



Southern Company

Technology Inclusive Content of Application Project For Non-Light Water Reactors

Topic Report

Sufficiency of Needed Information for Construction Permit Applications

Document Number
SC-16166-300 Rev 0

July 2021

Battelle Energy Alliance, LLC (BEA)
Contract No. 221666
SOW-16166

Prepared for:
U.S. Department of Energy (DOE)
Office of Nuclear Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517



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Issued by:

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July 2, 2021

Date

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1.0 Introduction

In applying for a construction authorization for a utilization facility (e.g., a nuclear power reactor), the question arises as to the scope and specificity of information required to obtain a construction permit under the long-standing two-phase licensing process of 10 CFR Part 50. Unlike the combined license established under 10 CFR Part 52 in 1989 that requires substantially more complete information to support the issuance of a license that authorizes construction and provides provisional operating authority, the Part 50 process does not require a “complete” design at the construction permit phase. However, even though final design details and ultimate determination of the acceptability of the design may not be required until the operating phase, the Part 50 process does not merely allow the deferral of addressing important design aspects until the operating license application. Although it may be difficult to precisely define the depth and scope of information required, a bare “IOU” in the construction permit application is insufficient.

2.0 Applicable Statutes and Regulations

The Atomic Energy Act of 1954 (AEA), as amended, 42 USC 2011 *et seq.*, establishes the bases for issuing licenses and permits as well as procedural requirements. The provisions relating to construction permits had their origins in the Communications Act of 1934.¹ Under Section 185a., 42 USC §2235(a), applicants must initially be granted a construction permit for construction of a utilization facility.² Thereafter, Section 185a. provides the following:

Upon the completion of the construction or modification of the facility, *upon the filing of any additional information needed to bring the original application up to date*, and upon finding that the facility authorized has been constructed and will operate in conformity with the application as amended and in conformity with the provisions of this Act and of the rules and regulations of the Commission, and in the absence of any good cause being shown to the Commission why the granting of a license would not be in accordance with the provisions of this Act, the Commission shall thereupon issue a license to the applicant.

As reflected in the above-italicized text from Section 185a., the AEA contemplates that there may be a need for additional information to be supplied after the construction permit is issued but before the grant of an operating license.

The process for filing an application for a construction permit for a production or utilization facility is described in 10 CFR 2.101 in the Nuclear Regulatory Commission’s (NRC’s) regulations. Further requirements applicable to the content of the application for a construction permit are specified in 10 CFR Part 50. For example, the applicant must provide, *inter alia*, information in its Preliminary Safety Analysis Report (PSAR) that addresses the following:³

¹ See Harold P. Green, “The Law of Reactor Safety,” 12 Vanderbilt Law Review 115, 122 (1958).

² Section 185 was modified in 1992 to codify the process relating to issuance of combined licenses in section 185b., 42 USC 2185(b). See P.L. 102-486, 106 Stat. 3120 (1992).

³ 10 CFR 50.34(a)(1)(ii). See also 10 CFR 50.33 and 50.34a.

- A description and safety assessment of the site and a safety assessment of the facility
- The extent to which the reactor incorporates unique, unusual, or enhanced safety features
- The safety features that are to be engineered into the facility and those barriers that must be breached as a result of an accident before a release of radioactive material to the environment can occur
- A summary description and discussion of the facility, with special attention to design and operating characteristics, unusual or novel design features, and principal safety considerations
- The preliminary design of the facility, including the principal design criteria for the facility and the design bases and the relation of the design bases to the principal design criteria
- A preliminary analysis and evaluation of the design and performance of structures, systems, and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents.

As further elaborated in Appendix A to Part 50, “General Design Criteria for Nuclear Power Plants,” the “principal design criteria establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety; that is, structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public.”

