

Business as Usual ... Only More So

Nuclear Plant License Extension and Plant Waste Operations

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By Nancy J. Zacha

What a difference a few years makes! Only five or six years ago, many energy “experts” claimed that the nuclear power industry was looking at a rash of early plant shutdowns and assumed that would be the wave of the future, especially as electricity industry deregulation loomed on the horizon. Market analysts predicted that a minimum of 25 percent of the operating nuclear plants would shut down for economic reasons before the year 2000. The early work that a few plants did on possible license extension was halted, and many nuclear utilities struggled to figure out which direction would be the most cost-effective for their nuclear plants: continuing operation, plant sale (at near-giveaway prices), or shutdown and decommissioning.

Today, the year 2000 has come and gone. The early plant shutdowns have halted, and several plants have already received license extensions. Nuclear plants are being bought and sold for prices far removed from the bargain basement. Most industry experts agree that nearly all the nuclear power plants now operating will apply for (and receive) extended operating licenses. Consequently, nuclear power plant decommissionings have been pushed some 20 years into the future.

But in addition to 20 more years of operation, licensing extension means that utilities have to plan farther into the future about such issues as spent-fuel storage and radwaste disposal. To get a sense of today’s thinking in these areas, *Radwaste Solutions* talked to a number of utilities to find out what effects they see from their license extension activities.

LICENSE EXTENSION: THE OPTION TO OPERATE . . . OR NOT

“One of the points we made to our public service commission when we applied for license extension was that we were not committing to operate the plant for even the full 40 years of the original license, but that operation will be driven purely by economics. As long as the economics look good, we will continue to operate the plant.”

Gary Young, Entergy Nuclear’s project manager for License Renewal, in a general overview of what license extension means to a nuclear utility, noted that his utility looks at license extension as the equivalent of getting a new car tag. “Once you get it,” he said, “that gives you the option to operate the plant as long as it’s economically advisable to do that.” Thus, he continued, many of the issues like radwaste and spent-fuel storage are not being looked at separately from the license extension itself, but instead are part of the issues considered in determining the economic viability of continuing to oper-

ate the plant. "Once you reach the point where a problem, whatever it is, is causing a lot of expense, then you make the decision either to spend the money to continue to operate or to shut down," he said. In fact, he continued, "one of the points we made to our public service commission when we applied for license extension was that we were not committing to operate the plant for even the full 40 years of the original license, but that operation will be driven purely by economics. As long as the economics look good, we will continue to operate the plant."

Young added that one effect of license extension is that the utility, which had already been looking "pretty far ahead," will now be looking even farther into the future. In the case of ANO-1, Entergy's "pilot plant" for license extension, the utility had been looking at options for waste handling and storage out to the 2014 time frame (the date of expiration of the original operating license). Other of the utility's plants, Young added, being newer, have even later license expiration dates, and thus the utility has made plans for handling waste that extend for decades or more.

Because of the success of its license extension request for ANO-1, Entergy has started license renewal activities for ANO-2 and for Pilgrim, Young said. The utility has made no final commitments for license extension beyond ANO-2 and Pilgrim. However, he continued, after the ANO-2 license extension is completed, the utility will probably focus most of its relicensing activities on its remaining plants in the Northeast, mostly because of the age of those plants. And, he added, "all indications are that we will pursue license renewal for *all* our plants; we just have not made any firm commitments."

But regardless of the fact that utilities are already looking years, or even decades, ahead in terms of plant operations, waste management, and spent-fuel storage, license extension is going to force them to look at contingencies and make plans even farther into the future.

RADWASTE GENERATION, STORAGE, AND DISPOSAL

Most nuclear utilities have had to deal with uncertainties in their low-level waste disposal options for many years, primarily because the Barnwell, S.C., LLW disposal facility has had a recent history of alternately opening and then eliminating access to the facility, depending on political considerations. As a consequence, most utilities years ago took actions to reduce the amount of LLW generated (waste minimization) and to increase the amount of storage capacity available at the plant sites. So for most utilities, license extension means continuing the activities they began years ago.

