


Preliminary Site Requirements and Considerations for a Monitored Retrievable Storage Facility

August 1991

*U.S. Department of Energy
Office of Civilian Radioactive Waste Management*



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Washington, DC 20585*

EXECUTIVE SUMMARY

In the November 1989 *Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program* (DOE/RW-0247), the Secretary of Energy announced an initiative for developing a monitored retrievable storage (MRS) facility that is to start spent-fuel acceptance in 1998. This facility, which will be licensed by the U.S. Nuclear Regulatory Commission (NRC), will receive spent fuel from commercial nuclear power plants and provide a limited amount of storage for this spent fuel. When a geologic repository starts operations, the MRS facility will also stage spent-fuel shipments to the repository. By law, storage at the MRS facility is to be temporary, with permanent disposal provided in a geologic repository to be developed by the U.S. Department of Energy (DOE).

The Nuclear Waste Policy Amendments Act of 1987, which authorized the DOE to site, construct, and operate an MRS facility, establishes two alternative paths for siting the facility: (1) siting by a DOE-directed survey-and-evaluation process and (2) siting through the efforts of the Nuclear Waste Negotiator, whose office was established for that purpose. The Negotiator is to seek to negotiate a proposed agreement with a State or Indian Tribe willing to site an MRS facility at a technically qualified site. Examination of the applicable Federal statutes, regulations, executive orders, and DOE orders and experience with comparable facilities suggest that many places within the contiguous United States would be technically suitable.

Siting through negotiation is the path preferred by the DOE. To provide guidance in assessing whether potential sites would be suitable, the DOE prepared this report. It presents preliminary site requirements and considerations that are intended as guidance in siting the MRS facility. It has been reviewed by the NRC staff, which stated that this document is suitable for "guidance in making preliminary determinations concerning MRS site suitability." The preliminary requirements and considerations are not dependent on the approach to MRS development or on details of design and hence should be applicable to a range of design options and concepts for storing and handling spent fuel. There are several proven concepts for handling and storage that could be used at the MRS facility. The concept that is chosen will depend on safety, licensing, cost, and schedule considerations and the preferences of the volunteer host.

The preliminary site requirements are based on specific requirements in the applicable Federal statutes and regulations, including the site-evaluation factors in the

regulations of the Nuclear Regulatory Commission that will be applied to the MRS facility (Title 10 of the Code of Federal Regulations, Part 72 (10 CFR Part 72), Subpart E). Unless they are met, these requirements exclude areas from further consideration.

The preliminary site requirements cover the following:

- Colocation with a geologic repository
- Site size
- Single-use protected lands
- Coastal barriers
- Critical habitat for endangered or threatened species
- Hazardous wastes

If a site meets the site requirements, then it should be technically suitable. The next step is to apply the preliminary site considerations, which identify the enhancing and favorable attributes of technically qualified sites—attributes that would enhance the ease with which compliance with applicable Federal regulations can be demonstrated. The preliminary site considerations, which are based on Federal statutes and regulations (including Subparts E and F of 10 CFR Part 72) and program preferences, identify conditions that are preferable, rather than mandatory. They should be especially useful to a host considering multiple sites for potential negotiations.

The preliminary site considerations are divided into five groups: (1) geologic and other hazards, (2) environmental factors, (3) socioeconomic factors, (4) transportation, and (5) cost and development time. They cover the following:

- Geologic and other hazards
 - Natural seismic hazards
 - Induced seismicity
 - Surface faulting
 - Floodplains
 - Ground stability
 - Volcanism
 - Other extreme natural phenomena
 - Human activities
- Environmental factors
 - Wetlands and coastal zones
 - Preservation of ground-water quality
 - Preservation of air quality
 - Protected species
 - Historical, cultural, or archaeological resources

- Socioeconomic factors
 - land use and ownership
- Transportation
- Cost and development time

The preliminary site requirements and considerations are not currently part of the DOE's technical baseline of requirements and are not intended to fully cover all regulatory requirements or to cover requirements for the license application that will be submitted to the Commission. They are intended to provide guidance and have wide applicability. Their purpose is to permit a reasonable determination, on the basis of available information without extensive analysis, that a site is potentially suitable for an MRS facility. However, if sufficient data are not available for analysis, then it may be necessary to gather additional data.

Once a potential MRS site is negotiated, a detailed analysis of the regulatory requirements will be completed to support the design and licensing of the facility. Before the submittal of a license application to the Nuclear Regulatory Commission, the conditions and characteristics of the site will be determined to demonstrate compliance with 10 CFR Part 72.