The regulations recognize that not all information bearing on the design or necessary to make the ultimate safety findings required at the operating license phase may be available for consideration at the construction permit phase. In this regard, the Commission may issue a construction permit as provided in 10 CFR 50.35(a) if it finds that:

- “the applicant has described the proposed design of the facility, including, but not limited to, the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public”
- “such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration, will be supplied in the final safety analysis report”
- “safety features or components, if any, which require research and development have been described” and “a research and development program reasonably designed to resolve any safety questions associated with such features or components” has been identified and will be conducted
- On the basis of the foregoing criteria, “there is reasonable assurance that, (i) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of construction of the proposed facility, and (ii) taking into consideration

the site criteria contained in part 100 of this chapter, the proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public.”

3.0 Early History

The approach of allowing authorization of a construction permit with less-than-complete design information or analysis has its origins in the earliest days of nuclear regulation. The Atomic Energy Commission’s (AEC’s) initial rules on facility licensing reflect such an approach.⁴ At that time, the purpose of 10 CFR 50.35 was labeled “Extended time for providing technical information,” and the rule required an applicant, if it were unable to provide all the required technical information, to “indicate the reason, the kind of information omitted, and the approximate times when such data will be produced.” If the Commission was satisfied that the existing information was sufficient to provide reasonable assurance that a facility of the general type proposed could be constructed and operated at the proposed site without undue risk to public health and safety and that the omitted information would be supplied, then the Commission would issue a construction permit “on a provisional basis.”⁵

Controversy arose early in the AEC’s licensing reviews over the approach of deferring the evaluation of a more “complete” design and the submittal of critical information until the consideration of an operating license. In its consideration of Power Reactor Development Corporation’s (PRDC’s) application to construct a fast breeder reactor (Fermi Unit 1) near Detroit, Michigan, the AEC was challenged on a number of procedural matters in its handling of the construction permit for the facility. In particular, the intervenors who opposed the AEC’s issuance of a provisional construction permit challenged the approach in 10 CFR 50.35 of allowing issuance of the permit in the absence of “complete” information as inconsistent with the AEA. The dispute eventually made its way to the Supreme Court in the seminal case *PRDC v. International Union*.⁶ In its decision, the Court reversed a federal appeals court decision that had overturned the AEC’s decision authorizing the provisional construction permit.⁷ In deciding “whether the Commission, in issuing a permit for the construction of a facility which will utilize nuclear materials, such as the power reactor presently involved, must make the same definitive finding of safety of operation as it admittedly will have to make before it licenses actual operation of the facility,” the Court sustained the AEC’s approach under Section 50.35 that allowed the Commission to defer a definitive safety finding until the operating license phase.⁸

The current text of Section 50.35 has its roots in the 1960s when the issuance of the authorization in such circumstances was deemed a “provisional construction permit,” a term used until 1970. See the following AEC Final Rules:

⁴ See AEC, “Part 50 – Licensing of Production and Utilization Facilities,” 21 Fed. Reg. 355, 357-58 (Jan. 19, 1956).

⁵ For a contemporaneous and, at times, critical commentary on the early licensing procedure, see Green, “The Law of Reactor Safety,” *supra* note 1, which was cited in the PRDC decision, *infra*, 367 US at 405.

⁶ *PRDC v. International Union*, 367 US 396 (1961).

⁷ *International Union v. United States*, 280 F.2d 645 (D.C. Cir. 1960). The AEC’s final decision that reached judicial scrutiny was published in the AEC’s reports. In re PRDC, 1 AEC 128 (1959).

⁸ 367 US at 398, 407.

- “Issuance of Provisional Construction Permits,” 27 Fed. Reg. 12915 (Dec. 29, 1962), retitling §50.35 as “Issuance of provisional construction permits” and providing criteria closer to the current wording
- “Miscellaneous Amendments to Parts 2, 50, 55, and 115,” 31 Fed. Reg. 12774, 12780 (Sept. 30, 1966), substituting the words “safety analysis report” for the words “hazards summary report” in various Part 50 regulations
- “Backfitting of Production and Utilization Facilities; Construction Permits and Operating Licenses,” 35 Fed. Reg. 5317 (March 31, 1970), ending provisional construction permit terminology and reflecting essentially current text in §50.35 (a) and (b)
- “Miscellaneous Amendments,” 35 Fed. Reg. 6644 (April 24, 1970)

The brief explanations for the proposed and final rules provided in the official notices published in the Federal Register provide no significant additional insight into the minimum level of information to be provided in the PSAR.

