

DRAFT RECORD OF DECISION  
U.S. NUCLEAR REGULATORY COMMISSION  
DOCKET NO. 50-608  
CONSTRUCTION PERMIT APPLICATION FOR THE  
SHINE MEDICAL TECHNOLOGIES, INC. MEDICAL RADIOISOTOPE PRODUCTION  
FACILITY

BACKGROUND:

By letter dated March 26, 2013, SHINE Medical Technologies, Inc. (SHINE), submitted to the U.S. Nuclear Regulatory Commission (NRC) Part 1 of a two-part application for a construction permit under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." The construction permit would allow construction of the SHINE medical radioisotope production facility (SHINE facility) in Rock County, Wisconsin, within the southern corporate boundaries of the City of Janesville, Wisconsin (Agencywide Documents Access & Management System (ADAMS) Accession No. ML14052A349). Section 103 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.) authorizes the NRC to issue construction permits for production and utilization facilities. To issue a construction permit, the NRC is required to consider the environmental impacts of the proposed action under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq., herein referred to as NEPA).

The NRC's environmental protection regulations that implement NEPA in 10 CFR Part 51 describe several types of actions that would require an environmental impact statement (EIS). Construction permits and operating licenses for production and subcritical utilization facilities are not specifically identified in 10 CFR 51.20 as an action that would require an EIS. Such activities may require an environmental assessment (EA) or an EIS, depending on their potential for significant impacts that may affect the quality of the human environment (ADAMS Accession Nos. ML12156A069 and ML12156A075). For the SHINE environmental review, the NRC staff determined that an EIS was appropriate to assess the environmental impacts of the proposed action. The NRC staff made this determination because of the potential for significant environmental impacts and the unique considerations of a first-of-a-kind application for a medical radioisotope production facility with a unique application of technologies, as well as to allow public involvement in the environmental review process.

Consistent with 10 CFR Part 51, the NRC staff published a Notice of Acceptance for Docketing in the *Federal Register* (FR) on July 1, 2013 (78 FR 39342), and a separate FR notice of its intent to prepare an EIS and conduct a scoping process on the same day (78 FR 39343). In addition, Federal, State, and local agencies as well as Tribal governments were noticed and invited to participate in the environmental review. The scoping notice began the 60-day scoping period. On July 17, 2013, the NRC held two public scoping meetings in Janesville, Wisconsin. The report entitled, "Environmental Impact Statement Scoping Process Summary Report for the SHINE Medical Radioisotope Production Facility," presents the comments the NRC received during the scoping process and the NRC staff's response to these comments (ADAMS Accession No. ML15062A111).

In July and August 2013, the NRC staff conducted a site audit at the proposed and alternative sites to verify information in SHINE's Environmental Report. During the site audit, the NRC staff

met with SHINE personnel; reviewed specific documentation; toured the proposed and alternative sites; and met with interested Federal, State, and local agencies. Following the site audit, the NRC staff issued requests for additional information (RAIs) to ask SHINE to clarify information in SHINE's environmental report and to ask for additional information to assess the environmental impacts of the proposed action (ADAMS Accession Nos. ML13231A041, ML14195A159, ML15005A407).

After the scoping period and site audit, the NRC staff compiled its findings in a draft EIS (ADAMS Accession No. ML15127A241). In accordance with 10 CFR 51.73, "the 45-day public comment period for the draft EIS was from May 22, 2015, through July 6, 2015 (80 FR 29701). During this time, the NRC staff hosted two public meetings and collected public comments (ADAMS Accession No. ML15170A262). On October 16, 2015, the NRC issued the "Final Environmental Impact Statement for the Construction Permit for the SHINE Medical Radioisotope Production Facility" (NUREG-2183), (ADAMS Accession No. ML15288A046 (final EIS). All comments related to the environmental review during the comment period are included in Appendix A of the final EIS. EPA issued the Notice of Availability for the final EIS on October XX, 2015 (XX FR XXXX).