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PRELIMINARY SITE REQUIREMENTS AND CONSIDERATIONS FOR A MONITORED RETRIEVABLE STORAGE FACILITY

1. INTRODUCTION

This report presents preliminary requirements and considerations for siting a monitored retrievable storage (MRS) facility. Its purpose is to provide guidance for assessing the technical suitability of potential sites for the facility. It has been reviewed by the NRC staff, which stated that this document is suitable for "guidance in making preliminary determinations concerning MRS site suitability."

The MRS facility will be licensed by the U.S. Nuclear Regulatory Commission. It will receive spent fuel from commercial nuclear power plants and provide a limited amount of storage for this spent fuel. When a geologic repository starts operations, the MRS facility will also stage spent-fuel shipments to the repository. By law, storage at the MRS facility is to be temporary, with permanent disposal provided in a geologic repository to be developed by the DOE.

In the Nuclear Waste Policy Amendments Act, the Congress provides for a dual approach to siting an MRS facility: (1) siting by the DOE, through a process of surveying and evaluating potential sites, and (2) siting through the efforts of the Nuclear Waste Negotiator. The Negotiator, appointed by the President and confirmed by the Senate, is to seek a willing State or Indian Tribe with a technically qualified site and is to negotiate a proposed agreement on reasonable terms. The agreement must be approved by the Congress. When it is submitted to the Congress, any proposed agreement with a volunteer host is to be accompanied by an environmental assessment for the proposed site. (An environmental assessment is also required if the MRS site is selected through a DOE-directed survey-and-evaluation process.)

The Secretary of Energy has announced the availability of grants to States, Indian Tribes, and affected units of local government that want to assess the feasibility of hosting an MRS facility.* The studies they conduct will help them determine whether they want to proceed to negotiations and to define the terms of the agreement they want to negotiate.

**Federal Register*, Vol. 56, No. 108, p. 25674, June 5, 1991.

The preliminary site requirements and considerations are not dependent on the approach to MRS development or on details of design and hence should be applicable to a range of design options and concepts for storing and handling spent fuel. There are several proven concepts for handling and storage that could be used at the MRS facility. The concept that is chosen will depend on safety, licensing, cost, and schedule considerations and the preferences of the volunteer host.

Examination of the applicable Federal statutes, regulations, executive orders, and DOE orders suggests that suitable sites for an MRS facility could be found throughout the contiguous United States. To identify the areas that would be excluded from further consideration, preliminary site requirements were identified. They are based on specific requirements in applicable Federal statutes and regulations, with special emphasis on Title 10 of the Code of Federal Regulations, Part 72 (10 CFR Part 72), the regulations of the Nuclear Regulatory Commission that will be applied to the MRS facility—in particular, the siting evaluation factors in Subpart E of 10 CFR Part 72.

The preliminary site considerations are derived from Federal statutes and regulations (including Subparts E and F of 10 CFR Part 72) and identify conditions that are preferable. If a site meets the preliminary site requirements, then it should be technically suitable and could then be examined in terms of the site considerations. The site considerations can be used to identify the favorable attributes of a technically qualified site—attributes that should enhance the ease with which compliance with applicable regulations can be demonstrated.

The preliminary site requirements and considerations provide guidance for assessing the technical suitability of a potential site. If a potential host is considering multiple sites for potential negotiations, then the potential sites should be examined in terms of the preliminary site considerations.

The preliminary site requirements and considerations are not currently part of the DOE's technical baseline of requirements and are not intended to fully cover all regulatory requirements or to cover requirements for the license application that will be submitted to the Commission. They are intended to provide guidance and have wide applicability. Their purpose is to permit a reasonable determination, on the basis of available information without extensive analysis, that a site is potentially suitable for an MRS facility. Thus, in order to identify a potential site, a State or an Indian Tribe should be able to use these site requirements and considerations on the basis of available and existing information. However, if sufficient data are not available for analysis, then it may be necessary to gather additional data.

The preliminary site requirements cover the following: collocation with a geologic repository, site size, single-use protected lands, coastal barriers, critical habitat for

endangered or threatened species, and hazardous wastes. The site considerations are divided into five groups: (1) geologic and other hazards, (2) environmental factors, (3) socioeconomic factors, (4) transportation, and (5) cost and development time. The environmental and socioeconomic considerations are not all inclusive. A broader range of factors will be included in the detailed analysis that will be conducted for the environmental assessment. This assessment will examine the probable effects of constructing and operating an MRS facility at the site.

