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How The NRC's New Licensing Process Will (And Won't) Smooth The Way For Nuclear Plant Construction

Primary Credit Analyst:
Dimitri Nikas, New York (1) 212-438-7807; dimitri_nikas@standardandpoors.com

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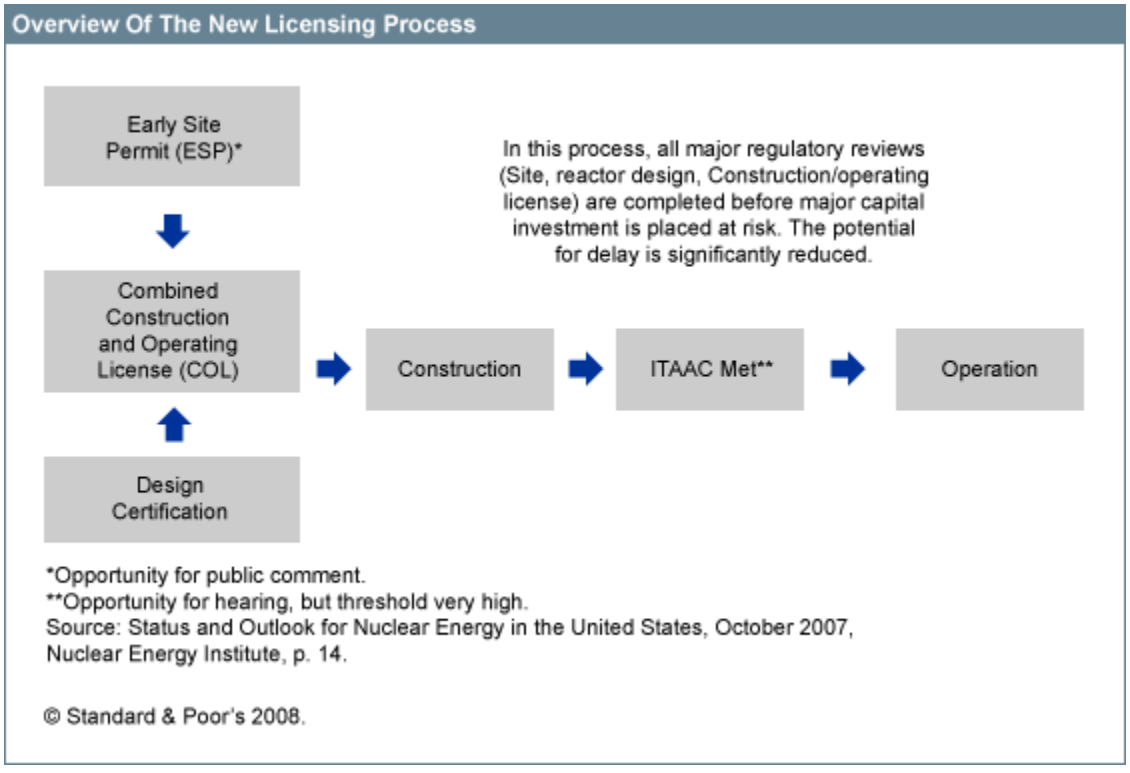
As U.S. electric utilities begin to pursue construction of new nuclear plants, they face a regulatory landscape that has changed drastically since the last reactor was put into service about 20 years ago. The Nuclear Regulatory Commission's (NRC) new licensing framework, along with various new government policies that support the construction of new nuclear power plants, seek to mitigate many of the risks encountered in the previous round of construction. However, this licensing framework remains untested and is bound to be challenged by nuclear energy opponents on many fronts, presenting potential credit risks to the first round of participants.

Combined Construction And Operating License: A Way To Eliminate Delays

In an effort to avoid the lengthy and very costly delays that plagued the last round of nuclear power plants and jeopardized investment, the NRC introduced a three-part licensing process in 1989 that consists of an early site approval or permit, certification of a standardized reactor design, and a combined license for construction and operation of a new nuclear power plant.



The early site approval ensures that a selected site meets all NRC requirements for safety, environmental, and emergency planning issues before a company commits significant capital for a project. Once the site approval is obtained, companies can hold on to it for 20 years and begin construction when market and regulatory conditions

are suitable. Preparation of an early site application can take 12 to 24 months, and the NRC indicates that it will need about 33 months to review the application (1). Companies follow different approaches, and some, such as Dominion for the North Anna site, Entergy Corp. for its Grand Gulf site, and Exelon Corp. for the Clinton site, have already obtained early site approvals for planned units. Others, such as Duke Energy for its William States Lee III Nuclear Station, intend to submit site approval applications along with the combined license for construction and operation.

