

CHAPTER 15

FINANCIAL QUALIFICATIONS

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ACRONYMS AND ABBREVIATIONS

<u>Acronym/Abbreviation</u>	<u>Definition</u>
AEA	The Atomic Energy Act of 1954
COGS	cost of goods sold
CP	Construction Permit
DCE	decommissioning cost estimate
FOCD	Foreign Ownership, Control, or Domination
IT	information technology
LEU	low-enriched uranium
Mo-99	molybdenum-99
NDAS	neutron driver assembly system
OL	Operating License
Tc-99m	technetium-99m

CHAPTER 15 – FINANCIAL QUALIFICATIONS

The purpose of this chapter is to present the financial information for the SHINE medical isotope facility, which establishes that SHINE is financially qualified to own, construct, operate, and decommission the facility. The following information regarding financial qualifications is described in this chapter:

- a. The financial ability to construct the facility, as authorized by the Construction Permit (CP).
- b. The financial ability to safely operate the facility.
- c. The financial ability to safely decommission the facility at the end of the facility’s operating license.
- d. Information regarding Foreign Ownership, Control, or Domination (FOCD).
- e. Information regarding Nuclear Insurance and Indemnity.

The SHINE financial information is provided in accordance with 10 CFR 50.33(d)(3)(iii), 10 CFR 50.33(f) and (k), and the implementing regulations regarding the Price-Anderson Act contained in 10 CFR 140.

15.1 FINANCIAL ABILITY TO CONSTRUCT THE SHINE FACILITY

The NRC has set forth requirements for applicants for a construction permit pursuant to 10 CFR 50.33(f) to submit sufficient information to demonstrate that the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. Additionally, the applicant should indicate the source(s) of funds to cover these costs. The NRC has previously concluded that SHINE is “financially qualified to engage in the activities authorized” under the terms of the construction permit (USNRC, 2016).

SHINE provided updated financial qualification information to the NRC in an application for transfer of control of the SHINE construction permit, submitted in accordance with 10 CFR 50.80 (SHINE, 2018a and SHINE, 2019). SHINE maintains the financial qualification to construct the SHINE facility, consistent with the NRC construction permit determination.

15.2 FINANCIAL ABILITY TO OPERATE THE SHINE FACILITY

The SHINE facility is licensed as a Class 103 facility in accordance with 10 CFR 50.22, for commercial and industrial facilities. The costs of owning and operating the facility are devoted to commercial activities. SHINE has requested an Operating License (OL) for a term of 30 years. The SHINE facility produces medical isotopes, primarily molybdenum-99 (Mo-99). Mo-99 is the precursor of the diagnostic imaging isotope technetium-99m (Tc-99m), which is used in medical procedures worldwide.

Financial reports and certified financial statements are submitted annually in accordance with 10 CFR 50.71(b). The total annual operating costs for each of the first five years of operation of the SHINE facility have been estimated. Operating costs will be funded from the expected revenues associated with the sale of Mo-99 and other radioisotopes produced by the facility. SHINE expects that this revenue will be more than the operating costs incurred. The information below demonstrates that SHINE has reasonable assurance of obtaining the funds necessary to cover estimated operation costs for the period of the license.

15.2.1 ESTIMATE OF OPERATING COSTS

Table 15.2-1 provides the budgetary estimate of operating costs for the first five years of operation of the SHINE facility. The estimated costs presented in **Table 15.2-1** are divided into two primary categories: costs of goods sold (COGS) and organizational expenses. The bases for the estimated operational costs of the facility for the first five years are discussed below as they relate to these categories.