Constellation Energy

Constellation Energy was the first U.S. utility to be granted license extension for a nuclear plant (Calvert Cliffs). Unit 1 is now licensed to operate until 2034, and Unit 2, until 2036. Constellation Energy spokesman Karl Neddenien noted that for years the utility has been sending its radwaste offsite for treatment, supercompacting, and volume reduction. In addition, the plant has been working to minimize the amount of LLW generated. "We carefully screen any kind of material going into the plant and use a lot of common-sense approaches to making sure that material doesn't come into the plant unless it needs to be there, so that it can't become low-level waste," he said.

If Barnwell closes to the utility in 2008, as currently scheduled, "we have capability onsite for interim storage of low-level waste," Neddenien continued. "In the past we have sent the material out for volume reduction and then brought it back to store it in our Material Processing Facility. It's a shielded concrete building where we have the capability for storing LLW until such time as we have somewhere to send it. If we have to, we can use that facility in the future."

Asked about the capacity of the facility, Neddenien responded that "back when it was designed in 1980 or '81, it was designed to hold five years' worth of low-level waste generation. Minimization has really stretched that well beyond the five years. In the future, of course, we would have to see what else is available. But it won't have an immediate impact. Right now, Barnwell is still open, and we still have the commitments and contracts to keep disposing."

Looking at the future, Neddenien remarked that Maryland is part of the Appalachian Low-Level Radioactive Waste Compact. "We did a lot of work in Pennsylvania, characterizing the entire state and eliminating any location that showed even the slightest sign of being unusable. But that was put on hold



The Calvert Cliffs ISFSI.

when Barnwell opened back up. So another option would be to take another look at the compact. However, the biggest impact on the Barnwell closure will most certainly be on the medical industry—hospitals, doctors, dentists—they’re the ones who are going to be the most hard-pressed because they don’t have the storage capabilities that the utilities have. They can’t store material and let it decay off the way we can.”

Neddenien concluded that “we’re in a pretty good position. We have a lot of qualified staff looking at all the options. We’re planning ahead, taking a look at what the options are, and already evaluating what might be the best course of action. But in the meantime, we’re continuing with the waste minimization program.”

Entergy

Entergy Nuclear tells much the same story. John Ethridge, a senior program manager for Entergy Services, described the company’s situation as follows: “When we look at license renewal, we obviously have to take into account the operational waste that’s going to be generated as a result of the additional years of operating the plant. Our Low-Level Radwaste Peer Group, which was formed to look at the various issues associated with radwaste management, will continue to monitor waste generation on an ongoing basis to determine various options we have for processing our wastes and disposing of them. And, if need be, storage options. We currently have pretty expansive storage capacity at ANO, but as we go along, if we start losing our radwaste disposal options, such as Barnwell, we’ll have to determine at that point in time what the appropriate mode of storage should be. We will probably still have options for sending our waste off-site, volume reducing it, and then having it returned to the site for ongoing storage. Our storage building, which was built around 1983, was originally designed for at least five years of storage capacity, based on the historical waste generation volumes at that time. We’ve made extensive strides in reducing waste generation since then, and the storage life of that building has been extended significantly already.

“We’ll continue to monitor the storage capacities and the needs that we have,” Ethridge continued, “so that within a reasonable time frame we’ll know if we have to expand that facility or not. And even though Barnwell will close to us in 2008, we fully anticipate that Envirocare of Utah’s capabilities will continue to be expanded basically to be a full-service licensed facility for LLW. When things settle down with the high-level waste issue in Utah, I firmly believe Envirocare will move forward full bore with their B and C license. So we expect that Envirocare will be available long-term, even though that’s not 100 percent certain, of course. In the meantime, we monitor the situ-

ation pretty closely. For instance, I stay in touch with the folks at Envirocare at least on a monthly basis, to keep track of what their status is.”