The second aspect of the new NRC framework is certification of a reactor design that addresses safety issues and is independent of site requirements. Design certification might take between 36 and 60 months, depending on whether the NRC has previously reviewed the technology and is valid for 15 years.

After obtaining the site approval and the design certification, companies still need to get a combined construction permit and operating license (COL) before construction can begin. The COL references a specific certified design and site permit and addresses residual design and safety issues, organizational and operational programs, and construction plans. The NRC estimates that a COL review will take as long as 42 months.

Integral to the NRC's new licensing framework is a series of quantitative inspections and tests (Inspections, Tests, Analyses, and Acceptance Criteria, or ITAAC) which companies must agree to during the design certification and COL processes. The ITAACs are meant to ensure that companies build the plant to the standards and specifications incorporated in the original licensing application. Therefore, given that the NRC has fully scrutinized the specifications and companies have addressed concerns before construction, compliance with the ITAAC conditions should allow the project to begin operations upon completion without any delay.

But In Reality…

Although the NRC's goal is to streamline the application process and eliminate or drastically reduce construction and planning delays by addressing all major issues during the COL review period, the actual COL process has not yet been tested and it is unclear how resistant the process will be to intervention by nuclear energy opponents. Furthermore, the inclusion of ITAACs introduces the potential for regulatory disruption after a company has spent significant amounts of money. Therefore, ideally, the ITAAC period should not be viewed as an opportunity to reexamine issues that have been addressed early on in the approval process, but rather should focus on verifying aspects of the design.

As part of the effort to expedite the application review process, avoid delays, and manage an expected increase in workload, the NRC clearly indicated a preference to receive standardized COL applications. The agency is reported to be hiring new staff to deal with what it expects will be a significant increase in workload, including 15 new COL applications for 22 new units. However, the expectation for standardized applications may not be realized as companies modify aspects of their applications. For example, NRG Energy is planning to use a General Electric reactor that the NRC certified in 1996, and which the company plans to modify in order to reflect recent operating experience and technological advancements. Such a process may require the NRC to recertify the reactor design before it can be used in a new facility, potentially causing delays by allowing challenges to be introduced. Another recent COL filer, Constellation Energy Group Inc., has selected a reactor design that the NRC has not yet certified, the Areva-designed U.S. Evolutionary Power Reactor. In addition, Constellation is pursuing a parallel approval track for the design certification and the COL application, hoping to align the content of the two applications and to maximize the amount of generic information that can be shared across applications, which would increase the

amount of standardization. However, this approach can be problematic because it assumes a smooth NRC approval process and that the applicants have addressed all potential NRC issues.

Yet more delays may arise due to the increasing number of reactor designs that the NRC needs to approve before they can be included or referenced in a COL application. Although initially there were few, there are now five potential designs, some of which the NRC has already approved and some of which the agency is in the process of approving, as shown below.

Status Of Reactor Designs In The U.S.	
AREVA U.S. Evolutionary Power Reactor (EPR)	The U.S. EPR is 1,600-megawatt pressurized water reactor. AREVA submitted this design to the NRC in December 2007 for review and certification.
General Electric Advanced Boiling Water Reactor (ABWR)	The ABWR is a 1,350-1,600 megawatt boiling water reactor. The NRC has certified the design.
General Electric Economic Simplified Boiling Water Reactor (ESBWR)	The ESBWR is a 1,520-megawatt boiling water reactor. The NRC is reviewing this design and expects to issue certification in 2009.
Mitsubishi Heavy Industries Ltd. U.S.-Advanced Pressurized Water Reactor (APWR)	The U.S.-APWR is a 1,700-megawatt pressurized water reactor. Mitsubishi submitted this design to the NRC for review and certification in February 2008.
Westinghouse AP1000	The AP1000 is a 1,117-1,154 megawatt pressurized water reactor. The NRC has certified the design.

Source: New Reactor Designs, Nuclear Energy Institute 2007

The increasing number of available reactor designs reflects the industry's efforts to improve operational efficiency, safety, and economics. However, the new designs may make it harder for the NRC to certify them all on a timely basis. According to a September 2007 report by the Government Accountability Office, even though the NRC has arranged for sufficient staff to conduct design certification reviews in parallel with the COL reviews, designs that have not yet been approved or are in need of modifications or changes are likely to test the agency's resources and staff (2). To address the potential for delays outside a company's control, such as litigation or failure by the NRC to meet license review schedules, the federal government through the Energy Policy Act of 2005 can provide standby support that will pay for debt service and other costs, including open market power purchases necessary to meet supply obligations, for the first six new plants (up to $500 million for each of the first two new plants and up to $250 million for each of the next four).

