

October 2000

FACILITY RELOCATION

NRC Based Its Decision to Move Its Technical Training Center on Perceived Benefits—Not Costs



G A O

Accountability * Integrity * Reliability

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Abbreviations

GAO	General Accounting Office
NRC	Nuclear Regulatory Commission



United States General Accounting Office
Washington, D.C. 20548

October 19, 2000

The Honorable Fred Thompson
Chairman, Committee on
Governmental Affairs
United States Senate

Dear Mr. Chairman:

The Nuclear Regulatory Commission (NRC) issues licenses to a wide array of private entities to ensure that they use radioactive materials safely and in a manner that protects the public and the environment, including 103 operating commercial nuclear power plants and 10 facilities that produce fuel for these plants. In addition, NRC or states that have agreements with NRC (agreement states) regulate more than 20,000 entities that use radioactive materials in medical, industrial, or academic applications. To ensure that its staff and those from the agreement states have the necessary expertise to carry out their responsibilities, NRC's Office of Human Resources manages a wide range of training programs, including those at the Technical Training Center (Center) in Chattanooga, Tennessee.¹ The Center provides diverse training curricula on such topics as nuclear power plant technology augmented by training on simulators, risk assessment, radiation protection, and regulatory skills.

To improve the effectiveness and efficiency of the agency's operations, on February 24, 2000, NRC decided to relocate the Center and its four simulators from Chattanooga to a location near its headquarters in Rockville, Maryland, after 5 years of debate.² NRC expected to maintain a small staff in Chattanooga from fiscal year 2001 until April 2003 to provide reactor technology training and expected to relocate the remaining Center staff to headquarters by the end of fiscal year 2001. Because of your concerns about the cost and programmatic implications of the proposed relocation, you asked us to determine whether (1) NRC used a reasonable methodology to estimate the costs to relocate the Center, (2) the expected

¹NRC requires the agreement states to ensure that their staff meet certain training and experience requirements. To help ensure that agreement states' personnel can obtain and maintain the required level of proficiency, NRC annually offers a number of courses that directly relate to them.

²A simulator is a model of a control room for different designs of commercial nuclear power plants.

programmatic benefits of relocating the Center versus keeping it in Chattanooga are reasonable and supported, and (3) other issues will affect NRC's technical training program.

We used generally acceptable economic principles to evaluate NRC's cost estimation methodology and the reasonableness of key economic assumptions used in the estimate. Since the expected benefits cannot be easily quantified, NRC could not develop a standard cost/benefit analysis for relocating the Center. In addition, neither the Office of Management and Budget nor the General Services Administration requires agencies to prepare a cost/benefit analysis when relocating facilities.

Results in Brief

NRC used a reasonable methodology to estimate the costs of relocating the Center from Chattanooga to Rockville. For example, NRC appropriately considered such cost elements as the differences in travel costs of the participants, salaries and benefits of the Center's staff, and lease payments between the two locations. However, NRC incorporated a number of assumptions in its estimate, including assumptions about the site that could be used for a Rockville Center, the number of staff who would relocate, and the timing of the move. Any change in these assumptions will affect the estimated cost of the move.

NRC has said that moving the Center to Rockville will result in a number of benefits for its technical training program and for improving the agency's effectiveness and efficiency. Although NRC could realize some of the benefits, it has no analysis supporting the extent that it could. For example, one claimed benefit would be that an increasing number of headquarters staff would participate in technical training. NRC may not fully realize this benefit because less than 25 percent of its 2,800 staff are required to receive technical training. When NRC moved the Center to Chattanooga in 1980, two of the expected benefits were that the remote location would provide a more conducive training environment and that the relatively low cost of living would facilitate the recruitment and retention of qualified instructors. Although the Center's staff believe that Chattanooga continues to provide these benefits, some NRC senior managers view the remote location and the time required to travel there as disincentives for headquarters staff to attend training.

A number of issues will have an impact on NRC's technical training program. For example, NRC will face a significant challenge to replace the Center's instructors. In 2003, 15 of the 18 instructors will be eligible to

retire; and in 2005, when the lease in Chattanooga expires, 17 of the instructors will be eligible to retire. Our analysis of NRC's data shows that the agency has potentially over 1,200 staff with the knowledge and experience to replace the Center's staff. However, NRC has not developed a plan to ensure that the agency has the appropriate number of instructors or the skills and expertise needed for the staff who will eventually succeed those at the Center. Timely succession planning will ensure the continued quality of NRC's technical training program and can be carried out without regard to relocating the Center. We are recommending that NRC identify the skills required for staff who will replace its instructors and develop a succession plan for replacing them.

We provided NRC a draft of this report for its review and comment. NRC generally agreed with the report's conclusions and recommendations but provided some additional information for our consideration. We incorporated this information where appropriate.

Background

Following the 1979 accident at the Three Mile Island nuclear power plant in Pennsylvania, various investigative bodies recommended that NRC improve its technical training for its staff. Consequently, the Commission approved the relocation of NRC's technical training to Chattanooga, Tennessee, because that location was the only place in the United States where NRC could train its staff on simulators for all of the nuclear power plant designs. The Tennessee Valley Authority owned the simulators, and NRC contracted with the Authority to use them. Subsequently, NRC purchased its own simulators and no longer relies on the Authority for such training. Therefore, the situation that was the primary cause of moving the Center to Chattanooga has changed over the last 20 years.

Five Years of Debate and Multiple Studies on NRC's Technical Training Program

To respond to the National Performance Review's recommendation that federal agencies improve the effectiveness and efficiency of their activities, in June 1995, NRC identified those functions that could be done more efficiently. One identified function was the training program. NRC's Office of Administration initiated a study to determine the feasibility of relocating the Center to enhance the agency's efficiency. The Office of Administration found that (1) NRC could not install the simulators in its headquarters buildings because the agency needed 40 feet between the buildings' support columns, while the headquarters buildings had only a 20-foot separation between support columns and (2) relocating the Center would not be cost-effective when considering the one-time moving costs of about

\$5 million and the annual \$75,000 increase in operating costs. On the basis of the increased operating costs, NRC's Office of Administration concluded that relocating all or part of the Center to its headquarters buildings was not feasible or cost-effective.

