Supplying the United Kingdom's new-build program

BY DICK KOVAN

Under an initiative called SC@nuclear, a range of activities is under way to induce British companies to join the new-build supply chain.

When the British government finally gave the go-ahead for a nuclear new-build program in 2008, some major challenges had to be addressed. One was to create a new skilled nuclear workforce; another was to develop a world-class British nuclear supply chain.

Currently, three joint ventures are planning to construct new nuclear plants in the United Kingdom: EDF Energy/Centrica, Horizon Nuclear Power, and NuGeneration Ltd. Only two reactor designs—Areva's EPR and Westinghouse Electric Company's AP1000—are currently being considered, although this may change in the future. The companies involved realize that a major effort is needed to ensure a strong presence of British companies in the supply chain, particularly the smaller companies, which would enter at the Tier 3 and Tier 4 supplier levels (see sidebar below and figure on opposite page).

Of the three joint ventures, EDF Energy/Centrica has a plan to build several EPRs (designated the UK EPR for the United Kingdom) that is well ahead of the others and has a supply chain that is well advanced. According to the United Kingdom's

Roles and responsibilities of the nuclear supply chain

The Essential Guide to the New Build Nuclear Supply Chain, prepared for SC@nuclear by Doosan Babcock and Lloyd's Register, describes the nuclear supply chain for the United Kingdom as follows.

The supply chain is divided into a number of levels, each having its own roles and responsibilities. At the top of the supply chain is the Principal, or Tier 1, contractor. The utility/plant owner, referred to as the licensee, will specify the delivery requirements under formal contractual arrangements with the Tier 1 contractor and will oversee the delivery of the finished products or services. The overriding principle is that it is the responsibility of the licensee to ensure that the products or services being procured are of a satisfactory quality.

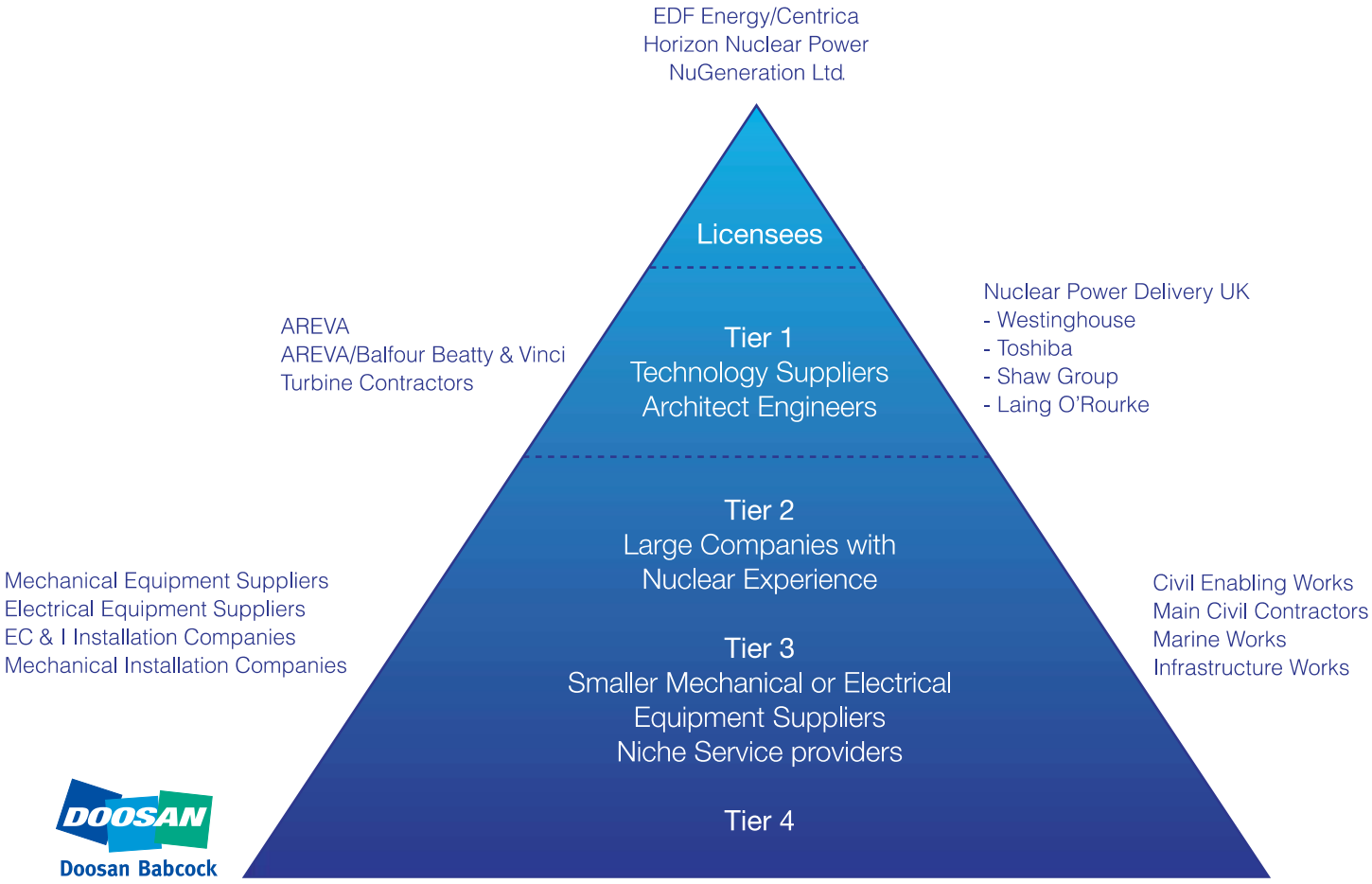
The regulator will expect the licensee to have adequate arrangements to act as an intelligent customer for the products and services being procured; to have arrangements to control the procurement process; and to maintain adequate oversight of the work carried out by the supply chain.