Ethridge has little faith in the compact process to solve the LLW disposal problems. “Right now, Envirocare appears to me to be the most reliable option for low-level radwaste. The compact process has not worked as well as the industry had hoped, and a lot of folks are saying that the compact process is dead and that we will not have new disposal facilities. Of course, that’s yet to be determined.”

In the Central States Compact, where Arkansas is located, Entergy is participating in a lawsuit with the compact commission against the state of Nebraska. Depending on the outcome, it’s possible that Nebraska could be forced to continue to develop a disposal facility if it proves to be safe and cost-effective.

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Duke Energy

Duke Energy Corp. operates three nuclear power stations: Oconee and Catawba in South Carolina and McGuire in North Carolina. Oconee was the second plant in the United States (after Calvert Cliffs) to obtain a license extension—in May 2000. The utility is now pursuing license extensions for McGuire and Catawba, having submitted its applications for license extension for those two plants in June 2001.

Duke is in a unique situation among utilities, noted Graham Johnson, a scientist in Radiation Protection with the utility. Two of its plants are located in South Carolina, which is a member of the Atlantic Low-Level Waste Compact, and thus these plants will have guaranteed access to Barnwell after the disposal site closes its doors in 2008 to the rest of the nation’s waste generators. “We are assuming that we will have access through decommissioning,” Johnson said. At McGuire, Johnson added, “we had previously built a storage facility to store waste that we cannot ship to Envirocare, and we are assuming that we have at least 10 years of storage capacity there. This facility was built when North Carolina was denied access to any disposal facility, and the waste did build up at the storage site. Since Barnwell has been reopened to North Carolina waste, we have been getting rid of this backlog and hope to have it cleared away by the end of 2002. Thus, once Barnwell is closed to North Carolina, the facility will be fully available for storing McGuire waste.

“In addition, we are continuing to target waste minimization strategies. With waste minimization and volume reduction, we have been able to reduce our level of radwaste generation by about tenfold over the last decade or so,” Johnson said.

As for the future, Johnson noted that at the time the McGuire storage facility was built, “we developed a plan for a larger facility, and we built only half of it. We can expand this facility as we need it. And, of course, we are hoping that Envirocare will be able to accept B and C waste sometime in the future.”

Johnson said he is not “optimistic” that North Carolina will ever site an LLW disposal facility. “It doesn’t seem like it’s moving forward at this point, and I’m not aware of any efforts we’re making to try to get that process rolling again. So we’re concentrating our efforts on what will be needed for storage.”

SPENT-FUEL STORAGE

License extension can mean that utilities will have 20 additional years’ worth of spent nuclear fuel to deal with. In the simplest terms, this means that the nuclear industry has even more reason to support and encourage the U.S. Department of Energy in its efforts to open a repository on schedule and to begin to take possession of this spent fuel. In real terms, however, it means utilities must look at other options for storage of this additional spent fuel.

Constellation Energy

Robert Beall, system manager of Constellation Energy’s independent spent-fuel storage installation (ISFSI), noted that the plant’s spent-fuel pool and offsite storage facility together have storage capability until the year 2017. Thus, the utility feels comfortable with its ability to handle its fuel—*provided the DOE opens a national repository on time.*

“Right now, our position in the queue is the third year after a repository opens. If it opens in 2010, we can begin to ship fuel in 2013. Our plan is to ship the fuel that would be in the spent-fuel pool at that time, since our oldest fuel is being stored in the ISFSI. Thus, shipments to the DOE facility would replace the shipments we currently make to the ISFSI,” Beall stated.

But if the DOE repository does not open on time, the utility does have contingency plans. “We are looking at some new designs of storage canisters from TransNuclear that could possibly extend our storage capability,” Beall noted. “In addition, right now we are licensed to have five sets of modules at our ISFSI, but if storage capacity became a problem, I think we could apply for a license amendment to build a sixth module, which would add between six and nine years of storage capability. That might be the most

practical way to address the issue. However, we have an agreement with the local county that we will store the fuel here only until there is a place to send it, and at the time we anticipated that five modules would be sufficient. We will need to go back to our local community, which has been very supportive of us, and explain that we’ve done everything we can but that we will need to build that sixth module.”