The U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) has entered into a cooperative agreement with SHINE to engage in cost-sharing activities to accelerate domestic endeavors to demonstrate and produce a reliable supply of molybdenum-99 (Mo-99) using a technology that does not rely on the use of highly enriched uranium, in accordance with Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352). DOE/NNSA is required to conduct an environmental review under NEPA for providing financial support to SHINE. The NRC and DOE decided to develop a Memorandum of Agreement to enable each agency to most efficiently meet its NEPA responsibilities (ADAMS Accession No. ML13304B666). In the Memorandum of Agreement, the NRC agreed to serve as the lead agency for preparing the EIS, with the DOE as a cooperating agency. The DOE was included in all aspects of the environmental review, including scoping, public meetings, and public comment resolution. Although both agencies must meet NEPA requirements, they also must meet mission requirements. As a cooperating agency, DOE/NNSA plans to adopt the final EIS in accordance with the DOE/NEPA implementing procedures in 10 CFR 1021.103.

Pursuant to 10 CFR 51.102 and 51.103(a)(1)-(4), the NRC staff has prepared this Record of Decision (ROD) to accompany the NRC's action on the construction permit application. This ROD incorporates by reference materials contained in the final EIS. See 10 CFR 51.103(c).

#### DECISION:

[If the Commission's mandatory hearing decision authorizes the NRC staff to issue the license, this Decision section will state:]

The NRC makes the decision to grant or deny the construction permit application based on whether the applicant has met all applicable requirements, including the NRC's safety and environmental regulations. The NRC's safety review of the application is documented in the safety evaluation report (SER) issued on October 20, 2015 (ADAMS Accession No. ML15288A076).

The EIS presents the staff's environmental review of the application. As documented in the EIS, after weighing the environmental, economic, technical, and other benefits of the facility against environmental and other costs and considering reasonable alternatives, unless safety issues mandate otherwise, the NRC staff recommend issuance of the construction permit. The NRC staff determined that this recommendation is in accordance with NEPA and the NRC's implementing regulations in Subpart A of 10 CFR Part 51, and that all applicable environmental requirements have been satisfied. In the Commission's Order dated [date], the Commission [XXX].

Accordingly, on [date], the NRC issued Construction Permit [#], authorizing the construction of the SHINE facility in Rock County, Wisconsin, within the southern corporate boundaries of the City of Janesville, Wisconsin. The construction permit is effective as of [date].

#### AGENCIES' ROLES AND RESPONSIBILITIES:

The EIS includes information on a broad range of issues that may be regulated by other Federal, State, or local agencies or Tribes. As documented in the EIS, SHINE must obtain and maintain permits from other Federal, State, or local agencies or Tribes in order to construct the SHINE facility.

Pursuant to Section 401(a) of the CWA, an applicant for a Federal license or permit, which may result in a discharge into navigable waters of the United States, must provide to the Federal licensing or permitting agency the certification, or a waiver, from the State in which the discharge originates. A Federal agency cannot issue such a license or permit to an applicant until the required certification is obtained. As described in the final EIS, SHINE would have to obtain and comply with a State-issued general permit for stormwater discharges associated with construction activity. Best management practices and other requirements imposed by the State issued stormwater discharge permit would ensure that runoff during construction of the proposed facility will meet applicable State water quality standards. By letter dated October 21, 2015, the State of Wisconsin determined that it will waive certification for SHINE because SHINE's activities will be regulated under Wisconsin's Chapter 283, Wisconsin Administrative Code.

