activities. **(NMSS)**

Office Director would urge increased RES staff participation. **(RES)**

The Office of State Programs does not deal significantly in the technical aspects of the nuclear power industry and, therefore, the simulators do not play a significant role in our training. The Agreement States have work with materials and, therefore, they would only be interested in a very limited number of people attending reactor courses mainly in the emergency response area. There have been a few States that are training limited numbers of staff to observe or be resident inspectors. A move of the training center to the DC area would not significantly impact this effort. **(OSP)**

Attachment 1 -- Senior Management Composite Stakeholder Survey (TTC Location)

Added convenience. Also, more likely to get senior folks to attend refreshers and other tech courses (due to convenience). **(RI)**

No change, since we use the simulators primarily for required training; however, we understand that MC 1245 is under review and may result in a change to the required training. **(RII)**

Definite increase but there is not enough information to determine how much. There would be better access to the simulators because regional staff are in HQs for many reasons and would only visit Chattanooga for training purposes. **(RIII)**

Simulator training is only used in conjunction with required qualification training. Region IV will attend the training wherever it is offered. **(RIV)**

The Commission and EDO have indicated that they would like to see more scenario-driven (Simulator-Driven) training packages for incident response training. Simulators located in the DC area would allow more access to simulators and simulator instructors for scenario development. **(IRO)**

Attachment 1 -- Senior Management Stakeholder Survey (Appropriate Number of Simulators)

1. Please indicate the number of staff in your office or region who are assigned responsibilities for CE plants and the number of staff in your office or region who are assigned responsibilities for B&W plants.

	RI	RII	RIII	RIV	NRR	NMSS	RES	OSP	IRO
Personnel with CE responsibilities	5+	5-6	*	37	**	0	0	0	8
Personnel with B&W responsibilities	2+	10-12	*	13	**	0	0	0	8

*RIII has one CE plant and one B&W plant in the region, therefore we have resident inspectors, region based inspectors and operator licensing examiners with a need to understand the CE and B&W technology. However, not having the CE and B&W simulators will not significantly impact their ability to inspect these plants. In fact, the better and more efficient and effective option is to train RIII staff on the site specific simulators at the two RIII plants. **(RIII)**

The majority of the NRR technical staff has the potential for being assigned work associated with CE and BW plants -- project management, technical reviews, inspection, operator examinations, and allegation follow-up. The actual number varies at any given time. **(NRR)

Attachment 1 -- Senior Management Stakeholder Survey (Appropriate Number of Simulators)

2. In your opinion, are the CE plant design, operation, transient and accident response, and emergency operating procedures sufficiently different from Westinghouse to warrant vendor specific simulator training for CE technology?

No, assuming that a technology cross-training and technology refresher courses would still be offered. These courses could then be modified to compensate for the inability to conduct hands-on operations and demonstrations on the simulators. Individuals cross-certifying as examiners could have their required OJT expanded to include additional examination observation at a CE vendor facility to in part compensate for the loss of specific simulator training. The CE plant designs could be adequately demonstrated with a Westinghouse simulator. **(NRR)**

No. **(RES)**

No, this is a luxury; a seasoned Westinghouse inspector/examiner can adapt with a little classroom training. **(RI)**

CE is not significantly different for our purposes. **(RII)**

No. **(RIV)**

Yes, differences in plant protection and feedwater operation are significant enough to warrant at least differences in training. Emergency operating procedures could be taught in the classroom, but the simulator makes a great difference in understanding the procedures. **(IRO)**

Attachment 1 -- Senior Management Stakeholder Survey (Appropriate Number of Simulators)

3. In your opinion, are the B&W plant design, operation, transient and accident response, and emergency operating procedures sufficiently different from Westinghouse to warrant vendor-specific simulator training for B&W technology?

Yes. The B&W plant designs could be adequately demonstrated with a Westinghouse simulator, and a simulator at a B&W plant could be used for occasional training. However, as discussed in Question #3 above, the technology cross-training and technology refresher courses would have to be upgraded to address the loss of simulator hands-on and demonstration training. Similarly, cross-certifying examiners would also have their B&W OJT upgraded. **(NRR)**

Possibly. **(RES)**

No, a seasoned inspector/examiner can adapt. **(RI)**

B&W is not significantly different. Additionally, any unique difference can be observed through other means, e.g., on-site observation. **(RII)**

No. **(RIV)**

Yes, differences in plant operation with their integrated plant operation and the differences in the secondary system (once through steam generators) warrant at least a differences course. The simulator provides significant extra to training in operating and emergency procedures. **(IRO)**

Attachment 1 -- Senior Management Stakeholder Survey (Appropriate Number of Simulators)

4. *What do you perceive is the value added of having CE and/or B&W vendor-specific simulator training (i.e. how much better is your staff able to perform having had the vendor-specific simulator training vs. only having Westinghouse simulator training)?*

The added value of having vendor-specific simulator training is most useful for the inspection staff, particularly the residents, and Project Managers. The NRC has greater credibility with the plant staff if they understand the design and operation of the plant. The same is true for technical specialists in headquarters, but their specialty area of expertise is usually more important. The staff would have a better understanding of B&W transient response, although the need for this is limited and could be served by occasional use of a simulator at a B&W plant. **(NRR)**

Inspection staff may gain similar value by observing the licensee's operator training to compensate for the loss of CE and B&W vendor-specific simulator training. With CE and B&W vendor-specific simulator training, examiner staff can evaluate more effectively the adequacy of the facility proposed simulator operating examination products with fewer questions and less impact on the facilities and licensed operator applicants. **(NRR)**