The licensee will clearly specify the requirements through formal contractual arrangements with Tier 1 companies and seek confidence that the Tier 1—and, in turn, the Tier 2—companies have the right processes/competencies/culture for their respective products and services. The licensee is very likely to sample directly down the supply chain to gain this assurance.

Tier 1 companies may wish to have a limited number of major suppliers that can take full responsibility for major packages of work, equipment supply, or installation packages. These Tier 2 companies will usually be large companies with a track record in the nuclear industry. They will deliver the work through the use of their own resources and those of their supply chain. A key requirement for a Tier 2 company is to have a well-managed supply chain of competent Tier 3 and 4 companies, vetted and managed through an approved supply chain process.

In this respect, one of the key roles for Tier 2 companies is in the flow down of the quality arrangements through their own activities and down into their supply chain. In addition to managing the delivery to time and cost specifications, they must instill a nuclear safety culture throughout all of their work and through their supply chains.

The Tier 3 and 4 companies support the Tier 2 companies in the delivery of their packages of work, supplying specialized plant, equipment, or on-site services. In the execution of their work, the Tier 2, 3, and 4 companies must meet the quality, health and safety, and other project delivery requirements as specified by the Tier 1 company and ensure that their contract review, communications, and notification processes are effective. This will ensure that they fully understand the purpose and technical characteristics of the products or services they are providing for the project. They can use their own quality arrangements for this, provided that they meet their client's requirements.—*D.K.*



The nuclear new-build market structure: A key feature of a good nuclear supply chain is that arrangements and requirements specified by the utility/plant owner flow down in a transparent manner through to the smallest subcontractor supplying the smallest component. The regulator may test these arrangements to ensure, among other things, that sufficient, demonstrably competent resources are being deployed at all levels on the project; that there is adherence to the appropriate quality standards; and that a nuclear safety culture runs from top to bottom on the project. It is essential that the Tier 1 companies actively engage with and support the Tier 2, 3, and 4 companies to achieve these objectives. (Graphic: Doosan Babcock/U.K. NIA)

Nuclear Industry Association (NIA), the nuclear steam supply system will be supplied and probably installed by Areva, and the turbine equipment and turbine building will be supplied and installed by the selected turbine contractor. The supply and installation of the remainder of the plant will be procured by EDF directly. This should account for about 60 percent of the total scope of the projects. The company has also engaged with chambers of commerce in the areas around the two sites chosen for the new plants to provide business support to local suppliers interested in joining the supply chain.

EDF has already issued requests of interest in the form of prequalification questionnaires that specifically relate to large packages of work or to the supply of specialized equipment. The large packages are such that Tier 3 and Tier 4 companies are unlikely to prequalify on their own and will need to form consortia or supply agreements with larger Tier 2 companies in order to do so. Exceptions to this are niche service or specialized equipment supply companies. Requests for bids for the main civil engineering and building activities and some of the early mechanical equipment supply have already been issued, and bids have been returned to EDF for evaluation.

Areva has an existing supply chain in which some U.K. companies are already involved. As the projects expand, however, there may be opportunities for Tier 2, 3, and 4 companies.