In April 1998, NRC's senior managers again tasked a group of staff to identify ways to improve the effectiveness and efficiency of NRC's training function. In its September 1998 report, the group made a number of recommendations, including that NRC consolidate its training resources in the Washington, D.C., area and that it reduce the number of simulators from four to two. The group subsequently noted that NRC should evaluate a number of programmatic, financial, infrastructure, staffing, and timing issues to help the Commission make an informed decision related to the two recommendations. In October 1999, the group provided the Commission with the additional information. In the interim, an NRC contractor estimated the costs of relocating the Center and its staff to Rockville, Maryland, and the maintenance and operating costs for both the Chattanooga and Rockville locations. The contractor developed four different estimates related to moving one to four simulators and assumed that NRC would move the Center over a 2-year period—fiscal years 2001 to 2003. The contractor also compared the operation and maintenance costs for both Chattanooga and Rockville over 10 years—fiscal years 2001 to 2010. The contractor estimated that it would cost NRC over \$4.2 million (in 2000 dollars) to relocate the Center.³

NRC based its decision to relocate the Center on the expected programmatic benefits identified by senior management rather than on cost. On February 24, 2000, NRC decided to

- pursue, with the General Services Administration, a location near NRC's headquarters for the Center;
- develop a comprehensive, integrated training plan that identifies the skills needed to implement NRC's mission and link the skills to the technical training offered;
- take advantage of key program office staff to enrich the training offered; and

³Because the Commission decided to move all four simulators, we limited our examination to that segment of the cost analysis. For the purpose of this report, we refer to the contractor's estimate as NRC's estimate.

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- maintain a small staff in Chattanooga from fiscal year 2001 until April 2003 to provide reactor technology training and relocate the Center's remaining staff to headquarters by the end of fiscal year 2001. NRC did not specify the number of staff who would remain in Chattanooga until April 2003.

Structure of NRC's Technical Training Program

NRC's Office of Human Resources manages the professional development training (supervisory, management, and executive development; sexual harassment prevention; computer technology; and equal employment opportunity) as well as the technical training offered by the Center. Technical training has two components: reactor technology training and specialized training and support. The 16 reactor technology training staff include 12 instructors who primarily develop and conduct classroom and simulator training, 3 engineers who maintain and update the simulator software, and 1 supervisor. Of the additional nine staff in the specialized training and support component, six develop and conduct training and manage a wide range of contract courses, two provide administrative support for all of the Center's technical training programs, and one supervises staff. Specialized training includes courses related to maintenance, accident investigation and root cause analysis, emergency diesel generators, and motor-operated valves at nuclear power plants. This training also includes nonreactor courses related to radiation protection, the industries that produce fuel for nuclear power plants, and the transportation of nuclear materials.

NRC Used a Reasonable Methodology to Estimate Relocation Costs but Made Several Assumptions That Could Affect the Estimated Cost

NRC used a reasonable methodology to estimate the costs of relocating the Center from Chattanooga to Rockville. For example, NRC appropriately considered such cost elements as the differences in travel costs for participants, salaries and benefits of the Center's staff, and lease payments at the two locations. However, NRC made a number of assumptions in its estimate, including assumptions about the site that could be used for the Center, the staff to provide the training, and the timing of the move. Taken together, these uncertainties suggest that without identifying such factors as an actual site in Rockville or the number of staff who would relocate, the final cost to relocate, operate, and maintain a Center in Rockville cannot be precisely determined. Finally, recalculating the costs to improve the precision of the estimate may be academic because NRC's objective was not to minimize the cost of operating the Center but rather to improve the effectiveness and efficiency of the agency's operations.

NRC Used a Reasonable Methodology

NRC's methodology is reasonable because the agency incorporated the appropriate cost elements in its comparison. For example, NRC estimated the one-time, nonrecurring costs of moving and establishing the Center in Rockville and estimated that it would incur these costs in fiscal year 2000. NRC also compared the estimated costs of maintaining and operating the Center in Chattanooga and Rockville during fiscal years 2001 through 2010. Specifically, NRC compared all cost elements for functions performed at or related to the Center, including differences in the travel costs for participants, salaries and fringe benefits of new and existing Center staff, and lease payments and other operating and maintenance expenses at the two locations. NRC discounted the 10-year operating and maintenance costs and presented this value and the one-time moving and relocation costs in 2000 dollars.⁴ In addition, to the extent possible, NRC used available sources of information and made a number of reasonable assumptions in conducting the cost estimate. We used generally acceptable economic principles to evaluate NRC's cost estimation methodology and the reasonableness of key economic assumptions used in the estimate. Since the expected benefits cannot be easily quantified, NRC could not develop a standard cost/benefit analysis for relocating the Center. In addition, neither the Office of Management and Budget nor the General Services Administration requires agencies to prepare a cost/benefit analysis when relocating facilities.

Several Uncertain Assumptions Could Affect the Estimated Costs to Relocate the Center

Some of NRC's assumptions are uncertain and, if changed, would affect the estimated cost of relocating the Center to Rockville. These assumptions include the site that could be used for the Center, the staff who would provide the training, and the timing of the move.

NRC Does Not Have a Site for a Rockville Center

NRC had not identified a site for the Center when it prepared the cost estimate. Rather, it used a site that was available at the time. Since NRC was not considering relocating the Center to that site, any cost comparison between Chattanooga and Rockville is questionable. All of the estimated costs could change once NRC selects the actual site for the Center. For example, such estimated costs as the construction needed to meet NRC's specifications, leasing cost per square foot, and shuttle service for

⁴Per the Office of Management and Budget's guidelines, NRC used a nominal rate of 10 percent to discount the total costs. In fiscal year 2000, the Office recommended that agencies use a nominal rate of 6.1 percent to discount the nominal flow of funds.

transporting staff to and from NRC's headquarters could be different, depending on the final location and conditions of the site selected.