Very little value added. **(RES)**

Slight. **(RI)**

There is some advantage to having vendor specific simulator training, however, there are other techniques that could be employed to compensate for any diminished use of the simulator. **(RII)**

Allows students to see and perform operations unique to each design; better preparation for emergency response situations; better understanding of procedures and plant transient response; and simulator training sets a design in your mind. As compared to a Westinghouse PWR, the integrated plant response of a B&W facility varies much more than does that of a CE plant. Perhaps the best option would be to negotiate time on the licensee's simulator at the sites where our residents are assigned. **(RIV)**

The simulator provides additional value to training on operating and emergency procedures that is not possible in the classroom. The value of the training in differences may be small, but can make significant impact on understanding by the person being trained. **(IRO)**

Attachment 1 -- Senior Management Stakeholder Survey (Appropriate Number of Simulators)

5. What do you perceive is the value added of having vendor-specific simulator training versus classroom-only training in the CE and B&W technologies?

The added value of having vendor-specific simulator training is most useful for the inspection staff, particularly the residents, and Project Managers. The NRC has greater credibility with the plant staff if they understand the design and operation of the plant. The same is true for technical specialists in headquarters, but their specialty area of expertise is usually more important. The staff would have a better understanding of B&W transient response, although the need for this is limited and could be served by occasional use of a simulator at a B&W plant. **(NRR)**

Inspection staff may gain similar value by observing the licensee's operator training to compensate for the loss of CE and B&W vendor-specific simulator training. With CE and B&W vendor-specific simulator training, examiner staff can evaluate more effectively the adequacy of the facility proposed simulator operating examination products with fewer questions and less impact on the facilities and licensed operator applicants. **(NRR)**

Very little value added. **(RES)**

Marginal. **(RI)**

Solely using classroom is not as valuable, however, in combination with some on-site training initiatives all objectives could be met. **(RII)**

The simulator reinforces classroom instruction; enables students to see the application of procedures and to observe the dynamic responses of each unique plant design; and provide a better understanding of unique system differences (like the RPS at CE plants, and the feedwater system at B & W plants). **(RIV)**

During any event involving either a CE or B&W plant, having an individual that has specific understanding of that vendor's equipment and methods of doing things, such as normal operation and emergency response, can be invaluable to the agency's response. **(IRO)**

Attachment 1 -- Senior Management Stakeholder Survey (Appropriate Number of Simulators)

6. In your opinion, does the new reactor oversight process (inspectable areas for reactor safety cornerstones, use of the significance determination process, and use of risk information matrices) rely heavily on inspector knowledge of vendor-specific plant design and operational characteristics?

Yes. The new reactor oversight process relies on an understanding of the cornerstones and the risk information, as well as inspector knowledge of the vendor specific-design and operational characteristics. However, inspector training with a vendor-specific simulator is not a requisite need to attaining this knowledge: reactor technology classroom training can be upgraded, and OJT requirements augmented, to compensate in particular for the loss of simulator resource in the B&W and CE reactor technology training courses. **(NRR)**

Moderately. **(RES)**

Yes, it does; however, this understanding can be developed in a variety of ways, including classroom study; PRA/IPE work; inspection preps; and consultation among inspectors, SRAs, license examiners, and others as needed; it is not heavily reliant on information learned in design-specific simulator training. **(RI)**

No, we do not anticipate any significant simulator training needs from the new process. **(RII)**

Yes, since plant design impacts risk and therefore the SDP process. But even more, there is a need for plant specific knowledge. **(RIV)**

There is some reliance. **(IRO)**

Attachment 1 -- Senior Management Stakeholder Survey (Appropriate Number of Simulators)

7. Given that the cost per student of CE and B&W simulator training is substantially higher than that for Westinghouse and GE, do the programmatic needs justify the costs for the relatively small student base?

No. It is NRR's view that the higher costs of the CE and B&W simulator training are not justified by the relatively small student base, particularly if the cross-training and refresher courses could be modified to compensate for the absence of simulator hands-on and demonstration training. **(NRR)**

No. **(RES)**

No. **(RI)**

No. **(RII)**

The region is not opposed to keeping the CE and B&W simulators because we have a CE and B&W plant. However, the economics may not support keeping those two simulators and we are not in a position to assess or defend that decision. **(RIII)**

No. **(RIV)**

For the HOOs it does. **(IRO)**

Attachment 2 -- Survey of Student Comments Regarding CE and B&W Simulator Training

During the 1997 CE and B&W cross training courses, TTC managers met with the classes and obtained the following composite information regarding simulator training:

Question: What is your sense of the value added of having CE (B&W) vendor-specific training? In other words, how much better will you be able to inspect at the CE (B&W) plant having had the cross training versus only having Westinghouse training?

Response: All students indicated that the vendor-specific training is essential. They felt that it would take a lot of effort and time to self-study and learn the differences, and still wouldn't be aware of all the nuances with things like RPS design and EOPs. They felt the courses are a more efficient and effective way to achieve the level of knowledge they need to do a quality inspection on the CE and B&W plants. One student indicated that a very experienced person may be able to pick up the knowledge through on-the-job training such as system walkdowns, etc., but he agreed with the others that it would take a lot of time and individual effort.

Question: What is your sense of the value of simulator training versus classroom-only reactor technology training?

Response: All students felt the simulator training is invaluable. This opinion was especially expounded upon by the examiners. The students indicated that there is no other way to fully understand how the plant responds without the simulator training experience. Both classes agreed that there were sufficient differences between CE, B&W, and Westinghouse to warrant simulator training on all 3 technologies.