#### PURPOSE AND NEED:

As identified in Section 1.3 of the EIS, the purpose and need of the proposed Federal action is to provide a medical radioisotope production option that could help meet the need for a domestic source of Mo-99. If the facility is licensed to operate, SHINE expects to produce up to 8,200 6-day Curies (Ci) ( $3.0 \times 10^{14}$  6-day Becquerel [Bq]) of Mo-99 per week. For the past 2 decades, the United States has relied on imported medical radioisotopes, such as molybdenum-99, iodine-131, and xenon-133. Global shortages of medical radioisotopes in 2009 and 2010 have highlighted the need for prompt action to ensure a reliable domestic supply. In recent years, U.S. policy has aimed to ensure a reliable supply of medical radioisotopes while minimizing the use of highly enriched uranium for civilian purposes through, among other things, supporting commercial projects that produce medical radioisotopes domestically without the use of highly enriched uranium.

## PROPOSED FEDERAL ACTION:

The proposed Federal action is for the NRC to decide whether to issue a construction permit under 10 CFR Part 50 that would allow construction of the SHINE facility, which would include up to eight utilization facilities and a production facility. If the NRC were to issue a construction permit, SHINE could build the proposed facility on a 91-acre (37-hectare) site in Rock County, which is located about 4 mi (6 km) south of the city center of Janesville, Wisconsin. The issuance of a construction permit is a separate licensing action from the issuance of an operating license. If the NRC issues a construction permit, then SHINE must submit a separate application for an operating license, pursuant to the NRC's requirements, and must obtain NRC approval before it can operate the SHINE facility. If the NRC were to issue an operating license, SHINE could operate the proposed SHINE facility and produce radioisotopes, including Mo-99, iodine-131, and xenon-133. To conduct an efficient and effective environmental review, the EIS covers the potential impacts from construction, operations, and decommissioning. If SHINE were to submit an application for an operating license, the NRC staff would prepare a supplement to this EIS in accordance with 10 CFR 51.95(b).

## NRC EVALUATION OF THE PROPOSED ACTION:

Section 102(2)(C)(iii) of NEPA states that EISs are to include a detailed statement analyzing alternatives to the proposed action. The NRC staff examined the environmental impacts from construction, operations, and decommissioning of the SHINE facility for the following resource areas: land use and visual resources; meteorology, air quality, and noise; geologic resources; water resources; ecological resources; historic and cultural resources; socioeconomics; human health; waste management; transportation; accidents; and environmental justice. These resource areas were also considered with other developments or activities that affect the resources cumulatively. The NRC staff also evaluated the environmental impacts of the no-action alternative, alternative sites, and an alternative technology to determine the environmentally preferable alternative and as part of the NRC staff's need to weigh the costs and benefits of the proposed action and alternatives to the proposed action.

To guide its assessment of the environmental impacts of the proposed action and alternatives, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance (40 CFR 1508.27). Based on this, the NRC established three levels of significance for potential impacts: SMALL, MODERATE, and LARGE. The definitions of these three significance levels, which are presented in the Interim Staff Guidance to NUREG-1537 (ADAMS Accession Nos. ML12156A069 and ML12156A075), are:

SMALL—environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource. In assessing radiological impacts, the NRC has concluded that those impacts that do not exceed permissible levels in the NRC's regulations are considered SMALL.

MODERATE—environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE—environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The EIS presents the NRC staff's analysis, which considers and weighs the environmental impacts of the proposed action at the Janesville site. The NRC staff determined that the impacts from construction, operations, and decommissioning of the SHINE facility would be SMALL for all resource areas with the exception of transportation. The impacts to transportation would be SMALL to MODERATE because of the noticeable increase in average daily traffic flow. The addition of up to 465 vehicles per day (or approximately 1,000 trips per day) from construction activities and 261 vehicles per day (or approximately 580 trips a day) from decommissioning activities at the proposed SHINE facility would result in an increased traffic volume on U.S. Highway 51. This increase in traffic would not likely destabilize traffic conditions near the SHINE site because traffic analyses indicate that the level of construction- and decommissioning-related traffic would not affect the level of service anywhere in the transportation infrastructure; therefore, the transportation infrastructure would not require any modifications. During operations, a "slight degradation of service" (i.e., traffic delays) would occur at the intersection of westbound State Trunk Highway 11 onto southbound U.S. Highway 51 during the morning during peak hours of commuting. The NRC staff expects the overall daily traffic flow in the immediate vicinity of the proposed SHINE facility to increase slightly during the operation phase, but it would not be appreciable when compared with the average daily and annual traffic flow of roads in the immediate vicinity of the proposed SHINE facility.