Number of Staff Who Will Provide the Training Could Differ Significantly

Another key factor in the cost estimate relates to the number of Center staff who would relocate or retire as well as NRC's need to hire replacement staff for those who retire or do not relocate. In its cost estimate, NRC assumed that 8 staff would retire in fiscal year 2001, 18 would relocate in that year, and 8 new staff would be hired by fiscal year 2000 to replace those who would retire. NRC's assumptions about relocations differ significantly from what 25 Center staff told us.⁵

First, as shown in table 1, 16 staff told us that they do not plan to relocate, 4 told us that they plan to relocate, and 5 are undecided and would relocate only if they cannot find other employment in Chattanooga.

Table 1: Relocation Plans of the Center's Staff

Category of jobs	Plan to relocate			Total
	No	Yes	Undecided	
Instructors				
Reactor technology training	10	0	2	12
Specialized technical training	3	2	1	6
Subtotal	13	2	3	18
Technical, Management, and Support				
Simulator engineers	0	1	2	3
Managers	1	1	0	2
Support staff	2	0	0	2
Subtotal	3	2	2	7
Total	16	4	5	25

Source: GAO's analysis of information obtained at interviews with NRC Center's staff during the week of May 1, 2000.

Second, NRC did not consider the natural attrition of instructors that would occur over the 10 years included in the cost estimate. Third, NRC

⁵Since NRC completed its cost estimate, one instructor has taken a job in one of its regional offices. Therefore, the number of staff at the Center as of September 24, 2000, was 25.

assumed that the federal grade level of staff hired to replace those who would not relocate would be virtually the same (same grade but at the first step). Fourth, NRC did not consider whether fewer than 18 instructors could provide the training needed or whether some of the skills and experience exist among the agency's headquarters and regional office staff. Ultimately, changes in the assumptions about the number of staff who will relocate or retire as well as the salary they would be paid would affect not only the one-time relocation cost estimate but also the estimates of annual savings in salaries and fringe benefits associated with filling the retiree slots with less-senior staff.

**A Different Relocation Date
Would Yield a Different
Estimated Cost**

The estimated date to relocate the Center also affects the final cost. Delaying the relocation until the lease expires in August 2005 could potentially reduce the total cost to the government. For example, if NRC moves the Center by April 2003 as the Commission directed, the General Services Administration could, according to an NRC document, incur rent expenses of up to \$2 million if the Administration is unable to lease the space between that date and August 2005. Moving the Center in 2005 could eliminate this expense.

**Expected Benefits of
Relocating the Center
to Rockville or Keeping
It in Chattanooga Seem
Reasonable, but NRC
Has Not Analyzed the
Benefits**

NRC has said that moving the Center to Rockville will result in a number of benefits for its technical training program and for improving the effectiveness and efficiency of the agency. These perceived benefits include increased attendance at training courses by headquarters staff and the increased use of simulators and instructors for the review and investigation of technical issues. Appendix I lists these and other expected benefits outlined in NRC's decisionmaking documents for relocating the Center to Rockville as well as the views of the Center's staff and the current views of NRC's Commissioners and senior managers. Although NRC could realize some of the benefits, it has no analysis supporting the extent that it could. NRC also has not analyzed the expected benefits of keeping the Center in Chattanooga. When NRC located the Center in Chattanooga, two of the expected benefits were that the remote location would provide a more conducive training environment and that the relatively low cost of living in Chattanooga would facilitate the recruitment and retention of qualified instructors. Although the Center's staff believe that Chattanooga continues to provide these benefits, some NRC senior managers view the remote location and the time required to travel there as disincentives for headquarters staff to attend training.

NRC Believes That More Headquarters Staff May Take Training if the Center Moves to Rockville

NRC contends that an increasing number of headquarters staff would participate in technical training if the Center moves to Rockville. However, NRC may not fully realize this benefit because less than 25 percent of its 2,800 staff are required to receive technical training.

NRC's Commissioners and senior managers provided a number of reasons for believing that the number of staff willing to attend technical training would increase if the Center were in Rockville. The reasons included the following: (1) Access to technical training would be easier, and some travel would be eliminated because headquarters staff would not have to travel to Chattanooga—a remote location; (2) management could more easily substitute staff when cancellations occur; and (3) training could be offered to staff who do not normally attend technical training. They said that headquarters staff attend training at the Center now when they are required or have a specific need to do so. But, with the recent downsizing, NRC staff are now stretched thin to effectively carry out their responsibilities; therefore, it is unlikely that staff would attend training that is not required. In addition, since some of the required reactor technology curriculum includes 5 weeks of classroom training and 2 weeks of simulator training, senior managers said that headquarters staff are reluctant to be away from their job for that amount of time.

Although NRC could expect that more headquarters staff would participate in technical training in Rockville, NRC has no analysis supporting the extent to which this would occur. For example, NRC's senior managers told us that slightly less than 25 percent of the agency's 2,800 staff are required to receive technical training. In addition, the Office of Nuclear Reactor Regulation estimates that only about 40 staff, in addition to an average of 314 staff who annually take technical training, would attend training at a Center located in Rockville. This would likely be a one-time occurrence because the 40 staff primarily assist the regulatory staff and are not responsible for reviewing and approving licensees' actions. In addition, from fiscal year 1995 through fiscal year 1999, the overall attendance at technical training courses declined for NRC's headquarters and regional staff. Total attendance reached a high of over 2,400 participants in fiscal year 1996 and declined to about 1,300 in fiscal year 1999—a 37-percent decrease.⁶ The largest decrease in attendance occurred in the specialized technical training courses that do not involve the simulators. Table 2 shows

⁶During the 5 years in which the overall attendance decreased, NRC reduced its staff by about 10 percent.

the breakdown of attendance by NRC's headquarters and regional office staff.⁷

Table 2: Headquarters' and Regional Offices' Attendance at Technical Training Courses, Fiscal Years 1995-99

Type of training received by headquarters and regional office staff	Fiscal year				
	1995	1996	1997	1998	1999
Headquarters					
Reactor technology training	201	170	138	165	181
Specialized technical training	934	1,077	811	943	598
Subtotal	1,135	1,247	949	1,108	779
Regional offices					
Reactor technology training	277	333	320	375	351
Specialized technical training	695	852	423	466	189
Subtotal	972	1,185	743	841	540
Total	2,107	2,432	1,692	1,949	1,319

Source: GAO's analysis of NRC's data.