During the 1998 cross training courses, the students were requested to complete a written survey that asked essentially the same questions as above. Examples of composite student comments for each survey question follows:

Question: Is the CE (B&W) plant design, operation, transient and accident response, and emergency operating procedures (EOPs) sufficiently different from Westinghouse to warrant vendor-specific simulator training on these technologies?

Response: Yes was the unanimous answer for all students surveyed (included one absolutely and several definitely's).

Question: What is your sense of the value added of having CE (B&W) vendor-specific training? In other words, how much better will you be able to inspect/examine/license, etc., at CE (B&W) plants having had the cross training versus only having Westinghouse training?

Attachment 2 -- Survey of Student Comments Regarding CE and B&W Simulator Training

Response: Much better; greater appreciation and understanding of control systems; very useful - I will be a much better examiner; a few weeks of training saves many hours of future time coming up to speed at my plant, it adds to my credibility, and reduces the chance of overlooking important safety issues; I received in three weeks what might have taken me the better part of a year (if ever) to assimilate on-the-job; I can better understand design & philosophy behind procedures - will help in many aspects of inspection activities; great value is added to inspections, "where to look," and for operator examinations in evaluating operator's response to walkthrough exam questions; value added from having CE training in addition to Westinghouse - due to ECCS systems and philosophies are significantly different; Improves my confidence while inspecting; I now have the specific information I need to adequately inspect a CE plant; observation of transients on the simulator gave me a good sense of what to expect during a (operator license) examination.

Question: What is your sense of the added value of simulator training versus classroom-only reactor technology training?

Response: Lots of value - simulator training gives a lot more added value in understanding plant operation; simulator training reinforced and helped me understand classroom concepts; simulator training helped make classroom topics real; Since I did not come from an operations background, I consider simulator very important; simulator training is an essential component of the training; very high value in simulator - effective in understanding material with the hands on experience, won't help as much as if simulator modeled my plant more closely; feeling and touching the controls in response to scenario events provides real time learning and "cements" the concepts learned in class; the simulator portion of the training is where it all comes together and has an overall greater value than just classroom training.

Question: Is periodic vendor-specific simulator refresher training necessary? What is your sense of the value of periodic CE (B&W) simulator refresher training vs (1) simulator refresher training on the Westinghouse simulator or (2) classroom only CE (B&W) refresher training?

Response: Yes, simulator training is better for understanding and observing integrated plant operation; simulator training would be very useful; yes, CE simulator refresher training is #1 value; as far as refresher training goes, I much prefer the vendor-specific simulator training for reinforcing operational concepts and EOP applications; yes, independent refresher courses (CE, B&W, Westinghouse) are valuable because they reinforce previous concepts learned and offer a chance for interchange of changes and views of the industry; absolutely because there are so few CE and B&W sites, examiners rarely get to review their material, the courses are excellent refresher; specific refresher training is necessary, at a minimum periodic simulator refresher would be required on the CE simulator.

Attachment 2 -- Survey of Student Comments Regarding CE and B&W Simulator Training

Several students stated that they were new, had never been to refresher training and therefore had no opinion. Several examiners stated that they have to refamiliarize themselves with the plant-specific simulator before each exam, therefore simulator refresher training for examiners is not as important.

Attachment 3 -- Perspectives of HR/TTC LMPC Labor Partners

Memorandum for: Lisa Shea, NTEU, Chapter 208
John Boardman, NTEU, Chapter 208
James Wigginton, NTEU, Chapter 208

From: Office of Human Resources LMPC Labor Partners

Subject: **CONSIDERATIONS REGARDING THE POTENTIAL RELOCATION OF
THE TECHNICAL TRAINING CENTER TO HEADQUARTERS**

NRC management is currently considering relocating the Technical Training Center (TTC), which has been located in Chattanooga, TN since 1980, to the NRC headquarters office area in Rockville. In recent months NRC management, assisted by independent contractors, has been evaluating the benefits and drawbacks of (1) consolidating NRC training resources in the Washington area, and (2) reducing the number of simulators maintained at the training center and used for training agency personnel to one boiling water reactor (BWR) simulator and one pressurized water reactor (PWR) simulator. These evaluations address the last two recommendations contained in SECY-98-291, "Plan for Improving the Effectiveness of NRC's Training Programs," dated December 18, 1998.

The recommendations regarding consolidation of NRC training resources and reducing the number of simulators were originally contained in the report of the Training Review Group, led by Jack W. Roe, NRR, issued in September 1998. Those recommendations were developed in response to the Training Review Group's "assessment of the processes, policies, and organizations used to ensure training effectiveness and efficiency," one of the key areas for review in its charter. The following is a partial list of the arguments presented by the report in support of the group's recommendations:

1. Many managers and Regional Administrators feel that the TTC's remote location is a disincentive to having staff attend training held at the TTC, and that a headquarters location for the TTC would result in a greater willingness of the staff to request technical training and of managers to send staff to training.
2. Although managers feel that a remote location benefits training by minimizing potential interruptions for students, managers note that a strong agency commitment to avoiding training disruptions would eliminate that benefit.
3. Managers note that locating the TTC near headquarters would allow for the efficient and effective communication of agency philosophy and policy by involving agency managers in the orientation and qualification process.
4. Most managers feel that simulator training specific to reactor plant design is not needed to support successful inspection and regulation. The Director, NRR, and all four Regional Administrators believe that the number of simulators could be reduced without reducing staff inspection capability.