The COGS is comprised of three key elements:

- Production personnel costs are based on an estimate of the number of employees required for the SHINE facility. This estimate includes personnel performing duties related to operations, engineering, radiation protection, and maintenance, as well as supervisory and management personnel. The production personnel cost estimate includes salary and benefits.
- Irradiation and processing costs include maintenance, replacement, and consumable costs associated with neutron driver assembly system (NDAS) main components, low-enriched uranium (LEU), and consumable supplies. As described in **Table 15.2-1**, the first year costs under this category are significantly lower than later years, as expected, based on minimal first year replacement projections.
 - For NDAS main components, SHINE has a binding contract with Phoenix, LLC that specifies the costs of NDAS main components on a firm-fixed basis. The contract with Phoenix, LLC serves as the basis for this operating cost estimate.
 - The LEU cost estimate is based on the total amount of LEU expected to be consumed within the SHINE facility and information provided during discussions with the U.S. Department of Energy/National Nuclear Security Administration Production Office and Y-12 National Security Complex in Oak Ridge, Tennessee.
 - Consumables consist of chemicals and materials used to produce, process, or refine medical isotopes or target solution, including tritium. This category also includes disposable or frequently replaced materials and chemicals that are used in facility operations or systems.

- Other fixed costs include operating costs associated with utilities, general facility and equipment maintenance and repair, and property taxes.
 - The SHINE facility utility costs are based on the estimated nominal electricity consumption of the facility (including NDAS operational requirements) and a quote from Alliant Energy, the SHINE facility electricity provider.
 - General facility and equipment maintenance and repair costs consist of component and part replacements based on preventative and corrective maintenance estimates. The maintenance and repair costs were estimated at system levels and compiled for the entire facility.
 - Property taxes as estimated as a percentage of the cost of the SHINE facility real property and local tax rates as provided by the City of Janesville.

The SHINE facility organizational expenses are comprised of two key elements:

- Logistical personnel costs include individuals performing duties such as: finance, accounting, licensing, quality, information technology (IT), human resources, and other business supporting roles, as well as supervisory, management, and executive personnel. The SHINE facility logistical personnel cost estimate includes salary and benefits.
- Other administrative costs include insurance costs, IT equipment expenses, legal support, and other costs related to general support of business operations.

15.2.2 FUNDS TO COVER ESTIMATED OPERATION COSTS

SHINE intends to cover its operating costs through the sale of medical isotopes, primarily Mo-99. SHINE has entered into contracts to sell Mo-99 to three customers: GE Healthcare; Lantheus Medical Imaging, Inc.; and HTA Co., Ltd. [

] ^{PROP} The SHINE facility has significant production capacity, in excess of the contract obligations, that is available for additional sales to fully cover the expected operating costs.

Table 15.2-2 provides the first five years of Mo-99 sales covered under these contracts, as well as the excess production capacity available within this timeframe, and minimum projected additional sales based on available production capacity for the first five years of operation. [

] ^{PROP} SHINE is confident of obtaining the funding necessary to cover its expected operating costs by either expanding its existing Mo-99 sales contracts or entering into new Mo-99 sales contracts. Medical isotopes sales will fully cover the expected operating costs of the SHINE facility.

In addition to pursuing additional sales contracts, [

]PROP

In the unlikely event that SHINE fails to obtain additional financing or is unable to establish additional Mo-99 sales contracts, SHINE will not be able to operate its facility.

Table 15.2-1 – Operating Costs for the First Five Years of Operation

	(in \$ thousands)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Cost of Goods Sold (COGS)					
Production Personnel	[] ^{PROP}				
Irradiation and Processing	[] ^{PROP}				
Other Fixed Costs	[] ^{PROP}				
Total	[] ^{PROP}				
Organizational Expenses					
Administrative Personnel	[] ^{PROP}				
Other Administrative	[] ^{PROP}				
Total	[] ^{PROP}				
Total Operating Costs	[] ^{PROP}				

Table 15.2-2 – Estimated Funding for the First Five Years of Operation

	(in \$ thousands)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Contract Revenue					
Minimum Contract Revenue	[] ^{PROP}				
Maximum Contract Revenue	[] ^{PROP}				
Projected Additional Mo-99 Sales					
Available Facility Production Capacity (after maximum contract obligation met)	[] ^{PROP}				
Additional Sales Needed	[] ^{PROP}				
Operating Costs					
Total Operating Costs	[] ^{PROP}				

15.3 FINANCIAL ABILITY TO DECOMMISSION THE SHINE FACILITY

15.3.1 DECOMMISSIONING REPORT

The decommissioning report contains information, in accordance with 10 CFR 50.33(k), describing how SHINE will provide reasonable assurance that funds will be available for the decommissioning process. The decommissioning report includes:

- a cost estimate for decommissioning the facility;
- the method or methods described in 10 CFR 50.75(e), as applicable, that will be used to provide funds for decommissioning; and
- a description of the means of adjusting the cost estimate and associated funding level periodically over the life of the facility.