Private spent-fuel storage ventures, such as Private Fuel Storage and Owl Creek, “have been helpful to us, because they are blazing a lot of paths for transportation and centralized storage. But we’re not part of those efforts yet. Of course, we will continue to monitor their progress,” Beall stated.

But, Beall said in conclusion, the best solution is that a federal repository be opened on time. “It’s very important that Yucca Mountain be approved based on sound scientific evidence,” he said. “Every utility is counting on a permanent disposal solution. Yucca Mountain appears to be the answer. There have been no showstoppers over many years of extensive studies. We need to have a permanent solution, and the people in America *want* a solution. We’re paying twice right now for storage, since we are paying the DOE the 1-mill-per-kilowatt-hour fee and we’re paying a lot of money to operate our dry fuel storage facility. Renewed American interest in nuclear power is bringing renewed pressure on Congress to give us Yucca Mountain, or something equivalent.”

Duke Energy

Duke’s Oconee plant has been operating an ISFSI since 1990, McGuire just loaded its first dry-storage cask in the last eight months, and the utility foresees dry stor-

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The Oconee ISFSI.

age will be needed at the Catawba plant before its original 40-year license expires.

David Jones, the utility's Spent-Fuel Program manager, stated that when the utility first looked at siting an ISFSI at McGuire, it took into account a possible additional 20 years of operation. Thus, when it characterized the site, it did characterization work on enough land to accommodate additional storage pads should they become needed. When it comes time to build an ISFSI for Catawba, he said, the utility expects to do the same type of broader characterization. The utility has also begun work on a site expansion effort at the Oconee ISFSI, not only to deal with additional storage needed to take fuel from the plant's original 40-year operating time, but also to provide storage for an additional 20 years of operation.

"We have not laid the site out and put up additional fences, etc., to accommodate an additional 20 years of operation," he cautioned, "but we have done the initial investigations to make sure that there is the capacity there."

Duke, however, is not counting too heavily on the DOE's opening a repository by 2010. As Jones noted, "They breached the contract in 1998, the courts have upheld that they did commit a breach of contract, and the number of utilities with damage claims against the DOE seems to increase by the week. The fact of the matter remains that the DOE contracting officer has never come back to us and given us a new date when they will perform their contractual obligations. The contract requires that when one party experiences a delay, they inform the other party and give a new date when services will be rendered. That has not happened. All we have from the DOE is a vague statement that Yucca Mountain may be operational as soon as 2010."

Thus, he continued, "from a prudent planning standpoint, recognizing the past performance of the DOE, we are not putting a lot of credence in the 2010 date. Instead, in addition to our own efforts, we are monitoring the private efforts for spent-fuel storage, even though we are not part of the utility consortium at Private Fuel Storage. We are briefed on a regular basis by the PFS folks. Owl Creek is less far along, but we continue to monitor that project as well."

However, the utility continues to support the DOE,



Darrell Williams, Entergy project engineer, at the ANO ISFSI. (Photo by Paul Nehrenz, courtesy Entergy)

Jones was quick to state. "We are expending efforts to ensure that they can meet the 2010 date. We continue to communicate on all political fronts; we continue to support various DOE task forces to ensure they are on a success path in their licensing efforts. Just looking at their licensing schedule, however, and recognizing that they are trying to license a first-of-a-kind facility and are not licensing something for 40 years, which is what the NRC is used to, but for thousands of years, we think 2010 is an extremely optimistic schedule—even if the political will were there to support it."

Jones added that the utility is also urging the DOE to look at other approaches to its licensing efforts. "Rather than trying to license the facility for thousands of years right off the bat, why don't we go with a phased licensing approach?" he suggested. "In this way, you might go with an initial 40-year license, or something the NRC is more comfortable with, and during that period you do performance confirmation, collecting data about rock and repository performance. And then you use all that data to support the longer term license application."

In the meantime, Duke communications spokesman Tom Shiel noted, "We intend to safely store our spent fuel for as long as it takes for the DOE to take it." ■

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