4.0 Interpretation and Guidance on Scope of Required Information

Some interpretation of the needed depth of information can be gleaned from NRC administrative adjudications of licensing applications. Perhaps of most relevance, the Atomic Safety and Licensing Appeal Board⁹ addressed the question in *Gulf States Utilities Co.* (River Bend Station, Units 1 & 2).¹⁰ In rejecting challenges to the sufficiency of the information provided in the River Bend construction permit application and the NRC staff’s evaluation, the Appeal Board noted with respect to the decision of a licensing board on an application before it:

[W]hether the absence of information not explicitly required to be supplied at the construction permit stage will stand in the way of permit issuance authorization hinges upon the ability of the licensing board to find, without more than has been placed before it, the existence of reasonable assurance both (a) that there will be a satisfactory resolution of the outstanding safety questions prior to operation of the facility, and (b) that that operation will not present undue risk to the public health and safety ...

[T]his ultimate “reasonable assurance” finding cannot be made on the strength of (1) a naked promise that any unresolved safety questions will be dealt with at some later time; or (2) the statement, without more, that work on the questions is in progress. To the contrary, irrespective of whether it is the staff, the applicant, a reactor vendor or yet another instrumentality (such as a national laboratory) which has undertaken the search for a solution, the licensing board very likely will need to have at its disposal

⁹ The Appeal Board operated as an intermediary appellate tribunal within the AEC and NRC from October 1972 through June 1991. During this period, it acted as the primary tribunal addressing appeals from Atomic Safety and Licensing Board decisions in licensing and other regulatory adjudications. Although Appeal Board decisions were subject to review by the full Commission, such decisions are considered authoritative precedent absent further modification or reversal by the Commission.

¹⁰ ALAB-444, 6 NRC 760 (1977).

information of the stripe which, in the preceding section of this opinion, we have suggested be included in the staff SER [Safety Evaluation Report].¹¹

The Appeal Board's reasoning underscores the need for substantial, if not wholly final, content in the application.¹²

Regulatory guidance on addressing the content of the PSAR is provided in the last version of NRC Regulatory Guide 1.70, Part 1, "Standard Form and Content of Safety Analysis Reports for Nuclear Power Plants – LWR Edition" (Rev. 3, 1978).¹³ Although the regulatory guide has not been updated since 1978 and applies particularly to LWRs, NRC specifically references Regulatory Guide 1.70 as providing "detailed guidance to the writers of safety analysis reports to allow for the standardization of information the NRC requires for granting construction permits and operating licenses."¹⁴ Regulatory Guide 1.70, pp. iv-v, provides the general guidance at the outset that:

The design information provided in the SAR should reflect the most advanced state of design at the time of submission. If certain information identified in the Standard Format is not yet available at the time of submission of a PSAR because the design has not progressed sufficiently at the time of writing, the PSAR should provide the criteria and bases being used to develop the required information, the concepts and alternatives under consideration, and the schedule for completion of the design and submission of the missing information. In general, the PSAR should describe the preliminary design of the plant in sufficient detail to enable a definitive evaluation by the staff as to whether the plant can be constructed and operated without undue risk to the health and safety of the public.

5.0 More Recent Experience

Since the late 1970s, the only examples of using the two-stage approach under Part 50 have been two medical radioisotope irradiation and processing facilities that were issued construction permits, respectively SHINE Medical Technologies, Inc., and Northwest Medical Isotopes. For

¹¹ *Id.* at 777-78.