#### Evaluation of Alternatives:

In Chapter 5 of the EIS, the NRC staff considered the following alternatives to construction, operations, and decommissioning of the SHINE facility at the proposed site in Rock County, Wisconsin, within the southern corporate boundaries of the City of Janesville, Wisconsin:

- the no-action alternative;
- construction, operations, and decommissioning of the SHINE facility at the Chippewa Falls site (Alternative Site No. 1);
- construction, operations, and decommissioning of the SHINE facility at the Stevens Point site (Alternative Site No. 2); and
- construction, operations, and decommissioning of a linear accelerator-based facility at the Janesville site (alternative technology).

#### *i. No-Action Alternative*

Under the no-action alternative, discussed in Section 5.1 of the EIS, the NRC would deny the construction permit, and the SHINE facility would not be constructed. The no-action alternative does not involve the determination of whether radioisotopes are needed or should be generated. The decision to produce radioisotopes is at the discretion of applicants.

Under the no-action alternative, no changes would occur to the proposed SHINE site in Janesville, Wisconsin. The site would remain zoned for industrial use. Therefore, impacts on all resource areas would be SMALL.

The no-action alternative is the only alternative considered by the NRC staff that does not satisfy the purpose and need for this EIS, because this alternative does not satisfy the need for a U.S. supply of Mo-99. Assuming that the need for a U.S. supplier of Mo-99 continues to exist, another private company would likely construct and operate a medical radioisotope production facility.

#### *ii. Alternative Sites*

The NRC staff independently evaluated SHINE's process for screening potential alternative sites, which followed a prescriptive methodology by applying exclusionary criteria appropriate to the proposed facility. NRC's site-selection process guidance calls for a systematic process to evaluate a broad range of potential sites and determine select sites to analyze in detail.

The NRC staff evaluated SHINE's site-selection process, which assessed a variety of economic and environmental factors to determine reasonable regions, states, cities, and, ultimately, alternative sites to construct and operate the proposed SHINE facility. The NRC staff concluded that the method used to identify reasonable regions, states, cities, and, ultimately, alternative sites was reasonable and logical and adequately satisfied applicable NRC guidance.

To begin the site selection process, SHINE selected a region, the Midwestern U.S., that maximized the proximity and access to customers because Mo-99 decays or disappears at a rate of about 1 percent per hour after production. SHINE further evaluated potential Midwestern States based on their proximity to available and potential customers, financial incentives, and seismic considerations. Next, SHINE evaluated potential cities based on two criteria: (1) build-to-suit land available for development with proximity and access to an interstate highway, and (2) an airport within approximately 10 minutes of the proposed facility location, capable of handling radioisotope distribution aircraft. Ultimately, SHINE developed a set of 11 criteria to score the three potential sites identified and to ultimately select the preferred site with the best economic advantage and fewest potential environmental impacts. The three sites analyzed in detail in the site selection process included:

- Janesville, Wisconsin (proposed site)
- Chippewa Falls, Wisconsin (alternative site)
- Stevens Point, Wisconsin (alternative site)

The NRC staff determined that the impacts at both alternative sites would be SMALL for most resource areas; however, the NRC staff determined that impacts from noise would be SMALL to MODERATE at both the Chippewa Falls and the Stevens Point sites and the impacts to visual resources would be SMALL to MODERATE at the Stevens Point site. Similar to the proposed Janesville site, the impacts at both the Chippewa Falls and the Stevens Points site would be SMALL to MODERATE for traffic. Therefore, the NRC staff concluded that the Janesville site would be environmentally preferable to either alternative site.