Once a potential MRS site is negotiated, a detailed analysis of the regulatory requirements will be completed to support the design and licensing of the facility. This analysis will include the detailed site-specific parameters that are needed to support design. Many of the site-specific parameters will be necessary to demonstrate compliance with the regulatory requirements used to develop the site considerations described in this report. Before the submittal of a license application to the Nuclear Regulatory Commission, the conditions and characteristics of the site will be determined to demonstrate compliance with 10 CFR Part 72.

2. PRELIMINARY REQUIREMENTS AND CONSIDERATIONS FOR SITING AN MRS FACILITY

This section identifies and describes the preliminary site requirements and considerations to be used in assessing the technical suitability of potential sites for an MRS facility. The preliminary site requirements are based largely on the Federal statutory and regulatory requirements applicable to an MRS facility. The applicable Federal statutory and regulatory requirements are listed in Table 1; they were derived from the Nuclear Waste Policy Act as amended (42 U.S.C.10101 et seq.), the regulations in 10 CFR Part 72, and applicable environmental statutes and regulations. In addition, the site requirements include site size (Section 2.1.2). Although size is neither a statutory nor a regulatory requirement, the site must meet a minimum size requirement for the site to be practical for developing an MRS facility and complying with the regulations of the Nuclear Regulatory Commission. A preliminary estimate of the minimum size for a candidate site has been made and is discussed in Section 2.1.2.

The considerations involved in siting an MRS facility cover a wide range of technical areas. Geologic and other hazards (Section 2.2.1) must be evaluated for any prospective MRS site in order to assess the potential effects of these location-specific hazards on the safety of the facility. It is also necessary to consider environmental factors (Section 2.2.2) and the socioeconomic factors of land use and ownership (Section 2.2.3), assessing how they might be affected by the construction and operation of the MRS facility, and to evaluate transportation conditions and potential impacts (Section 2.2.4). Finally, in order to discriminate among potential sites, cost and development time may be considered (Section 2.2.5).

The preliminary site requirements for an MRS facility are presented in Table 2 and discussed in Section 2.1. The site considerations are presented in Tables 3 through 7 and discussed in Section 2.2.

Table 1. Matrix of preliminary siting requirements and considerations and their statutory and regulatory bases

SITING REQUIREMENTS	STATUTES	REGULATIONS	EXECUTIVE ORDERS	DOE ORDERS
Colocation with a geologic repository				
Site size				
Single-use protected lands				
Coastal barriers				
Critical habitat for endangered or threatened species				
Hazardous wastes				
SITE CONSIDERATIONS				
Natural seismic hazards				
Induced seismicity				
Surface faulting				
Floodplains				
Ground stability				
Volcanism				
Other extreme natural phenomena				
Human activities				
Wetlands and coastal zones				
Preservation of ground-water quality				
Preservation of air quality				
Protected species				
Historical, cultural, or archaeological resources				
Land use and ownership				
Transportation				
Cost and development time				
	7 U.S.C. 4201 et seq. 16 U.S.C. 1 et seq. 16 U.S.C. 431 et seq. 16 U.S.C. 461 et seq. 16 U.S.C. 469 et seq. 16 U.S.C. 470 et seq. 16 U.S.C. 470aa et seq. 16 U.S.C. 521 et seq. 16 U.S.C. 668 et seq. 16 U.S.C. 668dd et seq. 16 U.S.C. 703 et seq. 16 U.S.C. 1131 et seq. 16 U.S.C. 1246 et seq. 16 U.S.C. 1273 et seq. 16 U.S.C. 1331 et seq. 16 U.S.C. 1451 et seq. 16 U.S.C. 1531 et seq. 16 U.S.C. 3501 et seq. 23 U.S.C. 138 et seq. 42 U.S.C. 300f et seq. 42 U.S.C. 1996 et seq. 42 U.S.C. 7401 et seq. 42 U.S.C. 10101 et seq. 43 U.S.C. 315 et seq. 43 U.S.C. 1701 et seq.	7 CFR Part 658 10 CFR Part 72 10 CFR Part 100, App. A 10 CFR Part 1022 36 CFR Part 293 36 CFR Part 296 36 CFR Part 800 40 CFR Part 264 43 CFR Part 7 43 CFR Part 2800 43 CFR Part 8560 50 CFR Part 29 50 CFR Part 35	Executive Order 11593 Executive Order 11988 Executive Order 11990	DOE 4320.1B DOE 5700.2C

2.1 SITE REQUIREMENTS

The site requirements presented in this section are to be used in identifying a potential site by eliminating from further consideration sites or areas where an MRS facility cannot be sited because of statutory or regulatory restrictions. In addition, a minimum size for an MRS facility site has been identified on the basis of a conceptual design for an MRS facility and the regulatory requirements in 10 CFR Part 72. Each of the site requirements is specified below, followed by a statement of its basis and the applicable references.