To some extent, a parallel path for design certification and COL review is inevitable due to the:

- Need for timely construction of new generation to meet increasing demand;
- Competition for financial incentives offered by the federal government in order to provide a boost to new plant construction; and
- Competition from abroad as nuclear power plant construction around the world threatens to increase costs and create significant delays for reactor vessels and tubings which only a limited number of foundries around the world can fabricate.

Even With Delays, New Reactors Will Be Built

As more companies submit their COL applications to the NRC, the next few years will be crucial in providing industry participants with insight into the agency's ability to comply with proposed review schedules as well as unexpected developments. At the same time, companies will have to decide if they will be better off submitting

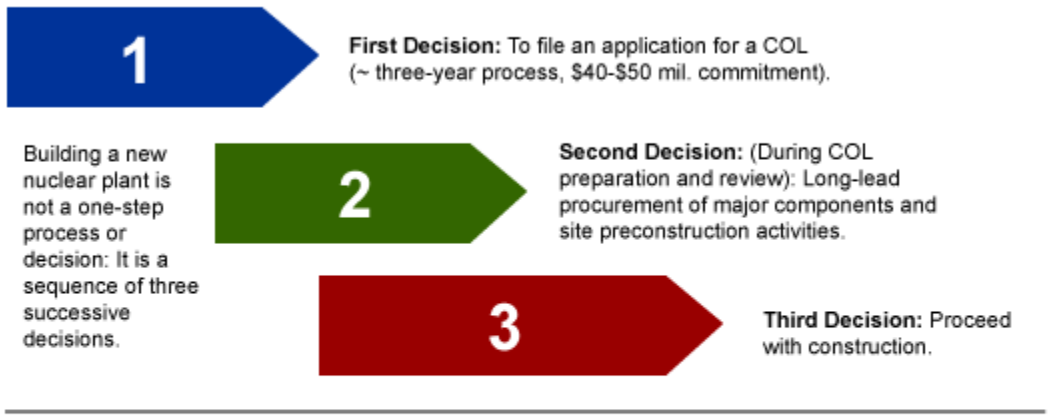
applications that deviate from the expected standards or standardized applications that will contribute to an expeditious approval process. Finally, amid preparations for new construction, companies will have a better idea of how suppliers in the global supply chain (component fabricators, engineering specialists, and craft laborers) will respond to the increasing demand. Eventually, these parties may be the ones dictating the pace of new construction and contributing to the final cost of construction.

Despite these uncertainties, and the potential for construction delays given the complex nature of nuclear power plants, at this point, Standard & Poor's believes that at least a handful new nuclear power plants will be successfully completed by 2020. Within this time frame, companies will be able to use not only the standby support mentioned earlier, but other incentives such as available loan guarantees for up to 80% of the project costs and a production tax credit of $18/MWh for the first 6,000MW of capacity.

COL Implications For Credit Quality

While companies can expect to incur some expenses in preparation for a COL, these should not be significant enough to adversely affect credit quality. Cost estimates for a COL application are in the range of $40 million - $80 million. At the same time, companies may start on the procurement of certain long-lead items such as reactor pressure vessels, steam turbine generators, and commodities such as steel (3). Importantly, at this stage of the licensing process, most companies pay to reserve a place in a manufacturer's queue, which does not obligate them to pursue construction as such items can be traded with other companies whose construction schedules may be more aggressive. Therefore, companies have an exit strategy, and in the worst case, can end up holding a COL license which becomes an asset. Therefore, the current licensing framework developed by the NRC provides participants with some flexibility in controlling project costs and the opportunity to terminate their involvement before costs rise rapidly, thereby preserving credit quality.

Roadmap To Commercial Operation



Source: Status and Outlook for Nuclear Energy in the United States, October 2007, Nuclear Energy Institute, p. 14.

Notes

(1) Licensing New Nuclear Plants Fact Sheet, September 2007, Nuclear Energy Institute.

(2) "NRC's Workforce and Processes for New Reactor Licensing Are Generally in Place, but Uncertainties Remain as Industry Begins to Submit Applications," U.S. Government Accountability Office Report To Congressional Committees, September 2007, p. 27.

(3) "Status and Outlook for Nuclear Energy in the United States," October 2007, Nuclear Energy Institute, p. 13.