¹² The Appeal Board's decision was focused in large part on the significance of open unresolved safety issues or generic issues that might have a bearing on the ultimate question of the proposed facility's safety (6 NRC at 775). The Appeal Board (6 NRC at 777) cited in its decision an earlier Commission decision, Department of Water and Power of the City of Los Angeles (Malibu Nuclear Plant, Unit No. 1), 3 AEC 179 (1967), which vacated the issuance of a provisional construction permit given the absence of certain design criteria that the Commission deemed necessary as part of the principal architectural and engineering criteria for the design. See 3 AEC at 186.

¹³ Similar guidance was provided by the AEC. See, e.g., AEC, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," Rev. 1, Section 1.5, "Requirements for Further Technical Information" (Oct. 1972), noting the earlier AEC "Guide to the Organization and Contents of Safety Analysis Reports" (June 30, 1966). The 1972 AEC guide, Foreword, p. I, noted the need to provide additional guidance to address the concern that the "AEC regulatory staff has found that most SARs as initially submitted do not provide sufficient information to permit the staff to conclude its review and it has been necessary for the staff to make specific requests for additional information."

¹⁴ NRC Regulatory Guide 1.233, "Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light-Water Reactors," p. 2 (June 2020).

example, in the summary chapter of the NRC staff's SER, for the SHINE facility,¹⁵ the staff noted, "For the purposes of issuing a construction permit, the SHINE facility may be adequately described at a functional or conceptual level in the PSAR. As such, SHINE has deferred providing many design and analysis details until the submission of its FSAR [Final Safety Analysis Report] with its operating license application." Further, the staff explained, "The staff may issue RAIs [requests for additional information] if it determines that it is necessary for the applicant to acknowledge certain technical deficiencies that could impact final design. Appropriate responses to these RAIs include commitments to resolving these deficiencies either in the FSAR or before the completion of construction."¹⁶ The staff outlined the extent to which it would require other information or research:

Appendix A contains a listing of those elements of design, analysis, and administration identified as requiring additional research and development or correction by the applicant through its Issues Management Report System. The staff has determined that while resolution of these items is not necessary for the issuance of a construction permit, it is the responsibility of the applicant to ensure that these items have been fully addressed in the FSAR supporting the issuance of an operating license. The staff is tracking these items as regulatory commitments and will verify their implementation during the review of SHINE's operating license application. However, the staff has determined that additional information is needed to address certain matters related to nuclear criticality safety and radiation protection in the RPF. Accordingly, the staff is proposing that the construction permit be conditioned upon SHINE providing information related to nuclear criticality safety and radiation protection, as described in Appendix A of this SER. The proposed conditions of the construction permit are confirmatory in nature and must be satisfied prior to the completion of construction.¹⁷

See also SER for Northwest Medical Isotopes, NUREG-2229, Sec. 1.2 (2020).

In both cases, the Commission approved the issuance of construction permits based on a finding of the adequacy of the information, i.e., the sufficiency of the principal design criteria and the identification of additional research necessary to make the final safety assessment at the operating license stage. See SHINE Medical Technologies, Inc., CLI-16-04, 83 NRC 58 (2016) and Northwest Medical Isotopes, CLI-18-06, 87 NRC 130 (2018).

6.0 Conclusions

In summary, there are no bright lines that establish with absolute certainty the needed information for the PSAR, but it is clear that a mere promise to address the matter at the operating license stage or work on it later will not suffice. Although it may be difficult to define precisely the depth and scope of information required to satisfy the preliminary findings in 10 CFR 50.35, it is clear that sufficient information to describe the facility's overall design,

¹⁵ NUREG 2189, p. 1-6 (2016).

¹⁶ *Id.*, p. 1-7.

¹⁷ *Id.*, p. 1-11.

safety parameters, and the approach to filling in the gaps (e.g., through research) are necessary for the application to be successful. The sufficiency of information will likely depend on the depth of information provided for related systems, which may interact with portions of the design for which less detail is available. As suggested in existing guidance documents, as well as by historical and more recent experience, it seems clear that the applicant will need to specify in some detail those areas for which design or other details are only preliminary and not sufficient to support an FSAR and further outline the approach to ensuring their resolution.