#### *iii. Alternative Technologies*

For the alternative technologies analysis, the NRC staff initially narrowed down the broad range of potential alternatives by considering three alternative technologies that received cooperative

agreements from DOE/NNSA and appeared to be technologically reasonable. In awarding these cooperative agreements, DOE/NNSA based its decision, in part, on an evaluation of the technical feasibility. The three alternative technologies included:

- neutron capture technology,
- aqueous homogenous reactor technology, and
- linear accelerator-based technology.

The NRC staff then considered whether sufficient environmental data existed to conduct a meaningful alternatives analysis for each of the three technologies. For the neutron capture and aqueous homogenous reactor technology, the NRC staff determined that due to the lack of environmental data regarding the potential impacts from construction, operations, and decommissioning, insufficient environmental information existed to meaningfully analyze the environmental impacts of these two alternatives. The NRC staff determined that sufficient environmental data existed for the linear accelerator-based alternative, whereby Mo-99 would be produced by utilizing an accelerator to irradiate natural molybdenum that has been enriched in the radioisotope Mo-100. The NRC staff analyzed this alternative in depth and evaluated the environmental impacts of construction, operations, and decommissioning a hypothetical linear accelerator-based facility to produce Mo-99. The NRC staff determined the environmental impacts of construction, operations, and decommissioning of the alternative technology at the Janesville site would result in the same impacts as the construction, operation, and decommissioning of the SHINE facility at the Janesville site.

#### *iv. Comparison of the Costs and Benefits of the Alternatives*

In Chapters 4 and 5 of the EIS, the NRC staff described the costs and benefits of the proposed action as well as alternatives to the proposed action. In weighing the costs and benefits, the NRC staff concluded that the overall benefits of constructing, operating, and decommissioning the proposed SHINE facility at the Janesville site outweigh the disadvantages and costs based upon the following considerations:

- U.S. policy is to ensure a reliable supply of medical radioisotopes while minimizing the use of highly enriched uranium for civilian purposes,
- the small environmental impact, including radiological impacts and risk to human health, which would be caused by constructing, operating, and decommissioning the proposed SHINE facility at the Janesville site,
- the economic benefit of constructing and operating the proposed SHINE facility to communities located near the Janesville site, and
- the increased availability of medical isotopes for U.S. public health needs.

Constructing, operating, and decommissioning the SHINE facility at the Janesville site would have slightly less environmental costs than at either alternative site because impacts from noise would be SMALL to MODERATE at both the Chippewa Falls and the Stevens Point sites, in part because the nearest resident would be closer, and the noise more audible to the closest

resident, than at the Janesville site. In addition, the impacts to visual resources would also be greater at the Stevens Point site (SMALL to MODERATE), if SHINE clears the majority of the onsite wooded areas, which would increase the visibility of the new facility. However, the overall benefits of constructing and operating the proposed SHINE facility at any of the sites would outweigh the environmental disadvantages and costs for the reasons outlined above. Installation of an alternative technology (e.g., linear accelerator-based) would not result in any greater economic advantages or disadvantages over the proposed SHINE technology and the environmental costs and benefits would be similar to those described for the proposed SHINE facility at the Janesville site. Therefore, the overall benefits and costs of utilizing an alternative technology at the Janesville site would be the same and would outweigh the environmental disadvantages and costs for the reasons outlined above.

#### MITIGATION MEASURES:

The NRC has taken all practicable measures within its jurisdiction to avoid or minimize environmental harm from the proposed action. Construction, operations, and decommissioning of the SHINE facility would have SMALL environmental impacts in all resources areas, except for transportation which would range from SMALL to MODERATE. An Environmental Protection Plan (Appendix A of the Construction Permit) is included in the Construction Permit to ensure compliance with the Endangered Species Act of 1973, as amended (ESA), and to ensure that the Commission is kept informed of other environmental matters. The Environmental Protection Plan describes reporting requirements regarding potential impacts to protected environmental resources during construction activities. The Environmental Protection Plan is intended to be consistent with Federal, State, and local requirements for environmental protection. The NRC is not otherwise imposing any license conditions regarding mitigation measures or requiring any new environmental monitoring programs.