According to NRC's Chairman and other Commissioners, if the Center were in Rockville, the agency would likely restructure its technical training courses to focus on the needs of headquarters staff. This refocus, the Chairman notes, would encourage more headquarters staff to participate in technical training. Another Commissioner told us that he does not support the way in which NRC "compresses" its reactor technology training. The Commissioner noted that the utilities had used a similar approach to train their employees but found it to be ineffective. Rather, the Commissioner supports a more university-type approach for reactor technology training, whereby NRC staff would be trained more frequently over a longer period

⁷Other federal agencies, such as the Federal Emergency Management Agency, the Department of Energy, the Department of Veteran Affairs, the Department of State, the Navy, the Air Force, as well as agreement state personnel and international officials, also participate in NRC-sponsored training. In fiscal year 1999, 257 agreement state officials, 22 other federal agency officials, and 20 international officials participated in training. In fiscal year 1998, 334 agreement state officials, 23 other federal agency officials, and 30 international officials participated in training.

of time. According to the Commissioner, a university-type approach would allow the staff time to think about and better understand the training they receive.

Using Simulators to Investigate Technical Issues Will Be Limited

Most of NRC's Commissioners and many senior managers believe that if the Center were in Rockville, the agency would use the simulators more frequently to investigate technical issues related to commercial nuclear power plants. However, the Center's staff and one Commissioner told us that using the simulators in this manner would be limited because their design impedes these types of analyses.

In its decisionmaking documents, NRC said that if it relocated the Center to Rockville, the agency's Office of Nuclear Reactor Regulation could use the simulators to model events at nuclear power plants, such as the rupture of the steam generator tube at the Indian Point 2 plant in New York, and to assist in the staff's review of license amendment applications submitted by utilities for NRC's approval. The document also noted that the Office of Nuclear Regulatory Research could use the simulators for research on such technical issues as digital instrumentation and control, accident scenarios, and risk analysis. In another document, NRC's Office of Nuclear Material Safety and Safeguards said that it would use the simulators to train those staff who participate in emergency response activities.

NRC's use of the simulators for other regulatory activities has been limited. For example, the Office of Nuclear Reactor Regulation asked the Center to conduct accident scenario simulations and to evaluate the effectiveness and acceptability of nuclear power plant operators' actions to the changes in emergency procedures proposed by a utility group. In addition, NRC's Office of Nuclear Regulatory Research has asked the Center to evaluate control room staffing issues and to validate its human performance model. Despite NRC's limited use in the past, NRC senior managers believe that simulator usage would increase if the Center were in Rockville. They believe that because the Center is geographically remote, headquarters staff do not routinely consider involving the Center. If the Center were in Rockville, they believe that headquarters staff would be more willing to interact with—and be physically present during the analysis conducted by—the Center's staff.

On the other hand, the Center's staff believe that headquarters staff could increase their use of the simulators without relocating the Center to Rockville. They said that their past actions demonstrate that they are

willing to use the simulators to conduct analyses for headquarters staff. They also noted that using the simulators to analyze events and other issues would be limited because a different type of simulator would be needed to analyze real-time events. One NRC Commissioner with extensive background and experience in the nuclear industry agrees with the Center's staff about the limitations of the training simulators.

We found that the simulators seem to be underutilized, as shown in the following example. The 12 reactor technology instructors spent an average of 14 weeks in fiscal year 1999 providing classroom and simulator training. According to the instructors, they also plan and develop courses, which includes using the simulators for an average of 9 weeks. Although NRC periodically updates the software used in the simulators, the equipment is idle a good portion of the year.

Expected Benefits of Keeping the Center in Chattanooga

When NRC moved the Center from Bethesda, Maryland, to Chattanooga in 1980, two of the expected benefits were that the remote location would provide a more conducive training environment and that the relatively low cost of living would facilitate the recruitment and retention of qualified instructors. According to NRC's decisionmaking documents, senior managers, and the Center's staff, the most obvious benefit for the Center to remain in Chattanooga is the reduction of distractions to students from normal office duties and home responsibilities. The remote location allows full concentration on the training curriculum and study outside of class, which is essential for the intensive reactor technology courses.

NRC's Commissioners and senior managers have stated that appropriate steps can be taken to help avoid staff disruptions, maintain the effectiveness of technical training, and preserve the quality of the learning environment if the Center were in Rockville. In voting on the proposal to relocate the Center, two of the five Commissioners discussed the managerial challenges associated with having the Center in Rockville. These challenges included the need to minimize class interruptions as well as competing work and family interests. Both Commissioners agreed that management oversight is required to minimize distractions and that NRC will need to implement strong administrative and managerial controls to help minimize the organizational situations that could interfere with staff's participation in training. As discussed in the next section, NRC has not assessed the potential to recruit staff for a Center located in Rockville.

NRC Needs to Resolve Other Issues to Ensure the Long-Term Efficacy of Its Technical Training Program

Regardless of where the Center is located, NRC needs to resolve other issues that affect the long-term efficacy of its technical training program. For example, NRC did not consider whether the agency needs 18 technical training instructors and did not consider where it would recruit staff with the skills needed to replace the instructors who would not relocate. However, NRC has not developed a plan to ensure that the agency has the appropriate number of instructors or the skills and expertise needed for the staff who will eventually succeed those at the Center. While a serious shortfall of instructors could become more acute if NRC relocates the Center before 2005, the agency is not planning now to meet its future staffing needs. Timely succession planning will ensure the continued quality of NRC's technical training program and can be carried out without regard to relocating the Center.

NRC's Need for 18 Technical Training Instructors Is Questionable

Over the last several years, NRC has offered the intensive 7-week reactor technology training course only once a year. In the past, NRC offered the course much more frequently to help reduce the backlog caused by inspectors who had not received such training. NRC has since eliminated the backlog, and the maturity of the industry and reductions in the number of NRC staff have lessened the demand for the 7-week course. Instead, NRC has focused on the annual refresher training that inspectors are required to take. Although the demand for the intensive reactor technology training course has declined, NRC has not determined whether it has the appropriate number of instructors and whether the skill mix is appropriate to meet the agency's needs. For example, NRC has qualified all 12 reactor technology instructors in at least two different nuclear power plant technologies. Table 3 shows the technologies for which the 12 instructors are qualified.

