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15.0 Financial Qualifications

Financial qualifications establish whether an applicant is financially qualified to own, construct, operate, and decommission a non-power production or utilization facility. Financial qualifications related to the issuance of a construction permit include estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs.

This chapter of the SHINE Medical Technologies, Inc. (SHINE) construction permit (CP) safety evaluation report (SER) describes the review and evaluation of the U.S. Nuclear Regulatory Commission (NRC) staff (the staff) of SHINE's financial qualifications, as presented in Chapter 15, "Financial Qualifications," of the SHINE PSAR, as supplemented by the applicant's responses to requests for additional information (RAIs).

15.1 Areas of Review

SER Chapter 15, "Financial Qualifications," provides an evaluation of SHINE's financial ability to construct its proposed facility, as presented in SHINE PSAR Chapter 15, within which, SHINE describes its financial ability to construct, operate and decommission the SHINE facility and provides information regarding foreign ownership, control, or domination (FOCD), as well as nuclear insurance and indemnity.

The staff reviewed PSAR Section 15.1, "Financial Ability to Construct the SHINE Facility," against applicable regulatory requirements using regulatory guidance and standards to assess the sufficiency of the financial qualification (FQ) related to the construction of the SHINE facility. As part of this review, the staff evaluated information and discussions of SHINE's FQ, with special attention to the financial ability of the applicant to cover costs of construction.

Areas of review for this section included estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs. SHINE provided additional information related to its financial ability operate and decommission the SHINE facility, as well as information related to FOCD and nuclear insurance and indemnity. These areas are outside the scope of the financial qualifications necessary for issuing a construction permit, and therefore, will be evaluated further during the review of SHINE's operating license application.

15.2 Summary of Application

PSAR Section 15.1 presents information related to SHINE's financial ability to construct its facility, including discussions demonstrating that it possesses, or has reasonable assurance of obtaining, the funds necessary to cover estimated construction costs and related fuel cycle costs. This section also provides budgetary estimates based on the preliminary design of the SHINE facility and the various committed sources of financing, including equity, debt and government grants.

PSAR Section 15.2, "Financial Ability to Operate the SHINE Facility," presents information demonstrating that SHINE possesses, or has reasonable assurance of obtaining, the funds necessary to cover estimated operating costs for the duration of the license. SHINE provides estimates for the total annual operating costs for each of the first 5 years of operation of the facility.

PSAR Chapter 15.3, "Financial Ability to Decommission the SHINE Facility," presents information indicating how reasonable assurance will be provided that funds will be available to decommission the facility.

PSAR Sections 15.4, “Foreign Ownership, Control, or Domination,” presents information regarding the makeup of the private corporation, from shareholders to board members.

PSAR Section 15.5, “Nuclear Insurance and Indemnity,” presents information indicating that SHINE is covered by the insurance and financial protection requirements of the Price-Anderson Act, pursuant to Section 170 of the Atomic Energy Act (AEA) of 1954, as amended.

Additional information related to SHINE’s financial qualifications, related to the requirements of 10 CFR 50.33, was submitted by letter dated March 26, 2013, as most recently updated by letter dated September XX, 2015.

As stated above, areas of review for this section included estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs. The additional information SHINE provided related to its financial ability to operate and decommission the SHINE facility; as well as information related to FOCD and nuclear insurance and indemnity, is outside the scope of the financial qualifications necessary for issuing a construction permit, and therefore, will be evaluated further during the review of SHINE’s operating license application.

15.3 Regulatory Basis and Acceptance Criteria

The staff reviewed SHINE PSAR Chapter 15 against applicable regulatory requirements, using regulatory guidance and standards, to assess the sufficiency of SHINE’s FQ in support of the issuance of a construction permit in accordance with the requirements of the Atomic Energy Act of 1954, as amended, and Title 10 of the *Code of Federal Regulations* (10 CFR).

15.3.1 Applicable Regulatory Requirements

The applicable regulatory requirements for the evaluation of the SHINE’s FQ are as follows:

- 10 CFR 50.33
- 10 CFR Part 50, Appendix C, “A Guide for the Financial Data and Related Information Required to Establish Financial Qualifications for Construction Permits and Combined Licenses”

15.3.2 Regulatory Guidance and Acceptance Criteria

The NRC staff evaluated SHINE’s FQ against the applicable regulatory requirements listed above primarily using the guidance and acceptance criteria contained in Chapter 15, “Financial Qualifications,” of NUREG-1537, Part 1, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content,” issued February 1996 (Reference 4), and NUREG-1537, Part 2, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Standard Review Plan and Acceptance Criteria,” issued February 1996 (Reference 5), as well as the “Final Interim Staff Guidance [ISG] Augmenting NUREG-1537, Part 1, ‘Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors: Format and Content,’ for Licensing Radioisotope Production Facilities and Aqueous Homogeneous Reactors,” dated October 17, 2012 (Reference 6), and “Final Interim Staff Guidance Augmenting NUREG-1537, Part 2, ‘Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors: Standard Review Plan and Acceptance Criteria,’ for Licensing Radioisotope Production Facilities and Aqueous Homogeneous Reactors,” dated October 17, 2012 (Reference 7).