Horizon Nuclear Power, which is expected to adopt the engineering, procurement, and construction (EPC) project model for the supply of complete power stations, is considering the EPR and AP1000 designs. Both Areva and Westinghouse have aligned with other major companies to assist them in the delivery of their EPC projects. For the AP1000, a joint venture called Nuclear Power Delivery UK, consisting of Westinghouse, Toshiba, the Shaw Group, and Laing O'Rourke, has been established. For the EPR, Areva has teamed with Balfour Beatty/Vinci and Siemens. These joint ventures can be considered Tier 1 contractors that will execute elements of the work while going out to the market to Tier 2 contractors for the supply of some packages. Both are now talking to companies to obtain cost estimates for the work.

New supply chain entrants

At the national level, efforts to interest more British manufacturing and supplier companies in the nuclear new-build market are being led by the NIA, explained John McNamara, head of media and public relations for the organization. The undertaking of such a national campaign is a new activity for the NIA, McNamara explained, and to carry it out, the NIA launched the SC@nuclear initiative, which provides the effort with an independent banner for engaging new U.K. nuclear suppliers. The main aim of the initiative is to raise awareness of the new nuclear market and the potential opportunities it presents in order to help suppliers decide whether participating is a viable option, and if it is, to assist them in joining the supply chain. "The government does not put any money into SC@nuclear but supports it in various ways," he said, such as providing speakers for events that are held to inform companies about the market.

SC@nuclear is run by a committee representing both government and industry. Government organizations include the Department for Business, Innovation and Skills and the Department of Energy and Climate

The Manufacturing Advisory Service

In February 2011, the U.K. Manufacturing Advisory Service (MAS) held a second national nuclear supply chain event in Doncaster. The event, Winning Business in the Nuclear Renaissance, attracted nearly 200 small and medium-sized U.K. manufacturers hoping to gain a foothold in the nuclear sector. Chief executive officers and company directors were provided with advice on what they needed to do to be considered serious contenders for nuclear supplier status. This included understanding where their companies might fit into the supply chain hierarchy, what improvements they may need to make to their systems and processes, advice on the codes and standards required, and what assurances their potential customers would be looking for to ensure that quality and safety were of the requisite standard and were auditable.

The event, explained Taylor-Jayne Fox, MAS's nuclear lead and process improvement practitioner, was held to provide Tier 3 and 4 manufacturers with the information they need "to better understand the nuclear industry and its specific requirements. This will ensure they can make informed strategic business decisions regarding investment of both resources and funds prior to entering the nuclear supply chain."

Speaking on behalf of the Nuclear Industry Association (NIA), Glen Little, director of nuclear new build at Doosan Babcock, assured the attendees that they could participate in nuclear business and that they would find help at the event on how to go about getting involved. He stressed that manufacturing companies with no nuclear experience can be part of the nuclear renaissance. He pointed out that in many cases, they will not have to have a detailed understanding of nuclear codes, but they must understand nuclear delivery and quality processes and adhere to them to be successful. "The supply chain is not just about nuclear new build and decommissioning," Little said. "It is also about building relationships throughout the supply chain so that U.K. industry can maximize the opportunities associated with the nuclear industry."

The meeting included a series of workshops that built on the results of the first MAS nuclear conference held last September, with support from the Nuclear Advanced Manufacturing Research Centre (Nuclear-AMRC) and the NIA. The workshops were Auditing and Assurance Requirements, led by Sellafield Ltd.; Nuclear New Build—EDF Contracting and Tendering, led by NIS Ltd.; Quality, Codes, and Standards, led by Bureau Veritas; and Developing a Nuclear Business Capability, led by Nuclear-AMRC.

Change. Industry interests include the utilities, the main technology providers (Westinghouse and Areva), other Tier 1 companies (such as Doosan Babcock and Rolls-Royce), and the Nuclear Decommissioning Authority (NDA).

The United Kingdom has an advantage in that it already has a world-class global supply chain in place for decommissioning—which is why the NDA has a seat on the committee—and a well-developed supply chain for its currently operating plants. But a sufficient supply chain for nuclear new build is not yet in place. This is the issue that the SC@nuclear initiative addresses, McNamara said, and that underpins the activities that are under way.

The utilities that are planning to build new plants and the main vendors have been actively developing a supply chain to carry out their own projects. This includes holding events in the vicinities of their nuclear sites in order to attract local companies. "We tend to work quite closely with the vendors," McNamara said, "and while their meetings are not SC@nuclear events, we advertise them and make sure there are no conflicts."