Below are mitigation measures and best management practices described in the EIS with respect to individual resource areas.

#### *Land Use and Visual Resources*

The facility would be built and operated in compliance with all local zoning requirements. Once SHINE completes construction activities, it may vegetate open areas with crops, native prairie grasses, or cool-season grasses to offset loss of agricultural lands. Vegetated areas could also mitigate impacts to visual resources given that the majority of the surrounding viewshed is cultivated fields or grasses. SHINE would also mitigate visual impacts by landscaping or planting shrubs along U.S. Highway 51 and bordering access roads.

#### *Air Quality*

Air quality permits from the Wisconsin Department of Natural Resources will set emission limits and will establish monitoring, recordkeeping, and reporting requirements with which SHINE will be required to comply. SHINE would control emissions of nitrogen oxide from the natural gas fired boiler using low nitrogen oxide burners and emissions from gas fired heaters using combustion controls and properly designed and tuned burners. SHINE would use BMPs and dust control plans for controlling fugitive dust and other emissions. Furthermore, SHINE plans



to develop programs, as appropriate, to encourage carpooling to minimize worker vehicle emissions. SHINE would develop a comprehensive program to avoid and control greenhouse gas (GHG) emissions associated with the facility. The program may include developing a GHG emission inventory and investigating and implementing methods for avoiding or controlling the GHG emissions identified in the inventory; implementing energy efficiency and conservation programs at the SHINE facility, such as installing solar panels and/or purchasing electricity generated from renewable energy sources; and encouraging carpooling or other measures to minimize GHG and other emissions due to vehicle traffic during construction and operation of the SHINE facility.

### *Noise*

The facility design (e.g., wall thickness and other physical barriers) and distance to the sensitive receptors would limit offsite noise levels. In addition, during construction, noise from traffic would be mitigated through posted speed limits, traffic control, and administrative measures (e.g., staggered work shift hours).

### *Geologic and Water Resources*

SHINE would adhere to standard industry BMPs to minimize soil erosion and sediment control. SHINE must conduct construction activities in accordance with the provisions of the Wisconsin General Permit to Discharge Construction Site Storm Water Runoff. The permit would require measures to minimize soil compaction and to preserve topsoil; a site-specific construction site erosion control plan, including specific BMPs or pollution control measures to reduce the discharge of pollutants in stormwater runoff; and a stormwater management plan (e.g., vegetated drainage swales to control runoff). Temporarily disturbed areas during construction activities may be revegetated with crops, cool-season grasses, or native prairie grasses.

The Wisconsin General Permit to Discharge Construction Site Storm Water Runoff would also require the development of spill prevention and response procedures, such as measures to avoid and respond to spills and leaks of fuels and other materials from construction equipment and activities. Wastewater must meet the acceptance requirements of the Janesville Wastewater Treatment Plant before it leaves the SHINE facility.

### *Ecological resources*

Once SHINE completes construction activities, it may vegetate open areas with crops, native prairie grasses, or cool-season grasses. BMPs, such as shielding or appropriate directional lighting, or both, would be used to mitigate the potential for bird collisions from artificial nighttime illumination on buildings or other structures. SHINE would apply herbicides according to an integrated pest management plan, which would include applicable BMPs or related permit requirements. For additional mitigation related to aquatic habitats, see mitigation measures described above for water resources.

### *Historic and Cultural Properties*

There are no known historic properties under 36 CFR 800.4(d)(1) or historic and cultural resources located on the proposed SHINE site. SHINE has developed a sitewide cultural resource management plan to manage and protect as-yet unidentified cultural resources.

### *Socioeconomics*

The availability of construction workers and housing within the region of influence and the short duration of construction (18 months) would minimize any socioeconomic impacts within the region of influence. New operations jobs would help maintain employment levels and would generate a small amount of additional property and sales tax revenue.