Attachment 3 -- Perspectives of HR/TTC LPMC Labor Partners

An obvious thread running through each of the above points is the exclusive management perspective. An easily reached conclusion is that the recommendations of the Training Review Group, and subsequent evaluations based on them, have not considered the interests of NRC labor, which constitutes the vast majority of the people being trained. Since the means and methods of doing business fall under the purview of the agency labor/management partnership process, and since the location of the TTC and the number of simulators are intimately related to the means and methods of doing business, we feel that it is appropriate to present labor interests associated with these issues in the partnership forum.

The following statements of NRC labor interests and supporting arguments speak directly to the delivery of effective and efficient training. In fact, arguments 2 and 4 of the Training Review Group's report, as listed above, are directly contradicted by the following arguments.

1. Provide a training environment that is most conducive to learning and studying.

This interest is best supported by the current remote TTC location, as opposed to a headquarters location, for the following reasons:

- a. The current TTC facility minimizes the potential for students to be called out of class by their managers or otherwise drawn to their normal duties. Students at the TTC do sometimes lose training time when they are engaged in long phone calls with their supervisors, but students *often* are absent from classrooms for significant periods when training is conducted at headquarters or at regional offices. TTC instructors have consistently observed such behavior while conducting or administering training at headquarters and at regional offices. Headquarters courses generally have had the most problems (see the attachments for instructor testimonials directly related to this topic). For training conducted at headquarters, a commitment to avoiding training disruptions has frequently *not* been evident.
- b. At the current TTC the classrooms and simulators are located close together in the same building; this arrangement maximizes the integration of the simulators into the technical training curriculum. An instructor can immediately demonstrate on the simulator some plant feature that has just been discussed in the classroom. This capability likely would not be available if the TTC is relocated to headquarters. Since OWFN and TWFN cannot accommodate the simulators, the simulators would likely be located remote from classrooms in OWFN or TWFN. In addition, depending on the facilities arrangement, travel between OWFN and TWFN and the remote simulator location might be necessary on a daily basis during simulator courses; this would result in lost training time and considerable inconvenience.
- c. The current TTC is easily and safely reached at night and during weekends for additional study. This may not be the case for a headquarters TTC; security for a remotely located simulator facility could be particularly difficult to ensure. In addition, students can quickly return to the current TTC after hours from nearby lodging when they feel the need;

Attachment 3 -- Perspectives of HR/TTC LPMC Labor Partners

headquarters personnel who live great distances from the headquarters buildings would be loath to return to a headquarters TTC after hours.

2. Provide training that provides the best technical background possible for inspectors.

This interest is best supported by the current four simulators (one Westinghouse PWR, one Babcock & Wilcox [B&W] PWR, one Combustion Engineering [CE] PWR, one General Electric BWR) used for inspector training, for the following reasons:

- a. Course evaluations from students who have attended TTC reactor technology courses almost unanimously accord great value to simulator operations and demonstrations in helping students understand integrated plant operation, plant responses to transients and accidents, and the use of emergency operating procedures. Most importantly, students in B&W and CE courses (mainly resident inspectors and operator licensing examiners) have emphatically endorsed plant-design-specific training; many (if not all) have indicated that the B&W and CE designs are sufficiently different from the Westinghouse design that design-specific training (and particularly simulator training) vitally contributes to the plant knowledge they need to inspect effectively. Without the availability of the B&W and CE simulators for cross training and refreshing inspectors, the corporate knowledge of NRC inspectors is likely to degrade.
- b. The new inspection process, which emphasizes the risk significance of performance indicators, events, and findings, places a premium on plant knowledge. In order to ascertain the risk significance of inspection findings, the inspector needs to be very familiar with a plant's systems, their interrelationships, and their relative importance to safety. Such familiarity is best delivered through design-specific training, with extensive simulator reinforcement of important concepts and details.

3. Disrupt the availability of training as little as possible.

Relocating the TTC would likely result in the unavailability of instructors and simulators for a significant period, possibly as long as several months, while people and materials are moved to headquarters. This unavailability would negatively impact inspector certification for newly hired staff, cross training for personnel preparing to inspect plants of designs with which they are not familiar, and needed refresher training. Further, simulators can be temperamental machines; transport damage or reinstallation problems could render them unusable longer than expected. Also, as discussed below, the expected loss of many instructors would probably sharply decrease the number of courses offered. Hence, continued training availability is best served by the current TTC location.

4. Maintain the ability to reconstruct and analyze events for all reactor plant designs.

Having a simulator of each reactor plant design provides an extensive capability at the TTC to reconstruct and analyze events to aid NRC staff understanding and to provide insights for

Attachment 3 -- Perspectives of HR/TTC LPMC Labor Partners

decision making. Losing the B&W and CE simulators would eliminate this capability for two of the four reactor plant designs. Removing the B&W and CE simulators from the TTC would constitute a particularly great loss because the software for those two simulators has been updated at great expense with state-of-the-art thermal hydraulic codes. The capabilities of those two simulators are, therefore, better in many respects than those of the Westinghouse and GE simulators.

5. Maintain the expertise of the TTC staff.

This interest is best supported by the current TTC location, for the following reasons:

- a. When the decision was made to move the TTC to Chattanooga, it was felt that Chattanooga's low cost of living would promote the retention of qualified staff. The last two decades have proven this to be the case; instructor turnover has historically been very low, and all current TTC instructors of all types have extensive technical and instructional backgrounds. Moving the TTC to headquarters would almost certainly result in much higher instructor turnover; Washington's high cost of living and greater access to technical positions within and outside the NRC would make a long-term position at the TTC considerably less attractive to the typical instructor.
- b. From interviews with the instructor staff, TTC management has confirmed that a near-term move of the TTC to headquarters would likely result in the almost immediate retirement of many instructors; specifically, it is likely that 11 of 19 instructors would retire within a year of a TTC relocation in 2001. Instructors would retire much more gradually if the TTC stays in Chattanooga. Such a large-scale staff loss would cause a large immediate drop-off in staff expertise and would almost certainly limit training, overwhelm the NRC's efforts to identify and attract qualified replacements, and severely tax the remaining instructors as they continue to conduct training while helping to certify new instructors.
- c. It is also likely that at least a portion of the current simulator engineering staff would not move to headquarters. As the simulators utilize a wide variety of computer systems and programming languages, it will be difficult to find replacement(s) with the range of knowledge and experience required. Experience with contractor support has shown that it can take six to eight months for an "experienced" individual to attain proficiency on *one* simulator. Consequently, the adequacy of support for all TTC simulators would be significantly reduced for some time.