Table 3: NRC's Reactor Technology Instructors and the Technologies for Which They Are Qualified

Instructor	Type of Technology			
	Westinghouse	General Electric ^a	Combustion Engineering	Babcock and Wilcox
A		X		
B	X		X	
C	X		X	X
D	X		X	
E		X		
F	X			X
G	X		X	
H		X		
I		X		
J	X			X
K		X		
L	X			X
Total	7	5	4	4

^aGeneral Electric has several versions of the boiling water reactor design. The instructors qualified to teach this technology are qualified in more than one of the designs.

Source: GAO's analysis of NRC's data.

As can be seen in table 3, 7 of the 12 reactor technology instructors have been qualified to teach the Westinghouse design, and 4 instructors have been qualified in the Combustion Engineering and the Babcock and Wilcox designs. In addition, two specialized training instructors are qualified reactor technology instructors: one in the General Electric designs and one in the Westinghouse design. In essence, NRC has 14 staff qualified to teach the reactor technology courses. Of the 103 commercial nuclear power plants that operate in the United States, 48 use the Westinghouse design, 34 use the General Electric design, 14 use the Combustion Engineering design, and 7 use the Babcock and Wilcox design.

In addition, the demand for training on the various simulators varies. Table 4 shows the number of NRC staff who were trained on each of the four simulators from fiscal year 1996 through fiscal year 1999. As shown in table 4, the highest demand is for training on the Westinghouse and General Electric simulators; the least demand is for the Babcock and Wilcox and

Combustion Engineering simulators because fewer operating plants use these two designs.

Table 4: Number of NRC Staff Trained on Simulators, Fiscal Years 1996-99

Type of simulator	Number of NRC staff			
	Fiscal year 1996	Fiscal year 1997	Fiscal year 1998	Fiscal year 1999
Westinghouse	101	123	118	129
General Electric	74	61	82	101
Combustion Engineering	30	25	31	22
Babcock and Wilcox	16	11	10	21
Total	221	220	241	273

Source: GAO's analysis of NRC's data.

Like reactor technology instructors, the specialized technical training instructors spend only a limited amount of time in the classroom. In fiscal year 1999, for example, these instructors spent an average of 3 weeks teaching and most of the remaining time overseeing the contractors that provide training for NRC. From fiscal year 1995 through fiscal year 1999, NRC reduced the number of specialized training courses offered from 49 to 36 but offered some courses more than once a year. In addition, in fiscal years 1998 and 1999, only about 12 percent of the specialized technical training courses were held at the Center. The remaining courses were held either in headquarters, regional offices, or locations that have specific equipment and facilities, such as hospitals, which are integral for courses in the nuclear materials area or are convenient for agreement state officials.

Taken together, the amount of time spent in the classroom, the decreasing number of courses offered, and the number of instructors qualified to teach both the reactor and specialized training courses would suggest that NRC reassess its need for 18 technical training instructors. According to senior managers, NRC recognizes the need to continually assess the number of instructors that it needs. However, they could not provide any documentation showing the assessments conducted.

NRC's Chairman told us that keeping the same number of instructors at a Center in Rockville assumes that the technical training would be the same as that offered in Chattanooga. The Chairman noted that NRC anticipates that it would integrate technical training more into the agency and change,

refocus, and revitalize the curriculum to make it more attractive to headquarters staff if the Center were in Rockville. In addition, one Commissioner told us that with the change to digital instrumentation, the possibility exists for NRC to develop desktop computer exercises that, over time, would eliminate the need for the simulators.

NRC Has Not Developed a Succession Plan for Its Instructors

Regardless of where it locates its technical training facility, NRC will face a significant challenge to replace its 18 instructors. In 2003, 15 of the 18 instructors will be eligible to retire; and in 2005, 17 will be eligible to retire. However, NRC has not developed a plan to ensure that the agency has the appropriate number of instructors or the skills and expertise needed for the staff that will eventually succeed those at the Center.

Of its approximately 2,800 staff, at least 1,200 potentially have the knowledge and experience to replace the Center's staff. For example, reactor analysts, various types of engineers, and resident inspectors would have the background and experience in the reactor technology area and for specialized training related to emergency diesel generators, motor-operated valves, and the fundamentals of regulation. Health specialists would have the background and experience to perform the functions of the three specialized technical training instructors who manage, oversee, and provide health physics training, primarily for agreement state officials. In addition, the Office of Nuclear Regulatory Research has staff experienced in developing and analyzing risk assessments.

Both the headquarters staff and the Center's staff agree that background and experience alone do not make an instructor effective. NRC would have to ensure that the staff selected have the necessary "people" skills to ensure that the training provided is effective. In addition, since the specialized training staff serve as project managers who oversee contractor-provided training and ensure that the training meets NRC's requirements, the six Center staff who perform these functions generally believe that the replacement staff must have this expertise also.

To determine the type of technical training needed and the appropriate number of instructors, NRC needs to identify the skills required to implement its mission and to ensure that its technical training program is linked to the skills identified. NRC does not have this information and has not linked the skills required to the technical training offered. In 1997 and 1998, the Office of Nuclear Reactor Regulation reviewed the knowledge, skills, and abilities that headquarters and regional office staff needed to

effectively perform their jobs and the training needed for them to do so. Although this review identified a need for additional training in regulatory processes, procedures, and skills, NRC did not conduct a similar review for its other major program offices.