### *Human Health*

With respect to radiological health impacts, SHINE would construct and operate the proposed facility in accordance with all applicable Federal and State of Wisconsin regulatory requirements. SHINE must limit radiological doses to the public and workers within the occupational dose limits in 10 CFR Part 20, "Standards for Protection Against Radiation." SHINE's proposed facility includes buildings that would contain radioactive material. The proposed building design includes shielding that will minimize direct radiation outside the facility and ensures that radiation will be within 10 CFR Part 20 dose limits at the site boundary. Radiation exposure to workers within the proposed facility will be minimized using shielding, shielded hot cells, shielded transport containers, access control to radiation areas, ventilation, filters, training, protective clothing, and administrative controls.

With respect to nonradiological health impacts, SHINE would implement normal construction and operational safety practices contained in Occupational Safety and Health Administration regulations. In addition, SHINE would limit toxic chemicals stored or used at the construction site to be within the threshold amounts listed in the Wisconsin Administrative Code. SHINE would have a Chemical Hygiene Plan to minimize chemical exposure to the workforce and a Chemical Hygiene Officer to administer the plan.

### *Waste Management*

SHINE would operate the proposed facility in accordance with all applicable Federal and State of Wisconsin regulatory requirements. For example, public and worker exposure, radioactive material within the facility, and radioactive effluents released into the environment must meet the radiation protection dose-based limits in 10 CFR Part 20. Wastes generated during plant operations would be collected, stored, and shipped for suitable treatment, recycling, or disposal in accordance with applicable Federal and State regulations. In addition, SHINE would implement waste management systems to minimize waste and pollution. Engineered design features would also minimize contamination and exposures.

### *Transportation*

SHINE would stagger construction work-shift schedules to reduce the hourly traffic flow onto U.S. Highway 51 and schedule truck deliveries early in the day to help reduce traffic congestion. Optimizing the signal timing for vehicles turning from westbound State Highway 11 to southbound U.S. Highway 51 would mitigate traffic delays.

SHINE and the common-carrier trucks would be required to adhere to the applicable regulatory packaging and transportation requirements for radioactive material in NRC regulations (10 CFR Parts 20 and 71); the State of Wisconsin Administrative Code Chapter 326, "Transportation"; and DOT requirements (49 CFR Parts 172 and 173). In addition, SHINE would follow delivery routes that avoid residential and sensitive areas.

### *Accidents*

For radiological accidents, SHINE analyzed scenarios that ranged from anticipated events (e.g., a loss of normal electrical power) to a postulated fission-product release with radiological consequences exceeding those of any accident considered to be credible. SHINE determined that the bounding accident scenario for the facility involves a release of radiological material from the Noble Gas Removal System tanks that would result in the maximum doses to workers and individual members of the public. SHINE incorporated engineered safety measures (e.g., shielding) and administrative controls (e.g., procedures and training) to ensure that exposure from the maximum hypothetical accident will be within regulatory dose limits set forth in 10 CFR 20.1301.

For chemical accidents, the NRC staff reviewed chemical safety-related accidents and chemical risks of plant conditions that affect the safety of licensed material. The NRC staff determined that SHINE's preliminary facility design, proposed operations, and anticipated safety controls for chemical safety provide reasonable assurance that they will function as intended and will be adequate to ensure that exposure from chemical accidents will be within regulatory dose limits set forth in 10 CFR 70.61.

### DETERMINATION:

Based on an independent review, analysis and evaluation contained in the EIS; careful consideration of all the identified social, economic, and environmental factors and input received from other Federal, State, and local agencies, Tribes, organizations, and the public; consideration of the mitigation measures outlined above; [and the input received during the

mandatory hearing], it is determined that the standards for issuance of a construction permit, as described in 10 CFR Part 50, have been met and the requirements of Section 102 of NEPA have been satisfied.

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