Additionally, the current simulator engineering staff has knowledge of nuclear power plant processes and controls which greatly enhances its ability to correct and upgrade simulator models. Possession of this knowledge is not the norm for individuals in this type of position. If prospective replacement engineering staff does not have this knowledge, greater involvement of the TTC instructional staff would be required in many aspects of simulator maintenance and upgrading. This would potentially slow the

Attachment 3 -- Perspectives of HR/TTC LPMC Labor Partners

maintenance and upgrading process, depending on the availability of instructor resources.

6. Disrupt the lives of the TTC staff as little as possible.

This is an interest that is specific to TTC labor. Almost every member of the TTC staff has lived in the Chattanooga area for at least ten years, has many ties to the community, and feels that a move to the Washington area would result in an abrupt drop in living standards for his or her family. Without a compelling reason for moving the TTC, the TTC staff would prefer to remain in Chattanooga. In response to a recent question concerning possible consolidation of the regional offices in headquarters, Commissioner Merrifield stated that the impact of moving the staff's families must be considered. Little, if anything, in recent papers concerning the potential relocation of the TTC to headquarters indicates that senior NRC management is actively considering the impact of a move on the TTC staff's families.

Additional Arguments

Although arguments 1 and 3 of the Training Review Group's report, listed on the first page of this memorandum, are not directly addressed by the labor arguments discussed above, they do not appear to be much affected by the TTC's location or by the number of simulators. If NRC senior management wishes to encourage the training needed by the staff to perform its duties, and to effectively communicate agency philosophy and policy, it has a number of forums in which to do so. A "willingness" to send people to training should not dictate personnel allocation decisions; if training is needed, it should be assigned irrespective of the location. Finally, the proximity of the TTC to headquarters personnel does not appear to be of prime importance when one considers that historically the great majority of TTC students have come from the regional offices, resident inspector sites, and, more recently, the Agreement States.

Attachment 3 -- Perspectives of HR/TTC LPMC Labor Partners

Attachment 1: Observations of John Ricci, TTC Health Physics Instructor, Concerning a Recent Class Conducted at Headquarters

Training Course at PDC

Day 1

Class starts at 0800. 10 of 19 students present. [State and Regional personnel arrive early.] Remaining 9 [all HQ personnel] arrive by 0810.

Class resumes at 0915 after break. 17 of 19 present. 2 late.

Class resumes at 1025 after break. 14 of 19 present. 5 late.

Class resumes at 1230 after lunch. 17 of 19 present. 2 arrive 50 min late.

Class resumes at 1350 after break. 14 of 19 present. 5 late.

During break one HQ student tells instructor they will be leaving class early because "My Division Director told me to participate in a 2:30 conference call or else". Student leaves at 1420 and does not return for remainder of day.

Class resumes at 1450 after break. 13 of 19 present. 3 arrive by 1500 and 2 more by 1505. Class ends at 1600.

Day 2

Class starts at 0800. 13 of 19 students present. 5 arrive by 0810. Remaining student does not arrive until 0905.

Class resumes at 0905 after break. 16 of 19 present. 2 arrive by 0910. Last arrives by 0920.

Class resumes at 1025 after break. 14 of 19 present. 3 arrive by 1035. One arrives sometime between 1045 and 1100. One does not return until 1330.

Class resumes at 1235 after lunch. 12 of 19 present. 5 arrive by 1240. One arrives at 1250 (stated that he and the other missing individual were in an enforcement conference).

Workshop in progress, no formal breaks. Missing individual arrives at 1330. All present.

Two leave at 1400 (17 of 19 present).

One returns at 1430 but another leaves (17 of 19 still present).

One returns at 1530 (18 of 19 present). Class ends at 1535.

Day 3

Class starts at 0800. 13 of 19 present. 5 arrive at 0805. Last arrives at 0810. Class completed by 0945.

Attachment 3 -- Perspectives of HR/TTC LPMC Labor Partners

Attachment 2: Observations of N. Jack Lewis, TTC Technical Program Specialist, Concerning Headquarters Courses

During the R-800 Course presentations at HQ over the past 5 years, it has been observed by myself, other class monitors, students and instructors that students are constantly late for class, and being called out of class for meeting[s] or to work on something that suddenly just can't wait. An average attendance would be best described as 90% of the students 85-90% of the class time with the remaining students attending 40-80% of the time because of being called out by their management for various reasons. The worse case occurred last year when two students did not receive certificates for the course due to extremely low attendance (<40% for the week).

Attachment 3 -- Perspectives of HR/TTC LPMC Labor Partners

Attachment 3: Observations of Bobby R. Eaton, TTC Reactor Technology Instructor, Concerning Headquarters Courses

During the Reactor Concepts Courses in headquarters, it is a common occurrence for someone to miss at least part of the course due to meetings, etc. I would say on the average that this occurs about twice per course for every 10 students. These meetings are everything from conference calls to going to the White House for meetings. Because of the types of students that attend the course, everyone from secretaries to office directors, absences are a common occurrence.