In its performance plan for fiscal year 2000, NRC identified the need to maintain core competencies (knowledge, skills, and abilities) and staff as a factor that could affect the achievement of its performance goals. NRC noted that maintaining the correct balance of knowledge, skills, and abilities is critical to accomplishing its mission and is affected by various factors. These factors include the labor market for experienced professionals, the workload as projected by the nuclear industry, and the declining university enrollment in nuclear engineering studies and other fields related to nuclear safety. In February 2000, the Commission directed the staff to develop a comprehensive plan that links the abilities needed to carry out NRC's mission with the training offered and have the plan available for its review in September 2000. According to NRC's senior managers, the lack of a computer system that is tied to NRC's personnel system has hampered the staff's efforts to conduct the skills assessment. NRC wants to collect the data for all of its staff and have a mechanism to automatically update the data as warranted. The senior managers noted that without a link to NRC's personnel system, the usefulness of the skills assessment data will be limited. They estimated that NRC could initiate the skills assessment sometime in fiscal year 2001.

Conclusions

Until it has a firm location for a Rockville Center and can better identify the number of staff who would relocate, NRC cannot precisely estimate the cost of relocating the Center. However, recalculating the costs to improve the precision of the estimate may be academic because NRC's objective was not to minimize the cost of operating the Center but rather to improve the effectiveness and efficiency of the agency's operations.

NRC has not addressed a number of issues that will affect its technical training program over the next several years. Given the number of staff who told us that they would not relocate and given the number of instructors who are eligible to retire over the next 3 to 5 years, NRC will face major challenges in providing effective technical training for its staff, regardless of where it locates the Center. However, NRC has not identified the skills required for the staff who will replace the instructors and has not developed a succession plan to identify, hire, and train replacement staff.

Recommendations

To ensure that NRC continues to provide effective technical training, we recommend that the Commissioners direct NRC staff to

- identify the skills required for the staff who will replace its technical training instructors and
- develop a succession plan to ensure that qualified staff are available and trained to minimize the disruption of the technical training provided.

Agency Comments

We provided NRC a draft of this report for its review and comment. NRC generally agreed with the report's conclusions and recommendations but provided additional information for our consideration. We incorporated this information where appropriate. NRC's comments are in appendix II.

We conducted our work from April through September 2000 in accordance with generally accepted government auditing standards. Appendix III provides details on our scope and methodology.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to the Honorable Richard A. Meserve, Chairman, Nuclear Regulatory Commission; the Honorable Nils J. Diaz, the Honorable Greta Joy Dicus, the Honorable Edward McGaffigan, Jr., and the Honorable Jeffrey S. Merrifield, Commissioners, Nuclear Regulatory Commission; and the Honorable Jacob J. Lew, Director, Office of Management and Budget. We will make copies available to others on request.

If you or your staff have any questions about this report, please call me on (202) 512-8021. Other key contributors to this report are Mary Ann Kruslicky, Mehrzad Nadji, Philip Olson, Carrie Stevens, and Derek Stewart.

Sincerely yours,

A handwritten signature in black ink that reads "Jim Wells". The signature is written in a cursive style with a large initial "J" and a long, sweeping underline.

Jim Wells
Director, Natural Resources
and Environment

NRC's Views on the Potential Benefits of Relocating the Technical Training Center

Table 5 reflects the information that we obtained through meetings with all 26 of the Technical Training Center's staff as well as the views of senior managers in the Nuclear Regulatory Commission's (NRC) Offices of Nuclear Reactor Regulation, Nuclear Material Safety and Safeguards, Nuclear Regulatory Research, and Human Resources on the expected benefits from relocating the Center outlined by NRC in its decisionmaking documents. Where applicable, table 5 also includes the views expressed by NRC's five Commissioners.

Table 5: Center's Staff, NRC's Senior Managers, and NRC's Commissioners views on the Potential Benefits of Relocating the Center

Potential benefits identified in decisionmaking documents	The Center's views on the potential benefits	Views of NRC's Commissioners and senior managers on the potential benefits
Use the simulators for review and investigation of such technical issues as event analysis and licensing action reviews	NRC could do this now, and the program offices could receive the results via E-mail or fax. NRC does not need to have the simulators in Rockville. However, NRC rarely uses the simulators for event analysis or to assist with licensing action reviews. Moreover, because the simulators relate to a specific plant design, it is difficult to model events at other plants. In addition, if NRC needs simulators to review and investigate technical issues, why did it recently decommission rather than move two simulators to Rockville?	<p>All five of NRC's Commissioners discussed this potential benefit. One noted that it was secondary to NRC's improving its effectiveness and efficiency, and one noted that the use of the simulators for technical issue reviews would be limited.</p> <p>At least once or twice a year, NRC's headquarters has asked the Center to use the simulators to analyze events. If a simulator has good fidelity, it can be useful in determining how long an event will last and how many staff it will take to handle the situation.</p> <p>Although NRC could use the Center in Chattanooga for such analysis, it would be more effective to have headquarters staff directly participate in the analyses conducted. For such participation to occur, the Center would have to be located in Rockville.</p>

Appendix I
NRC's Views on the Potential Benefits of
Relocating the Technical Training Center

(Continued From Previous Page)