15.4 Review Procedures, Technical Evaluation, and Evaluation Findings

As described in SHINE PSAR Chapter 15, for the purposes of issuing a construction permit, financial qualifications establish SHINE's financial ability to construct its facility, including discussions demonstrating that it possesses, or has reasonable assurance of obtaining, the funds necessary to cover estimated construction costs and related fuel cycle costs. The technical evaluation provided below in Sections 15.4.1 through 15.4.5 applies to the SHINE facility.

The staff performed an evaluation of the financial information presented in SHINE PSAR Section 15, as supplemented by information provided in letter dated **September XX, 2015** and the applicant's responses to RAIs, to assess the sufficiency of SHINE's FQ in support of the issuance of a construction permit, in accordance with 10 CFR 50.33 and Appendix C to Part 50. The sufficiency of the SHINE's financial qualification information is demonstrated by compliance with applicable regulatory requirements, guidance, and acceptance criteria, as discussed in Section 15.3, "Regulatory Basis and Acceptance Criteria," of this SER. The results of this technical evaluation are described in SER Section 15.5, "Summary and Conclusions."

As stated above, areas of review for this section included estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs. The additional information SHINE provided related to its financial ability to operate and decommission the SHINE facility, as well as information related to FOCD and nuclear insurance and indemnity is outside the scope of the financial qualifications necessary for issuing a construction permit, and therefore, will be evaluated further during the review of SHINE's operating license application.

15.4.1 Financial Ability To Construct the SHINE Facility

The staff evaluated the sufficiency of SHINE's financial ability to construct the SHINE facility, as described in SHINE PSAR Section 15.1, "Financial Ability To Construct the SHINE Facility," using the guidance and acceptance criteria from Section 15.1, "Financial Ability to Construct a Non-power Reactor," of NUREG-1537, Parts 1 and 2, and the ISG Augmenting NUREG-1537, Parts 1 and 2.

Consistent with the review procedures of NUREG 1537, Part 2, Section 15.1, the staff evaluated the applicant's estimates of construction cost, including calculations of the design architect or the engineering company, and construction bids; estimates of fuel cycle costs related to the target solution; sources of construction funding, including the amounting of funding that is committed, and the amount that is potentially available; and a breakdown of costs into major cost elements, such as material and labor, and include a detailed schedule of construction activity in today's dollars.

In the course of reviewing SHINE's estimates of construction costs, the staff determined that additional information was necessary on the bases for the total production plant costs, support facility costs, plant equipment, and 1-year supply of uranium inventory, in order to determine the adequacy of SHINE's estimated construction costs. This information was necessary to demonstrate compliance with 10 CFR Part 50, Appendix C.I.A.1, "Estimate of Construction Costs," which states that the estimate of construction costs for production and utilization facilities other than nuclear power reactors should be itemized by categories of cost in sufficient detail to permit an evaluation of its reasonableness. Therefore, in RAI FA-1 (Reference 14), SHINE was asked to provide additional information on the bases from which its construction cost estimates were derived.

In response to RAI FA-1 (Reference 20), and pursuant to 10 CFR 50.33(f)(1) and 10 CFR Part 50, Appendix C, Section I.A.1, "Estimate of construction costs," the applicant outlined the projected costs for the construction of the proposed facility in Table FA-1-1, "Revised Estimate of Construction Costs."

The applicant described the basis for each element of the estimate in the table. According to the application, the total plant production plant costs and plant equipment cost estimates were prepared by M.A. Mortenson Company (Mortenson), SHINE's construction consultant. The consultant is an established construction company that provides planning, program management, preconstruction, general contracting, construction management, design-build, and turnkey development across a variety of industries. The support facility costs estimate uses standard construction cost of \$130-135/square foot and includes items such as a parking lot, utility hookups, and architect fees.

Additionally, according to the SHINE PSAR, as further clarified in response to RAI FA-1, the initial price of low enriched uranium was provided by the U.S. Department of Energy, National Nuclear Security Administration Production Office at Y-12 national Security Complex in Oak Ridge, Tennessee. The price provided was used by SHINE as the basis to calculate an approximate cost for a one year supply.

The staff finds this response demonstrates an adequate basis for SHINE's construction cost estimates and satisfies the requirements of 10 CFR 50.33(f)(1) and 10 CFR Part 50, Appendix C, Section I.A.1.

Pursuant to 10 CFR, Part 50, Appendix C, I.A.2, "Source of construction funds" and as described in SHINE PSAR Section 15.1, SHINE has obtained financing for its development and construction project using various sources of financing, including equity, debt and government grants. As of the time of this evaluation, SHINE has received at least \$58 million in commitments, including:

- a. Cost sharing agreement with the DOE/NNSA: \$25 million
- b. Equity financing raised to-date: \$11.4 million
- c. Alliant Energy shared savings program loan: \$4.8 million
- d. State of Wisconsin Enterprise Zone Tax Credits: \$11.2 million
- e. City of Janesville loan packages/guarantees: \$4.6 million
- f. 90 acres of land for the building site provided by Janesville: \$1.0 million

In addition to these commitments, SHINE is in the process of obtaining additional equity capital investments. SHINE expects to finance the construction of the facility under either a short-term lease, debt agreement, or both.