2.1.1 Colocation with a Geologic Repository

Requirement

A potential site for an MRS facility shall not be located in the State of Nevada.

Basis

The Nuclear Waste Policy Act as amended prohibits the construction of an MRS facility in the State of Nevada. In addition, the regulations of the Nuclear Regulatory Commission (10 CFR 72.96) specify that an MRS facility cannot be sited in a State in which there is any site approved for characterization as a candidate site for a repository, which currently precludes only the State of Nevada.

References

Nuclear Waste Policy Act, Section 145(g), 42 U.S.C. 10101 et seq.

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.96, "Siting limitations."

2.1.2 Site Size

Requirement

The potential site will require a sufficient surface land area to accommodate spent-fuel transfer and storage facilities and support services and to provide a sufficient area around the MRS facility to ensure that radiation doses from all pathways resulting from facility operations are within regulatory limits and that there is an adequate controlled area in accordance with the applicable NRC regulations (10 CFR 72.104 and

72.106). For an undeveloped site, current estimates based on engineering studies indicate a requirement of about 450 acres. For sites at existing nuclear facilities the specific site-area requirements would be assessed case by case in accordance with the facility requirements and the applicable NRC regulations (10 CFR 72.104 and 72.106).

Basis

An MRS facility will have two distinct areas: (1) a protected area containing facilities for handling spent fuel in radiation shielded buildings and for storing spent fuel in shielded modular units and (2) the limited-access area that houses support buildings and services. Engineering estimates for a handling facility in the protected area and for a limited-access area are approximately 80 and 50 acres, respectively. The area required for storage within the protected area is dependent on the dry storage technology employed and the amount of spent fuel stored. For example, if concrete casks are used for storage, an additional area of about 50 acres would be needed to accommodate the quantity of spent fuel stored at the MRS facility (15,000 metric tons of uranium.)

The dose limits specified in Sections 72.104 and 72.106 are used as criteria to establish site boundaries and determine that an MRS facility at the proposed site would be able to comply with the NRC regulations. The area required is based on the location of the storage units and the distance between the site boundary and facilities or structures where spent fuel is handled or stored. However, the total area required for the MRS facility varies with the storage concept. For example, if concrete storage casks are used, the boundary is estimated to be 450 meters from the nearest cask. To store 15,000 metric tons of uranium, a total land requirement of about 420 acres is estimated for a facility that provides storage in concrete casks.

Preliminary calculations have been performed to assess the potential doses resulting from normal operations or under postulated accident conditions, using the outer fence around the controlled area as the site boundary. The results of these calculations show that the dose limits identified in 10 CFR 72.104(a) and 10 CFR 72.106(b) would not be exceeded. Site- and design-specific calculations demonstrating radiation safety will be contained in the application to the Nuclear Regulatory Commission for a license for an MRS facility.

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.104, "Criteria for radioactive materials in effluents and direct radiation from an ISFSI or MRS."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.106, "Controlled area of an ISFSI or MRS."

Analyses of Alternative Designs and Operating Approaches for a Monitored Retrievable Storage Facility, MRS Action Plan Task B Report, PNL-6770, Pacific Northwest Laboratories, Richland, Washington, 1988.

2.1.3 Single-Use Protected Lands

Requirement

A potential site for an MRS facility shall not be located on federally protected land dedicated to a single use not compatible with the construction and operation of an MRS facility.

Basis

Siting an MRS facility on lands protected by Federal statutes and regulations that dedicate land for a single use is prohibited because an MRS facility would not be compatible with the purpose for which these lands are set aside. This requirement excludes from consideration land dedicated to such uses as national parks, national wildlife refuges, and wilderness areas.

References

The Organic Act of the National Park Service, 16 U.S.C. 1 et seq.

National Wildlife Refuge System Administrative Act, 16 U.S.C. 668dd et seq.

National Wilderness Preservation Act, 16 U.S.C. 1131 et seq.

National Wild and Scenic Rivers System Act, 16 U.S.C. 1273 et seq.

Federal Land Policy Management Act, 43 U.S.C. 1701 et seq.

Wilderness-Primitive Areas, 36 CFR Part 293.