Potential benefits identified in decisionmaking documents	The Center's views on the potential benefits	Views of NRC's Commissioners and senior managers on the potential benefits
Would allow program offices to be involved in course development	NRC could do this now. The Center does not need to be in Rockville for management, possibly in conjunction with a visit to Region II in Atlanta, Georgia, to spend time at the Center working on the content of courses. However, program offices have not interacted with the Center on needed long-term revisions to the nuclear power plant inspector courses to reflect the new oversight process. In addition, NRC program offices have provided relatively few suggestions on the content of courses—reactor technology training has generally been the same for the past 20 years.	NRC acknowledged that the former Training Advisory Group could have been more successful. However, having the Center in Rockville would minimize the "out-of-sight, out-of-mind attitude." With the number of changes occurring within NRC, it is not realistic to telephone or conduct a videoconference to discuss policy issues. Program office staff have participated in course development. However, with the Center located in Rockville, the involvement would increase.
Would allow for rotation of staff between program offices and the Center	NRC can do this now. With sufficient notice, the Center's staff could plan their time to allow for a 3- to 6-month rotation. Some of the Center's staff participated on the various task forces in preparation for the pilot project for the new oversight process. One staff spent 6 months working at the Office of Incident Response Operations. If NRC rotated the Center's staff to program offices, who would conduct the training in the interim? Would that staff need to meet the instructor qualification requirements?	The Center's staff can rotate through program offices and make valuable contributions when they have been involved on task forces and other agency activities. If the Center were in Rockville, NRC could better utilize the experience and expertise of the Center's staff. Staff would not be rotated in and out of training positions in a way that would create instability in the training program. NRC needs to invest in the future by getting other staff qualified as instructors.
Contracting process may be more efficient by having the Center's project managers in close proximity to headquarters' contract staff	NRC staff need to have both the knowledge about and the practical experience related to the courses to effectively oversee the contractor to ensure that the quality of training meets NRC's requirements.	Headquarters' technical staff could perform the functions performed by the Center's staff. If the Center were in Rockville, NRC would probably need fewer specialized technical training instructors, and the remaining staff could possibly manage and oversee a larger number of contractors.
Enhance NRC's ability to address new or changing agency priorities and the current and future direction of the agency	NRC can do this now. Both headquarters and the Center have videoconferencing, and arrangements can be made for senior management to address all classes. However, the program offices have not until recently elected to do so. The Center would need to be flexible if senior managers had to reschedule the time for the presentations. In June 2000, the Center invited the Office of Nuclear Material Safety and Safeguards to address a training class. The Office did so and expects to do so again in September 2000.	Two of NRC's Commissioners noted that having the Center in Rockville would not only provide senior managers an opportunity to address new or changing agency priorities but also to conduct portions of the training curriculum. NRC's senior managers acknowledged that they could better utilize videoconferencing to discuss new or changing agency priorities. However, videoconferencing does not provide the students with the same experience as that provided in a face-to-face discussion.

**Appendix I
NRC's Views on the Potential Benefits of
Relocating the Technical Training Center**

(Continued From Previous Page)

Potential benefits identified in decisionmaking documents	The Center's views on the potential benefits	Views of NRC's Commissioners and senior managers on the potential benefits
Increase opportunities for regional office staff to network with headquarters staff	A large percentage of technical training is provided at contractor sites or at NRC's regional offices. If it is important for regional staff to network, NRC could require that they spend a few days or a week each year working and interacting with headquarters staff.	One of NRC's Commissioners strongly believes that regional office staff would benefit greatly from networking with their headquarters counterparts. Some regional office staff have never been to headquarters. Therefore, having the Center in Rockville would provide more opportunities for regional office staff to interact with the headquarters staff with whom they work.

**Appendix I
NRC's Views on the Potential Benefits of
Relocating the Technical Training Center**

(Continued From Previous Page)

Potential benefits identified in decisionmaking documents	The Center's views on the potential benefits	Views of NRC's Commissioners and senior managers on the potential benefits
Increase the number of headquarters staff who would receive technical training	<p>NRC has no requirement that all of its professional staff acquire some minimum level of training each year. However, NRC has specified training for nuclear plant, fuel cycle, and materials inspectors. If NRC does not require staff to take training, they will not do so. On the other hand, if NRC does not require training, managers would be reluctant to approve staff to take technical training.</p> <p>The Center provides some training in headquarters. NRC could increase the number of courses held at headquarters.</p> <p>If it is important for headquarters staff to receive technical training, why would NRC wait until the Center is in Rockville to provide the needed training?</p>	<p>All five NRC Commissioners believe that training of headquarters staff will increase because the agency expects to restructure the technical training program with courses that would be more focused on headquarters staff, thereby encouraging them to participate in training. One Commissioner told us that program and project managers as well as other staff in the Office of Nuclear Reactor Regulation and the regional offices that regulate commercial nuclear power plants should be provided with simulator training to have a certain amount of knowledge and understanding about the scope of activities on the reactor operator console and the culpabilities of the plants. Such knowledge and understanding, the Commissioner noted, would allow NRC staff to better determine the impact of a regulation or license amendment, thereby enhancing NRC's effectiveness and efficiency. Some staff are reluctant to travel to Chattanooga to attend training. However, NRC will continue to send to training those staff who are required by NRC's policies or whose job performance, in management's opinion, could be improved through such training.</p> <p>In February 2000, the Commission directed the staff to develop a comprehensive training plan that links the abilities needed to carry out NRC's mission with the training offered. NRC staff had expected to provide the Commissioners with the plan by the end of September 2000. Although NRC has task groups assessing whether a need exists to revise the agency's technical training requirements, it stopped conducting a number of other activities, such as the development of the comprehensive training plan, when it learned that we had been asked to assess the Commission's decision to relocate the Center.</p>

Appendix I
NRC's Views on the Potential Benefits of
Relocating the Technical Training Center

(Continued From Previous Page)

Potential benefits identified in decisionmaking documents	The Center's views on the potential benefits	Views of NRC's Commissioners and senior managers on the potential benefits
Reduce travel time and costs for headquarters staff	Travel costs would increase for regional office, agreement states, and others if NRC relocates the Center to Rockville.	Although travel costs would be higher for Region II (Atlanta, Ga.) staff who can now drive to training, it would be lower for Region I (King of Prussia, Pa.) staff. Overall, travel costs may increase if the Center moves to Rockville, but access to three airports would make it more convenient for staff to get to and return from training.
Facilitate the last-minute substitution of students	Many headquarters staff cancel their planned training. Although the Center did not have reliable information on the extent to which headquarters and regional office staff cancel and/or substitute students for scheduled training, the data available showed that the Office of Nuclear Reactor Regulation and Region III (Lisle, Ill.) had the highest number of cancellations for training in fiscal year 1999. The Office of Nuclear Materials Safety and Safeguards and Region II (Atlanta, Ga.) had the second highest number of cancellations.	NRC's headquarters does not track this information.
Would facilitate NRC's using the knowledge and expertise of the Center's instructors	NRC can do this now. A number of examples exist where the Center's staff participated in various initiatives, such as developing the new training course for the pilot project for the new oversight process and its implementation industrywide.	NRC's senior managers acknowledge that the agency can do this now and has used the Center's staff expertise in the past. In addition, headquarters staff can also contact the Center's staff by telephone to share knowledge and expertise. However, these interactions would be more beneficial if conducted on a face-to-face basis with the Center in Rockville. In addition, if the Center were in Rockville, the instructors would be more knowledgeable about policy issues and be able to include such issues in their curriculum on a real-time basis.