On the basis of its review, the staff finds the level of detail provided on SHINE's financial qualifications for construction is reasonable and satisfies the applicable acceptance criteria of NUREG-1537, Part 2, Section 15.1 and the ISG Augmenting NUREG-1537, Part 2, Section 15.1, allowing the staff to make the following relevant findings: (1) the applicant has supplied financial information for construction and fuel cycle costs; and (2) there is reasonable assurance that funds will be made available to construct and cover fuel cycle costs for the facility and that the financial status of the applicant regarding construction and fuel cycle costs is in accordance with the requirements of 10 CFR 50 33(f).

Therefore, the staff finds that SHINE's FQ for construction, as described in SHINE PSAR Section 15.1, meets the applicable regulatory requirements and guidance to support of the issuance of a construction permit in accordance with 10 CFR 50.33.

15.4.2 Financial Ability To Operate the SHINE Facility

The staff evaluated the sufficiency of SHINE's financial ability to operate the SHINE facility, as described in SHINE PSAR Section 15.2, "Financial Ability to Operate the SHINE Facility," using the guidance and acceptance criteria from Section 15.2, "Financial Ability to Operate a Non-power Reactor," of NUREG-1537, Parts 1 and 2, and the ISG Augmenting NUREG-1537, Parts 1 and 2.

As stated above, areas of review for this section included estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs. The additional information SHINE provided related to its financial ability to operate the SHINE facility is outside the scope of the financial qualifications necessary for issuing a construction permit, and therefore, will be evaluated further during the review of SHINE's operating license application.

15.4.3 Financial Ability To Decommission the SHINE Facility

The staff evaluated the sufficiency of SHINE's financial ability to decommission the SHINE facility, as described in SHINE PSAR Section 15.3, "Financial Ability to Decommission the SHINE Facility," using the guidance and acceptance criteria from Section 15.3, "Financial Ability to Decommission a Non-power Reactor," of NUREG-1537, Parts 1 and 2, and the ISG Augmenting NUREG-1537, Parts 1 and 2.

As stated above, areas of review for this section included estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs. The additional information SHINE provided related to its financial ability to decommission the SHINE facility is outside the scope of the financial qualifications necessary for issuing a construction permit, and therefore, will be evaluated further during the review of SHINE's operating license application.

15.4.4 Foreign Ownership, Control, or Domination (FOCD)

The staff evaluated the sufficiency of SHINE's description of FOCD considerations, as presented in SHINE PSAR Section 15.4, "Foreign Ownership, Control, or Domination (FOCD)," using the guidance and acceptance criteria from Section 15.4, "Foreign Ownership, Control, or Domination (FOCD)," of NUREG-1537, Parts 1 and 2, and the ISG Augmenting NUREG-1537, Parts 1 and 2.

As stated above, areas of review for this section included estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs. The additional information SHINE provided related to FOCD is outside the scope of the financial qualifications necessary for issuing a construction permit, and therefore, will be evaluated further during the review of SHINE's operating license application.

15.4.5 Nuclear Insurance and Indemnity

The staff evaluated the sufficiency of SHINE's nuclear insurance and indemnity considerations, as described in SHINE PSAR Section 15.5, "Nuclear Insurance and Indemnity," using the guidance and acceptance criteria from Section 15.5, "Nuclear Insurance and Indemnity," of NUREG-1537, Parts 1 and 2, and the ISG Augmenting NUREG-1537, Parts 1 and 2.

As stated above, areas of review for this section included estimates of construction costs, estimates of fuel cycle costs, and sources to cover costs. The additional information SHINE provided related to nuclear insurance and indemnity is outside the scope of the financial qualifications necessary for issuing a construction permit, and therefore, will be evaluated further during the review of SHINE's operating license application.

15.5 Summary and Conclusions

The staff evaluated the descriptions and discussions of SHINE FQ, as described in Chapter 15 of the SHINE PSAR, as supplemented by information provided in letter dated September XX, 2015, and the applicant's responses to RAIs, and finds that SHINE has: (1) supplied financial information for construction and fuel cycle costs, and (2) provided reasonable assurance that funds will be made available to construct and cover fuel cycle costs for the facility and that the financial status of the applicant regarding construction and fuel cycle costs is in accordance with the requirements of 10 CFR 50.33(f), and therefore, meets all applicable regulatory requirements and acceptance criteria in NUREG-1537 and the ISG augmenting NUREG-1537.

Therefore, the staff has concluded that SHINE has demonstrated adequate FQ for construction, to support of the issuance of a construction permit in accordance with 10 CFR 50.33.