MAKING NUCLEAR SERVICE TECHNOLOGY TRANSFER WORK

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ABSTRACT

Technology transfer has been common practice in the commercial nuclear industry since its very early days. The success of this practice is evidenced by the fact that many of the companies that are now industry leaders started as licensees of other companies. Many of these cooperative relationships have endured over the years while many have ceased to exist. As the industry has changed, there have also been many changes in how technology transfer has been implemented, and how the parties to such agreements have interacted. In today's environment of rapid change in both technology and industry structure, the partnership aspects of technology transfer need to be more strongly developed more than ever before.

INTRODUCTION

In May 1994, the Korea Power Plant Service Co. Ltd, [recently renamed the Korea Plant Service & Engineering Co., Ltd. (KPS)] – a subsidiary of the Korea Electric Power Co. (KEPCO), and the Nuclear Services Division (NSD), – a part of Westinghouse Electric Corporation's Energy Systems Business Unit (ESBU), entered into a Service Technology Cooperation Agreement (STCA). This agreement, which covered the transfer of technology, training, and joint engineering development programs, was put in place to establish a cooperative, and mutually beneficial relationship between the two companies in the area of service technology for operating nuclear plants.

BACKGROUND

Technology transfer has been a key part of the Westinghouse philosophy since it started in the commercial nuclear power business. The first international cooperation agreements were signed in the 1960s. In those early days, the agreements tended to be broad scope, and for the most part focused on the technology necessary for designing and building new reactors. Many countries were just entering into the nuclear age, and were interested in establishing indigenous capabilities.

After some time, as more plants came into operation, there was a distinct shift in interest to agreements that covered various aspects of nuclear fuel design and manufacture. Finally, as the emphasis began to change from building new plants to the operations and maintenance of the plants that were already running, more and more attention began to be paid to nuclear service technology. This has been reflected in a similar trend among the technology transfer agreements to which Westinghouse has been a party to.

KPS was established by KEPCO in 1977. It now has 5,000 employees, with people located at over 40 regional sites. KPS provides a full range of maintenance services for fossil plants, nuclear plants, hydro plants, gas turbines and diesel units. KPS has also worked on projects outside of Korea since 1982. In the fossil maintenance area, it has secured contracts in Indonesia, the Philippines, China, Brazil, Saudi Arabia and Iraq.

SERVICE TECHNOLOGY COOPERATION AGREEMENT

Technology Transfer

There are several unique features to the STCA signed by W and KPS that differentiate it from previous agreements. First, an attempt was made by the two parties to define individual service technologies as precisely as possible. This is greatly different than more traditional agreements that have usually covered almost all, if not vast, areas of technology. This technology focus results in KPS being able to selectively choose which services it is interested in, and which it can productively use with its customers, instead of having to acquire information for which it has no use.

After many preliminary meetings and discussions, an initial list of candidate service technologies was identified by KPS and Westinghouse that met certain criteria. These technologies were mature and proven. They had either already been used in doing service work in Korea, or it was felt that their overall pedigree would allow them to be introduced with no opposition from either the utility or the regulatory authorities. Most importantly, they were technologies that would be needed by the Korean operating fleet. The initial technologies that were identified as prime candidates are shown in Table 1.

Table 1 Candidate Service Technologies

In-service inspection
Ultrasonic testing
Eddy current testing
Sludge lancing
Robotics
RCCA inspection
Steam generator tube sleeving
RTD bypass elimination
Refueling technology
Steam generator tube plugging
Foreign object search and retrieval
Pressure pulse cleaning
RCS chemical decontamination
Outage management technology

After more evaluation of the merits of the services on the list, the parties agreed to start with a smaller subset. However, KPS has retained the ability to specify additional technologies over time to add to the agreement. These can be services that were on the initial list but were delayed, or others that are added by mutual agreement. This has benefits for both parties. For KPS, it provides the opportunity to become familiar and comfortable with certain base technologies. In any organization, we believe that there is a limit to the amount of technical information that can be easily absorbed at one time, and used productively. For instance, there is usually only a small cadre of people that will be responsible for receiving, assimilating, and deploying information that is covered by an agreement like this. This group will usually choose to work on one technology at a time, to assure that it has been properly catalogued, that the

appropriate groups have received training, that any required tooling is in place, etc. Therefore, the ability to properly receive information is usually the limiting factor in an exchange of this nature.

The benefits of this paced process also accrue to the transmitting party. Since there is a tremendous amount of data and information that is prepared at the beginning of any cooperative relationship, Westinghouse can focus initially on a select amount of information, and make sure that those transmittals are complete and well managed. As additional technologies are added to the agreement, the focus for both parties can shift to the new material.

The companies have also engaged in other activities in an attempt to help make sure that the technology transfer process is successful. For short periods of time, both companies have put resident engineers in the offices of the other. We have found that it is relatively easy to put technical information in boxes and mail it. What is difficult is understanding what to do with the information when the box is opened. The exchange of resident engineers has helped both parties understand the needs of the other. We have also found that the resident engineers on short rotating assignments of 3 to 6 months, instead of long term assignments, allows the selection of engineers with specialized talents available to meet specific short term needs. This has also allowed more people in both organizations to develop relationships with their counterparts.

Service Engineer Training Program

One of the key parts of the relationship has been the extensive Service Engineer Training Program for KPS engineers at Westinghouse facilities. This has covered many areas of technology beyond those agreed to in the cooperation agreement. Table 2 identifies training that has already been completed.

Table 2 Training Programs

Instrumentation and Control
SG Eddy Current Analyst
Qualified data Analyst
Robotics
Materials and welding
Structural mechanics
RCP Motor Refurbishment
In Service Inspection
Outage Management
Service Repair Center
Ultrasonic Testing & Eddy Current
RCCA Inspection

The parties have also put in place a unique Mentoring Program, where KPS engineers work alongside Westinghouse engineers to gain actual on-the-job experience in both our service center and in the field.

Service Engineer Utilization Program

Finally, Westinghouse and KPS have established a Service Engineer Utilization Program, where trained and qualified KPS engineers are used by Westinghouse as part of its crews on service jobs on nuclear plants around the world. There have already been more than 20 KPS engineers that have participated in 16 of these opportunities around the world, covering such activities as RCP motor repair and maintenance, S/G eddy current analysis, and refueling.

In many cases, the KPS service engineers have extensive experience working on Korean plants and need little additional training to become productive members of the Westinghouse crews.

CONCLUSION

In any type of relationship, it is important to have a vision for the future. Westinghouse and KPS are currently discussing ways to expand resource sharing, so that both companies will have access to a larger, group of trained workers. This will help combat the problems faced by the large swings in service engineer needs produced by the traditional spring/fall outage peaks. In addition, KPS is now investigating the feasibility of constructing a centralized nuclear service center in Korea. The experience gained by Westinghouse in putting four service centers into operation in various parts of the world will be useful in this venture.

Technology transfer means many things to different people. In its simplest form, it can be limited to the transmittal of paper from one party to another. However, in its most successful form, it is a partnership that is based on a vision of mutual success. Our vision is one in which KPS will develop the capability to handle tooling design, maintenance and repair in all the areas needed to support the growing number of operating Korean nuclear power plants, and in which Westinghouse technology will continue to be the backbone of this effort.

KEY WORDS

Technology transfer, nuclear service, international