Comments From the Nuclear Regulatory Commission



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 4, 2000

Mr. Jim Wells
Director, Energy, Resources, and
Science Issues
U. S. General Accounting Office
Washington, DC 20548

Dear Mr. Wells:

We have reviewed the U. S. General Accounting Office (GAO) report, "Facility Relocation: NRC Based Its Decision to Move Its Technical Training Center on Perceived Benefits, Not Costs." In general, we agree with the conclusions and recommendations in the report. The following comments are provided on the draft report.

A common theme throughout the report is that there are a number of issues which NRC must address regarding its technical training program over the next several years. These include, but are not limited to, planning for attrition and appropriate replacement of the technical training staff, determining the appropriate levels of technical training resources to best meet current and future agency needs, and achieving the most appropriate means to make training available to headquarters, regional, and remote site personnel. These are complex issues that have been addressed in the past and will be addressed in the future on a continuing basis.

The report provides more recent and more detailed information regarding likely instructor attrition in the event the Technical Training Center (TTC) is moved to NRC headquarters than was available when the Commission made its relocation decision. The prospect of losing 64% to 84% of the technical training staff at approximately the same time is of concern to the NRC. The implications of these GAO-developed data will require ongoing NRC consideration.

The report seems to indicate that NRC senior managers believe that succession planning for technical training personnel is dependent on the TTC location and that technical training succession planning cannot be done because of limiting statutory language. We believe that we can and should plan for the replacement of staff who will be lost through attrition and that we already have the necessary flexibility to do this succession planning irrespective of the TTC location. When implementing succession planning, location, of course, would be a factor.

The report indicates that NRC has not determined whether it has the appropriate number of instructors and whether the skill mix is appropriate to meet the agency's needs. It provides course participation, instructor qualification, and simulator usage data to suggest that the need for 18 technical training instructors is questionable. Based on the current inspector qualification programs, the NRC has made a conscious decision to maintain the core capabilities to provide relevant technical training in each of the U. S. light water reactor designs. These core capabilities include both the reactor simulators for these reactor designs and a minimum number of qualified staff to provide the training in each reactor technology area. It is these minimum core capabilities, rather than the number of NRC students attending the courses, that principally determines the staffing levels at the TTC.

**Appendix II
Comments From the Nuclear Regulatory
Commission**

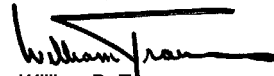
-2-

The NRC has established a reactor inspector qualification task group which is reviewing and assessing inspector qualification requirements including new or revised training requirements in concert with the revised reactor oversight process as well as continuing emphasis on enhancing the inspection risk knowledge base. This is a multi-month effort which is expected to define what training will need to be provided to reactor program inspectors. A natural byproduct of this effort will be a more precise determination of the technical training resources that will be required for the next several years.

The technical training skill mix necessary to provide the training that is currently being provided is well known. The optimal skill mix required for the future may well be different if we change the format and delivery method of a significant portion of the technical training. While some of the current skills will certainly still be required, additional skills not presently available within the TTC staff will almost certainly be required.

Thank you for the opportunity to comment on the draft report.

Sincerely,



William D. Travers
Executive Director
for Operations

Scope and Methodology

To assess whether NRC used a reasonable approach to estimate the costs to relocate and operate the Center, we reviewed cost analyses prepared by an independent consultant in July and September 1999 under contract to NRC. We used generally acceptable economic principles to evaluate NRC's cost estimation methodology and the reasonableness of key economic assumptions used in the estimate. We also reviewed various Office of Management and Budget guidelines related to the preparation of cost analyses for or by federal agencies. We reviewed the assumptions for estimating the cost elements and discussed them with managers and staff in NRC's Offices of Administration, the Chief Financial Officer, and Human Resources. In addition, we met with all 26 of the Center's staff to determine whether the assumptions used in the cost analyses regarding those staff who would relocate accurately reflected their plans to do so. However, we did not verify such information as the costs incurred by NRC staff to travel and participate in training, the salaries and benefits of existing staff or staff who would be hired to replace them, lease payments for the two locations, or the costs to move the simulators.

To assess whether NRC's expected benefits to relocate the Center are reasonable and supported and to determine the benefits of keeping the Center in Chattanooga, we reviewed NRC's decisionmaking documents, analyses that supported these documents, and memorandums provided by the Executive Director for Operations to identify the expected benefits and the rationale and support for them. We met with all 26 of the Center's staff to obtain their views on the expected benefits. We also met with senior managers in the Offices of Nuclear Reactor Regulation, Nuclear Material Safety and Safeguards, Nuclear Regulatory Research, and Human Resources to obtain their views on the expected benefits and the analyses conducted to support them. We also met with the five NRC Commissioners to obtain their perceptions on various relocation issues as well as the benefits expected from relocating the Center. We obtained the views of the Nuclear Energy Institute and the Vice President for Economic Development and the Existing Industry Coordinator for the Chattanooga Chamber of Commerce on NRC's decision to relocate the Center. In addition, we analyzed various data obtained from NRC's Office of Human Resources and the Center's staff to assess the reasonableness of expected benefits.

To provide information on other issues that could affect NRC's technical training program, we reviewed NRC's decisionmaking documents, material presented by the Center's staff to the Commission during a November 1999 meeting, and inspection manual chapters to determine the training required

for NRC's staff. We obtained and analyzed such data as the relocation plans, workload, and retirement eligibility of the Center's staff. We also obtained information showing the technical positions of all NRC staff to determine those who could potentially replace the Center's staff who would not relocate to Rockville. Finally, we analyzed the attendance of headquarters and regional office staff at technical training courses during fiscal years 1995-99; the percentage of technical training courses offered at the Center, headquarters, regional offices, and other locations during fiscal years 1998-99; the technologies in which NRC's reactor technology instructors are qualified to teach; and the number of NRC staff trained on simulators during fiscal years 1996-99.

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