43 CFR Part 2800, Rights-of-Way, Principles and Procedures.

Wilderness Areas, 43 CFR Part 8560.

Land Use Management, 50 CFR Part 29.

Wilderness Preservation and Management, 50 CFR Part 35.

2.1.4 Coastal Barriers

Requirement

A potential site for an MRS facility shall not be located within the Coastal Barrier Resources System, which consists of undeveloped coastal land along the Atlantic and Gulf coasts and adjacent wetlands and inlets.

Basis

New Federal expenditures for construction within the Coastal Barrier Resources System are prohibited. Undeveloped coastal land along the Atlantic and Gulf coasts and adjacent wetlands and inlets are therefore excluded from further consideration.

Reference

Coastal Barriers Resources Act, 16 U.S.C 3501 et seq.

2.1.5 Critical Habitat for Endangered or Threatened Species

Requirement

A potential site for an MRS facility shall not be located in areas designated a critical habitat for any species on the Federal list of endangered or threatened species.

Basis

The presence of an endangered or threatened species at and in the vicinity of a potential MRS site does not exclude a site from consideration. However, the presence of an area designated a critical habitat would preclude the use of a site for an MRS facility. The Endangered Species Act requires that any action authorized, funded, or carried out by a Federal agency in the United States must not be likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat.

Reference

Endangered Species Act, 16 U.S.C. 1531 et seq.

2.1.6 Hazardous Wastes

Requirement

Potential MRS sites that are more than 200 feet from a Holocene-age fault, outside a 100-year floodplain, and not within or adjacent to wetlands can be considered.

Basis

To maintain flexibility for MRS facility operations, it is assumed, for the sake of conservatism, that the hazardous-waste location standards in the regulations implementing the Resource Conservation and Recovery Act (40 CFR 264.18) would be applicable. Currently, facilities for the management of hazardous wastes must be at least 200 feet away from geologic faults of Holocene age (last 10,000 years). Amendments are under consideration that would prohibit hazardous-waste facilities to be sited within 100-year floodplains or in areas within or adjacent to wetlands.

Reference

Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 40 CFR Part 264, Section 264.18, "Location standards."

Table 2. Site requirements

<u>Category</u>	<u>Requirement</u>	<u>References</u>
Colocation with a geologic repository (Section 2.1.1)	A potential site for an MRS facility shall not be located in the State of Nevada.	42 U.S.C. 10101, Sec. 145(g) 10 CFR 72.96
Site size (Section 2.1.2)	Current estimates for an undeveloped site indicate a land requirement of about 450 acres. For proposed sites at existing nuclear facilities the specific site area requirements would be assessed on a case-by-case basis in accordance with the facility requirements and the applicable NRC regulations (10 CFR 72.104 and 106).	10 CFR 72.104(a) 10 CFR 72.106(a) 10 CFR 72.106(b)
Single-use protected lands (Section 2.1.3)	A potential site for an MRS facility shall not be located on Federally protected land dedicated to a single use not compatible with the construction and operation of an MRS facility.	16 U.S.C. 1 et seq. 16 U.S.C. 668dd et seq. 16 U.S.C. 1131 et seq. 16 U.S.C. 1273 et seq. 43 U.S.C. 1701 et seq. 36 CFR Part 293 43 CFR Part 2800 43 CFR Part 8560 50 CFR Part 29 50 CFR Part 35
Coastal barriers (Section 2.1.4)	A potential site for an MRS facility shall not be located within the Coastal Barrier Resources System.	16 U.S.C. 3501 et seq.
Critical habitat for endangered or threatened species (Section 2.1.5)	A potential site for an MRS facility shall not be located in areas designated as critical habitat for any species on the Federal list of endangered or threatened species.	16 U.S.C. 1531 et seq.
Hazardous wastes (Section 2.1.6)	The regulations implementing the Resource Conservation and Recovery Act (RCRA) specify that potential MRS sites that are located beyond 200 feet from a Holocene-age fault can be considered. Proposed amendments to this regulation indicate that potential MRS sites outside 100-year floodplains and not within, or adjacent to, wetlands can be considered.	40 CFR 264.18

2.2 SITE CONSIDERATIONS

The site considerations are grouped into five categories: geologic and other hazards (Section 2.2.1), environmental factors (Section 2.2.2), socioeconomic factors (Section 2.2.3), transportation (Section 2.2.4), and cost and development time (Section 2.2.5). The sections that follow present a statement of each consideration, a brief discussion of its regulatory basis, and the applicable references. In addition to the references cited below, applicable portions of DOE Orders 6430.1A and 4300.1B Chg 1, may be used in siting NRC licensed facilities.