15.3.1.1 Decommissioning Cost Estimate

The decommissioning cost estimate (DCE) for the SHINE facility is \$50,058,000. The estimate considers costs for decommissioning activities as described in NUREG-1757, Volume 3, Section 4.1 and Appendix A.3 (USNRC, 2012), including planning and preparation, decontamination and dismantling of facility components, costs of equipment and supplies, radioactive waste characterization, waste packaging and shipment, waste disposal, contingency costs, contractor costs, and radiation surveys. The DCE assumes that decommissioning activities begin immediately after radioisotope production activities and operations involving radioactive materials cease. The DCE encompasses the costs necessary to decommission and release the site for unrestricted use in accordance with 10 CFR 20.1402.

15.3.1.2 Method to Provide Funds for Decommissioning

In accordance with 10 CFR 50.75(e), SHINE will maintain an external escrow account in which deposits will be made periodically, coupled with a surety method, insurance, or some other form of guarantee. This escrow account, coupled with a surety method, insurance, or some other form of guarantee, is intended to provide reasonable assurance that funds will be available to decommission the facility.

15.3.1.3 Means of Adjusting Decommissioning Cost Estimate and Funding Level

The decommissioning funding level will be adjusted every three years, or when the amounts or types of materials at the facility change, to demonstrate that a reasonable level of assurance will be provided that funds will be available when needed to cover the cost of decommissioning. The triennial adjustments account for inflation, for other changes in the prices of goods and services (e.g., disposal cost increases), for changes in facility conditions or operations, and for changes in expected decommissioning procedures, as applicable. The triennial adjustments account for changes such as:

- leaks and spills of radioactive material producing additional facility contamination or residual radioactivity in on-site subsurface material;
- newly detected facility, soil, or groundwater contamination;
- waste inventory increasing above the amount estimated;
- waste disposal costs increasing above the amount previously estimated, including any additional costs associated with the availability of disposal facilities;

- facility modifications and changes in on-site materials inventories;
- actual remediation costs that exceed previous cost estimates; and
- on-site disposal remediation costs that exceed previous cost estimates.

15.4 FOREIGN OWNERSHIP, CONTROL, OR DOMINATION

SHINE is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. SHINE is not acting as an agent or representative of another person in filing this application.

15.5 NUCLEAR INSURANCE AND INDEMNITY

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, are applicable to SHINE. SHINE has determined that maintaining financial protection in the amount of \$1.5M, covering each of the eight utilization facilities and the production facility, satisfies the financial protection requirements of the Price-Anderson Act (SHINE, 2018b). SHINE will also maintain an indemnification agreement with the NRC that extends for the life of the license.

15.6 REFERENCES

SHINE, 2018a. Application for Order Approving Indirect Transfer of Control of Construction Permit and Conforming Administrative Construction Permit Amendment, SHINE Medical Technologies, Inc., December 11, 2018 (ML18347A215).

SHINE, 2018b. Request for Confirmation of the 10 CFR Part 140 Financial Protection Requirements for the SHINE Facility, SHINE Medical Technologies, Inc., August 27, 2018 (ML18239A219).

SHINE, 2019. SHINE Medical Technologies, Inc. Application for Order Approving Indirect Transfer of Control of Construction Permit Response to Request for Additional Information, SHINE Medical Technologies, Inc., March 8, 2019 (ML19071A055).

USNRC, 2012. Consolidated Decommissioning Guidance - Financial Assurance, Recordkeeping, and Timeliness, NUREG-1757, Volume 3, Revision 1, U.S. Nuclear Regulatory Commission, February 2012 (ML12048A683).

USNRC, 2016. Commission Memorandum and Order, CLI-16-04, U.S. Nuclear Regulatory Commission, February 25, 2016 (ML16056A094).