Another important effort for promoting the nuclear market is being led by the government's Manufacturing Advisory Service (MAS), which is tasked with helping manufacturing companies find new markets for their products. Nuclear is now firmly on its agenda. In February, MAS held a second national nuclear supply chain event that attracted nearly 200 small and medium-sized U.K. manufacturers (see accompanying sidebar above).

SC@nuclear is also linked to regional business support networks and chambers of commerce. For example, SC@nuclear held an event in Scotland in conjunction with Scottish Enterprise, which is the lead agency for business development there. Another event was held recently near the Sizewell nuclear station, which is earmarked for new units, in conjunction with East of England Energy, a group that represents energy companies in the region.

At SC@nuclear events, speakers describe the nuclear new-build market and explain the critical issues that companies need to negotiate if they are considering taking the plunge. New entrants to the sector, particularly smaller Tier 2 companies and many Tier 3 and Tier 4 companies, have to understand the high standards required in all aspects of work on nuclear projects, including quality assurance, safety, and safety culture, as well as in the production of components, where advanced manufacturing codes and documentation requirements must be met. Without such knowledge, companies will find it difficult to fully assess the challenges in pursuing nuclear opportunities.

Participants are also put directly in touch with those at the head of the supply chain—

The new-build market in the United Kingdom

Currently, three joint ventures are developing plans to construct new power reactors in the United Kingdom. At this time, only two reactor designs—Areva's EPR (designated the UK EPR for the United Kingdom) and Westinghouse Electric Company's AP1000—are being reviewed by the nuclear regulators under the Generic Design Assessment process. Provided they both receive preliminary approvals—expected before the end of this year—the power companies will then be able to submit applications to build either design.

■ EDF Energy (the U.K. subsidiary of Electricité de France) and its partner, Centrica, are proposing to build four UK EPR units, two at Hinkley Point and two at Sizewell, with a total generating capacity of 6.6 GWe. A planning application for the Hinkley Point site is expected to be submitted by the end of 2011, with the first pour of concrete for the first unit expected in 2013 and first power in 2018. Completion of the second reactor at Hinkley Point is anticipated by the end of 2020.

■ Horizon Nuclear Power, a joint venture formed by German utilities E.ON and RWE, plans to construct a total of 6 GWe of new nuclear capacity at two nuclear sites, Wylfa and Oldbury. The company is currently part way through a technology selection process.

■ NuGeneration Ltd., a joint venture formed by GDF Suez, Iberdrola, and Scottish & Southern Energy, has acquired land at the Sellafield site for developing new nuclear capacity. No decision has been made on the technology to be used.—*D.K.*

the vendors and Tier 1 and Tier 2 companies—that attend these events, allowing companies to talk directly with potential partners. These events are designed to encourage business development managers to look at nuclear as a possible market for their products, McNamara said, and they will have to decide whether it is worth further investigating a new market that will require some considerable financial commitment. Nevertheless, he said, "If nuclear plans progress as hoped, then new nuclear construction in the United Kingdom will be huge." The aim is to find and inform new companies, and if possible, encourage them to take the next step by getting on the approved lists of the top-tier companies. This could then lead to signing agreements or even contracts. In fact, McNamara said, feedback suggests that this is already happening.

It is particularly important, he added, that SC@nuclear focus on the social and economic benefits and opportunities that the new nuclear market can offer to companies and the local workforce. "Mobilizing companies to get involved is a very positive activity," McNamara said, "much different from NIA's usual engagement with stakeholders, which tends to concentrate on issues such as, Is nuclear energy needed? Is it low-carbon? Is it safe?" As a result, good union backing and political support are the norm, along with positive media attention.

The events are well publicized and are usually fully booked, McNamara said, and are attended by many companies from sectors such as renewable energy, offshore oil and gas, and the chemical industry. "It is not surprising that marketing managers want to take advantage of these events, which include follow-up with participants afterward in order to develop continuing relationships," he said. "But it is made clear that supply chains will be put in place over the next 18 months to two years, and so if they are interested, they need to act fairly quickly."

There is still a ways to go in getting the needed supply chain in place, McNamara said, particularly to create one that is first class. He added that if the program goes as planned, the United Kingdom will be able to take a fleet approach, building four, six, or eight units concurrently or successively. This provides a massive attraction for companies considering whether to enter the nuclear market. In addition, he said, once part of the U.K. supply chain, opportunities will exist for expansion into the global supply chain.

"This is a process that other countries will have to go through as well," McNamara noted. "Nuclear has to have a first-class supply chain," he added. "The aim is not only to deliver the projects, but also to provide the maximum benefit to the country." NN