2.2.1 Geologic and Other Hazards

Geologic and other hazards should be considered in site selection because of their potential effects on the construction and operation of an MRS facility.

The hazards identified in this section do not cover all of the regulatory approvals that will be needed for licensing an MRS facility. The considerations focus instead on a reasonable determination that could be made on the basis of available information and without extensive analysis as part of the process for identifying potential sites.

2.2.1.1 Natural Seismic Hazards

Consideration

Sites beyond the range of strong near-field ground motion from historical earthquakes on large capable faults are preferred.

Basis

The consideration of natural seismic hazards is required by NRC regulations because an earthquake might affect the safety of MRS operations. However, many sites in the contiguous United States should be found suitable in terms of this consideration.

East of the Rocky Mountain Front (i.e., east of approximately 104 degrees west longitude), except in areas of known seismic activity (e.g., New Madrid, Missouri; Charleston, South Carolina; and Attica, New York), most potential sites will be acceptable because the potential vibratory ground motion is less than an appropriate response spectrum anchored at 0.2g. A design earthquake and response spectrum anchored at 0.25g would generally be considered conservative and may expedite

licensing since the Nuclear Regulatory Commission would not require a full review under 10 CFR Part 100, Appendix A (see 10 CFR 72.102).

For sites west of the Rocky Mountain Front and in other areas of known seismic activity, it will be necessary to evaluate seismicity in accordance with the techniques specified in 10 CFR Part 100, Appendix A.

In evaluating the seismic hazards for a potential MRS site, sites where nuclear power facilities have been licensed would have advantages in that the potential for seismic hazards would already have been evaluated in a formal license proceeding and found acceptable.

While the site considerations for natural seismic hazards cite Appendix A to 10 CFR Part 100 (cited in 10 CFR Part 72), the DOE has expressed concern over the use of Appendix A for a nonreactor facility such as the surface facilities of a geologic repository or an MRS facility. Appendix A was specifically written for nuclear power reactors and was based on the scientific and engineering practices of the late 1960s and early 1970s. Many technical advancements that have been made since that time are not reflected in Appendix A. The approach to evaluating seismic hazards should be based on state-of-the-art scientific methods, as appropriate. If at some point in time the requirements of Appendix A to 10 CFR Part 100 can be shown not to add to public health and safety, the DOE will investigate all options for assessing the seismic safety of the MRS facility, which may include a request for updating 10 CFR Part 72 to reflect the state of the art in the evaluation of seismic hazards and in seismic design.

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90, "General considerations."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.92, "Design basis external natural events."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.98, "Identifying regions around an ISFSI or MRS site."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.102, "Geological and seismological characteristics."

Reactor Site Criteria, 10 CFR Part 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," Section V(a)(1)(iv).

Site Development Planning, DOE 4320.1B.

2.2.1.2 Induced Seismicity

Consideration

Sites are preferred without the potential for seismicity induced by human activities, such as explosive blasts; the withdrawal of fluid from, or addition to, the subsurface; the extraction of minerals; or the loading effects of dams or reservoirs.

Basis

Certain facilities or activities may induce ground motion. The potential for, and the frequency and severity of, these man-induced events that could affect the safety of the MRS facility should be considered. The locations of past or present activities that may be causes of induced seismicity should be determined, and both past and present facilities or activities should be evaluated. Sites away from causes of induced seismicity are preferred.

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90(b).

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.94, "Design basis external man-induced events."

2.2.1.3 Surface Faulting

Consideration

Sites that do not display evidence, at or near the surface, of differential ground displacement caused directly by the movement of Quaternary-age faults, as distinct from nontectonic types of ground disruptions, are preferred.

Basis

Because surface faulting could cause differential ground displacement that might affect MRS structures or operations and is considered in NRC regulations, its potential at the site must be evaluated. Candidate site areas where licensed nuclear and other critical facilities already exist may be preferable since the nature of capable faults or other Quaternary faults within 200 miles of the site and their potential effects would have been previously evaluated. This consideration is not widely applicable to sites east of the Rocky Mountain Front, where only two capable faults have been recognized.

To maintain operational flexibility, the Resource Conservation and Recovery Act is assumed to apply to an MRS facility, and areas within 200 feet of a Holocene fault would be excluded from further consideration (see Section 2.1.6).

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90, "General considerations."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.102, "Geological and seismological characteristics."

Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 40 CFR Part 264, Section 264.18, "Location standards."

Site Development Planning, DOE 4320.1B.