Attachment 4 -- NTEU Perspectives

From: NTEU
To: Michael Fox
Date: Tue, Sep 14, 1999 4:48 PM
Subject: COMMENTS ON TTC DOWN SIZING AND RELOCATION

Subject: NTEU CONSIDERATIONS CONCERNING THE POSSIBLE DOWNSIZING AND RELOCATION OF THE TECHNICAL TRAINING CENTER SIMULATORS AND STAFF TO NRC HEADQUARTERS

As the number of NRC inspection hours and the level of experience of reactor engineers at the NRC who perform inspections at power reactors continue to drop, it would appear that the NRC would attempt to increase the knowledge and proficiency of the fewer, less experienced reactor engineers that remain. Instead, NRC management appears to be determined to reduce the scope and effectiveness of the present training provided by the Technical Training Center (TTC).

There are NTEU bargaining unit members who consider the present TTC facilities to be superior for learning the necessary factors related to the design and operation of power reactors. They have used the TTC extensively; and are familiar with NRC headquarters. They have attended the series and refresher courses in reactor design and operation using the TVA simulators (4-loop Westinghouse and BWR-4) and the CE Windsor, Conn simulator, as well as the TTC courses, using their simulators. NRC personnel who have attended such courses could be polled, and their responses weighted by the number of courses they attended and their grades. As an example of empowerment, it would appear logical that former students should be utilized to determine the location of their training, not management personnel who may have used the TTC little, if at all.

Of the management personnel who agreed in the decision to move the TTC simulators and staff to HQ, how many (1) have attended at least two series courses in reactor design and operation, and (2) have been certified as a reactor inspector for independent inspections and have performed at least 24 independent inspections of power reactor licensees? The point here is that those who are making these significant and far reaching determinations may not have an in-depth knowledge of the factors involved in the proposed move.

NTEU considers that the existing TTC simulators have another purpose that may have not been considered by NRC management. NSSS design-specific simulators could be invaluable in helping the NRC in the evaluation of serious events. If the NRC had had a simulator and staff at a site such as the TTC during the event, the resultant accident at TMI-2 might have been prevented.

A consideration identified by NRC management to justify moving the TTC simulators and staff to NRC headquarters (HQ) is that the cost of facility rental for the simulators at the TTC is based on a facility that occupies 42,000 square feet, while the cost at HQ is based on a facility that occupies only 21,000 square feet. This comparison is considering four simulators at TTC and

Attachment 4 -- NTEU Perspectives

only two at HQ. It is requested that the comparison show the same number of simulators at each location.

Does the management proposal to move the TTC simulators and staff to HQ include the cost of transportation and lost staff time to go between the remotely located simulators, lodging for regional students, and HQ, and what is the cost and its basis?

Additional significant considerations provided by the TTC NTEU labor partners were previously forwarded.

Pete Hearn

Attachment 5 - Use of Simulators in Current Reactor Technology Training

Reactor technology curriculum areas are provided in the General Electric (GE), Westinghouse, Combustion Engineering (CE), and Babcock and Wilcox (B&W) reactor vendor designs. These curricula include a spectrum of classroom and simulator courses. The core of the reactor technology training program for GE and Westinghouse technologies is an integrated series consisting of a three-week systems course, a two-week advanced course, and a two-week reactor simulator course for a particular technology. Since this integrated series of courses has been designed to optimize the use of student time when in training, it results in an intense sequence of courses. For CE and B&W technologies, the core is a three-week cross training course which follows the same general structure of the full course series (i.e., systems, advanced, simulator) but focuses on differences from the Westinghouse design and unique attributes of these technologies. The Westinghouse full course series is a prerequisite for the CE and/or B&W cross training courses.

The first course in the full series is a systems course which provides a working knowledge of the specific reactor vendor's technology. Classroom presentations emphasize power distribution and thermal hydraulic limits, system design and operation, normal and emergency functions, and instrumentation and safety signals. System design and operational problems, technical specifications, and PRA insights are also included. The simulator portion of the class consists of system walkdowns which cover the control room switches, indications, controllers, and alarms for the systems previously covered. These reviews reinforce the system descriptions covered in the classroom with practical, visually-oriented reviews using the simulator. Preplanned simulator demonstrations show normal system configurations, controls, and instrumentation available to assess plant conditions. Emphasis is placed on technical specification requirements for the systems under review and alarms or indications that would be available to recognize off-normal conditions.

The second course of the integrated series, called an advanced technology course, provides a working knowledge of system interrelationships. Classroom presentations provide analysis of integrated plant responses to normal operating, transient, and accident conditions. In addition, classroom presentations cover technical issues important to NRC regulatory activities along with exercises in the structure and use of technical specifications. Discussions pertaining to facility abnormal events, emergency operations, and PRA insights are also included. Transient curves generated from simulator data are analyzed to reinforce system interrelationships and control system dynamics. Actual plant events are discussed to show integrated facility operation during transient conditions, licensee and NRC actions during the event, applicability of the plant technical specifications and other regulatory requirements, and lessons learned by the licensee and the NRC.

The third course in the series is conducted using the simulator for the appropriate reactor vendor design. Emphasis is placed on technical specification recognition; normal, abnormal, and emergency plant operations; and application of normal, abnormal and emergency procedures. During this course, students manipulate the controls of the various process systems as directed by the applicable procedures to maneuver the plant from shutdown conditions to full power operations. This is not done to achieve a particular level of expertise as would be the case for operators but rather to give NRC students an understanding of integrated

Attachment 5 - Use of Simulators in Current Reactor Technology Training

plant operations and appropriate operator interfaces. Emphasis is placed on identification of abnormal or accident conditions, plant status, and discussion of proper operator and NRC actions for a given plant condition.