2.2.1.4 Floodplains

Consideration

Sites outside 100-year floodplains are preferred. The MRS facility should be sited to avoid, to the extent possible, the long- and short-term adverse effects from floods (from surface-water bodies or surface runoff) or areas where extensive modification of floodplains would be required.

Basis

This guideline is concerned with (1) the potential effects of floods on an MRS facility located in a floodplain and (2) the potential effects of the MRS facility on the floodplain, especially if extensive modifications of the floodplain are required. As in the case of seismic activity and surface displacement, the frequency and severity of flooding should be considered in MRS siting. Moreover, the adverse effects associated with the occupancy and modification of floodplains should be avoided. Thus, sites without potential adverse effects associated with the occupancy and modification of floodplains are preferred.

To maintain operational flexibility, the Resource Conservation and Recovery Act is assumed to apply to an MRS facility, and sites outside 100-year floodplains should be considered (Section 2.1.6).

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90(f).

Compliance with Floodplain/Wetlands Environmental Review Requirements, 10 CFR Part 1022.

Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 40 CFR Part 264, Section 264.18, "Location standards."

Floodplain Management, Executive Order 11988.

Site Development Planning, DOE 4320.1B.

2.2.1.5 Ground Stability

Consideration

Sites without soil or bedrock conditions that have potential for ground movement from liquefaction, subsidence, or landslides are preferred. A site should be located to avoid adverse effects from nearby ground movement. The soil bearing capacity of the potential site should be adequate for the proposed foundation loading.

Basis

Sites with stable geologic and foundation-engineering characteristics are preferred. Sites should be evaluated for the potential for ground movement from liquefaction, subsidence, landslides, or other soil instabilities due to vibratory ground motion or the withdrawal of subsurface materials.

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90, "General considerations."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.102, "Geological and seismological characteristics."

Site Development Planning, DOE 4320.1B.

2.2.1.6 Volcanism

Consideration

Sites without potential volcanic hazards that would adversely affect the safe operation of an MRS facility are preferred.

Basis

The potential for, and the severity of, volcanism should be evaluated. Volcanism that may exist or can occur in the region of a proposed site should be identified and assessed in terms of its potential effects on the safe operation of the MRS facility. Sites that are outside areas of explosive volcanism, the resulting mudflows, or other conditions that would require extraordinary engineering measures are preferred.

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90, "General considerations."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.92, "Design basis external natural events."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart F, "General Design Criteria," Sections 72.122(b)(1)(2) and (3).

Site Development Planning, DOE 4320.1B.

2.2.1.7 Other Extreme Natural Phenomena

Consideration

Sites located outside a region of extreme natural phenomena or severe weather that may adversely affect the design and safe operation of an MRS facility are preferred.

Basis

The potential for, and the frequency and severity of, severe-weather events should be evaluated. Severe-weather events like tornadoes, lightning, and hurricanes and earthquake-induced phenomena like tsunamis and seiches should be evaluated in terms of their potential for occurring in the region of the site and their effects on the safety of the MRS facility. Since the potential for severe weather may require extraordinary engineering measures in the design of the MRS facility, sites located in regions without a significant potential for severe weather are preferred.

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90, "General considerations."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.92, "Design basis external natural events."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart F, "General Design Criteria," Sections 72.122(b)(1)(2) and (3).

2.2.1.8 Human Activities

Consideration

Sites away from human activities that could affect the safe operation of an MRS facility are preferred. In addition, because of limitations imposed by the regulations of the Nuclear Regulatory Commission, sites more than 50 miles from the first geologic repository are preferred.

Basis

This siting consideration addresses hazards from human activities in close proximity to a candidate site. Sites are preferred if they do not contain exploitable mineral and energy resources and are not adjacent to airports, plants in which toxic chemicals are manufactured, facilities with explosives, and refineries. In addition, the NRC regulations specify that if an MRS facility is located within 50 miles of the first geologic repository, then the combined quantity of spent fuel in both facilities must not exceed 70,000 metric tons of uranium until a second repository is in operation.

References

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.90, "General considerations."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.94, "Design basis external man-induced events."

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.96(c).

Site Development Planning, DOE 4320.1B.