The simulator course also provides NRC students with a general understanding of the Owners Group Emergency Procedure Guidelines (EPGs) and Emergency Operating Procedures (EOPs). The structure, interfacing, and intent of each procedure are covered in some detail. Included in these discussions are symptoms and entry conditions into the EOPs, monitoring of critical plant parameters, and intent of each procedure. Presentations include both classroom discussions and simulator demonstrations. Classroom discussions are keyed to the evolutions and sequence of steps to be demonstrated on the simulator. After each emergency exercise, critiques are held to ensure achievement of the learning objectives.

Two simulator refresher courses are required for inspector requalification once every three years. A Technology Review Course and an EOP Simulator Refresher Course are implemented in each of the four reactor technologies. Simulator refresher courses are provided to assist NRC technical staff in maintaining a working knowledge of the vendor design and operations. The Technology Review Courses provide a review of vendor-specific plant systems and operational characteristics, conduct of control room operations, instrumentation and plant data available in the control room, application of normal and abnormal procedures, effect of equipment malfunction or incorrect or untimely operator actions, and PRA insights. The EOP simulator refresher courses provide NRC students with a review of the vendor-specific Owners Group Emergency Procedure Guidelines (EPGs) and Emergency Operating Procedures (EOPs). Presentations for the simulator refresher courses include both classroom discussions and simulator demonstrations. Classroom discussions are keyed to the evolutions which are later demonstrated on the simulator.

Attachment 6 -- Summary of Grant Thornton Cost Analyses

The Office of the Chief Financial Officer (OCFO) contracted with Grant Thornton LLP to perform an estimate of the costs of relocating the Technical Training Center (TTC) and personnel in the vicinity of the NRC headquarters. Grant Thornton delivered the final report on September 7, 1999. In addition to estimating the costs of such a move, the analysis included a comprehensive cost estimate for maintaining and operating the TTC in Rockville, MD, versus Chattanooga, TN, as well as preparing a break-even analysis that identifies the amount of time it would take the NRC to recoup the relocation costs. Cost models for four separate scenarios based on the number of simulators (i.e., four, three, two, or one) were developed. This summary only includes data for the four simulator and two simulator scenarios since they are the two scenarios actually being considered.

ASSUMPTIONS

A comprehensive list of assumptions were developed to ensure a consistent, auditable, and defensible analysis. Grant Thornton made the following assumptions in their cost analyses:

1. The cost analysis was based on FIPS Pub 64 and OMB Circular A-94 guidelines.
2. The Base Year was FY 1998.
3. The TTC life cycle was 10 years starting in FY 2001 which is the first year possible to effect the move. Present value calculations for the break-even analysis begin in the year 2001.
4. Costs of the BWR/6 simulator were removed from Base Year 1998 costs.
5. The simulators cannot be accommodated within the White Flint Complex due to panel height and column spacing.
6. The simulator facility will be located within 5 miles of NRC headquarters. The simulator facility will require 38,000 square feet of space for 4 simulators or 32,168 square feet of space for 2 simulators.
7. There will be no change in the supervisory and operational personnel count or mix.
8. There will be no change in class duration, size, or composition over the life cycle of the study.
9. There will be no change in trainee mix (number, location, etc.) over the life cycle of the study.
10. Travel expenses are not calculated for any non-NRC personnel attending training classes at the TTC in either location. Similarly, travel expenses are not calculated for NRC headquarters students for classes in Rockville, MD.

Attachment 6 -- Summary of Grant Thornton Cost Analyses

11. Personnel from King of Prussia, PA, attending classes in Rockville, MD, will drive a personally owned vehicle (POV); personnel from Atlanta, GA, attending classes in Chattanooga, TN, will drive a POV. Distances from Atlanta, GA, to Chattanooga, TN, and from King of Prussia, PA, to Rockville, MD (one-way), are 112 miles and 150.5 miles respectively. Mileage reimbursement for POV's for FY 1998 is 32.5 cents a mile and 31 cents a mile for FY 1999. One round trip is reimbursed during the travel period.
12. Students traveling to Chattanooga, TN, from locations other than Atlanta, GA, will travel by air to Chattanooga, TN; while students traveling to Rockville, MD, from locations other than King of Prussia, PA, will fly into Ronald Reagan Washington National Airport, VA.
13. Lodging expense reimbursement for FY 1998 is \$126 per day in Rockville, MD versus \$62 per day in Chattanooga, TN. For FY 1999, the reimbursement rates are \$115 per day in Rockville, MD, and \$50 per day in Chattanooga, TN.
14. Meals & Incidental Expenses (M&IE) reimbursement for FY 1998 is \$42 per day in Rockville, MD, versus \$30 per day in Chattanooga, TN. For FY 1999, the reimbursement rates are \$38 per day in Rockville, MD, and \$34 per day in Chattanooga, TN. Only 75% of these expenses is paid on the first and last days of the travel period.
15. Students traveling to Chattanooga, TN, from any location other than Atlanta, GA (Region 2), will rent cars for the duration of the training period. Daily rental car cost is \$50 per day including local taxes and fees for a mid-size car, with students from the same location going two to a car. If an odd number of students attends from a region, the odd student will also rent a car.
16. Shuttle service will be provided from the NRC headquarters building to the training site and other locations as necessary. The personnel assigned to NRC headquarters and attending classes at the TTC and other NRC headquarters staff members are projected as the primary users of the shuttle. Secondary use is to shuttle personnel to and from the TTC and NRC headquarters to alleviate parking problems.
17. When calculating staff travel costs, trips to Rockville, MD, have a cost of \$0 with the TTC in Rockville, MD. Those trips on the schedule involving multiple locations where Rockville, MD, is included are prorated for the remaining site(s).
18. Of the 26 personnel currently assigned to the Technical Training Center, 18 will move from Chattanooga, TN, to Rockville, MD. The 8 who do not move will be replaced.
 - a. It is assumed that one GS-15 and seven GS-14s will retire in FY 2001 if the TTC is moved.
 - b. The NRC will overhire the retiree positions for the fiscal year of FY 2000, at the same grade as the retiring personnel, but at step 1. These personnel will receive all normal step increases through FY 2010 for this study.

Attachment 6 -- Summary of Grant Thornton Cost Analyses

- c. The replacement personnel will be hired by October 1, 1999, and will have a permanent duty station of Rockville, MD, and will have 2 three-month details to Chattanooga, TN. The eight replacement personnel are entitled to one weekend trip home every three weeks during the three-month details.

- d. Four personnel will be hired from within the National Capital Region and four personnel will be hired from outside the region and will be paid for relocation expenses.

COSTS TO ESTABLISH THE TTC IN ROCKVILLE, MD

The estimated one-time non-recurring costs to the Nuclear Regulatory Commission to establish the TTC in Rockville, MD, in FY 2000 are:

- Cost to establish four simulators in Rockville, MD \$4,222,173

- Cost to establish two simulators in Rockville, MD \$4,036,875

LIFE CYCLE ANALYSIS

A synopsis of the total operating costs for a ten year cycle from FY 2001 through FY 2010 is provided in the table below.

	ROCKVILLE, MD	CHATTANOOGA, TN	DIFFERENCE
FOUR SIMULATORS			
Total Cost	\$85,032,441	\$85,661,483	\$629,042
Total Present Value Cost	\$42,154,218	\$42,522,267	\$368,049
TWO SIMULATORS			
Total Cost	\$81,287,446	\$82,300,645	\$1,013,200
Total Present Value Cost	\$40,287,593	\$40,846,284	\$558,691

Grant Thornton data indicated that over the ten year life cycle of the study, it would be less expensive to operate the TTC in Rockville, MD, than in Chattanooga, TN. This is primarily as a result of the reduction in space needed in a Rockville, MD, simulator training facility because the TTC instructors and the majority of the classrooms, could be located within existing space in NRC headquarters. Grant Thornton assumed 38,000 square feet of space for a four simulator facility or 32,168 square feet of space for a two simulator facility.

Attachment 6 -- Summary of Grant Thornton Cost Analyses

BREAK-EVEN ANALYSIS

An analysis was conducted for each scenario to determine how long it will take to recover the costs of relocation. The analysis revealed that there is not a break-even point for any of the scenarios within the ten year life cycle. All savings in relation to relocating the TTC to Rockville, MD, end in Years 12-15 for the scenarios using two and four simulators. This is primarily caused by the eight new hire personnel in Rockville, MD, receiving step increases in salary and becoming equal to the Chattanooga, TN, location in salary costs. The total one-time cost to establish the TTC in Rockville, MD, and the Total Net Present Value (NPV) of the savings for years one through ten for each scenario are shown below.

	ONE-TIME COSTS	TOTAL SAVINGS (NET PRESENT VALUE)	NET ONE-TIME COSTS
FOUR SIMULATORS	\$4,222,173	\$368,049	\$3,854,124
TWO SIMULATORS	\$4,036,875	\$558,691	\$3,478,184

GRANT THORNTON REPORT CONCLUSIONS

1. The cost to the Nuclear Regulatory Commission to establish the Technical Training Center in Rockville, MD, would be between \$4.0 million and \$4.2 million dependent on the number of simulators being moved.
2. Only a small percentage of the cost of establishing the Technical Training Center in Rockville, MD, can be recovered. There are no break-even points for any of the scenarios within the ten year life cycle.

Attachment 7 -- Option/Cost Summary Table

	One-Time Costs [Principal Causes]	Total Costs (One-Time Costs + Cumulative Yearly Operational Costs) (FY 2000 - FY 2010)	Present Value of Total Costs (FY 2000 - FY 2010)
Option 1 Maintain 4 simulators and TTC staff in Chattanooga, TN (Status Quo)	\$0K	\$92.9M	\$58.7M
Option 2 Decommission the CE and B&W simulators but maintain the TTC and the whole TTC staff in Chattanooga, TN	\$0.2M [Costs to dispose of 2 simulators and reconfigure TTC space]	\$90.0M	\$56.9M
Option 3 Decommission the CE and B&W simulators; maintain a small staff in Chattanooga, TN; and move other TTC staff members to headquarters by mid-FY 2001	\$2.6M [Costs to dispose of 2 simulators, reconfigure TTC space, reconfigure TWFN space, relocate TTC personnel, and relocate and train replacement personnel]	\$89.9M	\$57.7M
Option 4 Decommission the CE and B&W simulators; maintain a small staff in Chattanooga, TN, during FY 2001 - FY 2002; move other TTC staff members to headquarters by mid-FY 2001; and move the GE and Westinghouse simulators and remaining TTC staff members to headquarters by the end of FY 2002	\$4.3M [Costs to dispose of 2 simulators, reconfigure TTC space, reconfigure TWFN space, relocate TTC personnel, relocate and train replacement personnel, move 2 simulators and other equipment, and establish a simulator building lease]	\$91.2M	\$58.9M