Table 3. Site considerations: geologic and other hazards

<u>Category</u>	<u>Consideration</u>	<u>References</u>
Natural seismic hazards (Section 2.2.1.1)	Sites beyond the range of strong near-field ground motion from historical earthquakes on large capable faults are preferred.	10 CFR 72.90 10 CFR 72.92 10 CFR 72.98 10 CFR 72.102 10 CFR Part 100, Appendix A DOE 4320.1B
Induced seismicity (Section 2.2.1.2)	Sites without the potential for seismicity induced by human activities like explosive blasts; the withdrawal of fluid from, or addition to, the subsurface; the extraction of minerals; or the loading effects of dams or reservoirs are preferred.	10 CFR 72.90(b) 10 CFR 72.94
Surface faulting (Section 2.2.1.3)	Sites that do not show evidence at or near the surface of differential ground displacement caused directly by Quaternary fault movement, as distinct from nontectonic types of ground disruption, are preferred.	10 CFR 72.90 10 CFR 72.102 40 CFR 264.18 DOE 4320.1B
Floodplains (Section 2.2.1.4)	Sites outside 100-year floodplains are preferred. The MRS facility should be sited to avoid, to the extent feasible, adverse impacts from floods or areas that would require extensive modification of floodplains. If proposed amendments to the Resource Conservation and Recovery Act location standards are adopted, 100-year floodplains should be avoided to maintain operation flexibility.	10 CFR 72.90(f) 10 CFR Part 1022 40 CFR 264.18 Executive Order 11988 DOE 4320.1B
Ground stability (Section 2.2.1.5)	Sites without soil or bedrock conditions that have potential for ground movement from liquefaction, subsidence, or landslides are preferred.	10 CFR 72.90 10 CFR 72.102 DOE 4320.1B
Volcanism (Section 2.2.1.6)	Sites without potential volcanic hazards that would adversely affect the safe operation of an MRS facility are preferred.	10 CFR 72.90 10 CFR 72.92 10 CFR 72.122(b)(1)(2) and (3) DOE 4320.1B

Table 3. Site considerations: geologic and other hazards (continued)

<u>Category</u>	<u>Consideration</u>	<u>References</u>
<p>Other extreme natural phenomena (Section 2.2.1.7)</p>	<p>Sites located outside a region of extreme natural phenomena or severe weather that may adversely affect the design and safe operation of an MRS facility are preferred.</p>	<p>10 CFR 72.90 10 CFR 72.92 10 CFR 72.122(b)(1)(2) and (3)</p>
<p>Human activities (Section 2.2.1.8)</p>	<p>Sites away from human activities that could affect the safe operation of an MRS facility are preferred. Areas would be preferred if they do not contain exploitable mineral and energy resources and are not located adjacent to airports or facilities that store or produce toxic chemicals or explosives.</p>	<p>10 CFR 72.90 10 CFR 72.94 DOE 4320.1B</p>
	<p>This siting consideration is intended to direct site-evaluation efforts to consider the hazards from human activities in close proximity to a candidate site.</p>	
	<p>In addition, if an MRS facility is located within 50 miles of the first geologic repository, then the combined quantity of spent fuel at both facilities must not exceed 70,000 metric tons of heavy metal until a second repository is in operation.</p>	<p>10 CFR 72.96(c)</p>

2.2.2 Environmental factors

The potential for significant adverse environmental effects should be considered in selecting the site for an MRS facility, including potential effects on regional or local natural ecosystems, air and water quality, endangered species, and the human population. Efforts should be made to minimize significant adverse effects that might be caused by the construction and operation of an MRS facility. Key environmental siting considerations and their bases are given below.

The environmental siting considerations identified here do not cover all of the environmental factors that must be evaluated or all of the regulatory approvals that will be needed for an MRS facility. Rather, the criteria focus instead on a reasonable determination that could be made on the basis of available information and without extensive analysis.

2.2.2.1 Wetlands and Coastal Zones

Consideration

Sites outside wetlands and coastal zones are preferred.

Basis

A site should be located to minimize adverse effects on wetlands and coastal areas. However, if no practicable alternatives exist, then the DOE must assess the adverse effects that could result from the occupancy and modification of wetlands. Siting should consider both State coastal zone management programs and national policy to preserve and protect coastal zones. To maintain operational flexibility, the Resource Conservation and Recovery Act is assumed to apply to an MRS facility, and sites outside wetlands should be considered.

References

Coastal Zone Management Act, 16 U.S.C. 1451 et seq.

Compliance with Floodplain/Wetlands Environmental Review Requirements, 10 CFR Part 1022.

Protection of Wetlands, Executive Order 11990.

Site Development Planning, DOE 4320.1B.

2.2.2.2 Preservation of Ground-Water Quality

Consideration

Sites outside the recharge areas for sole-source aquifers or wellhead protection areas are preferred. Sites not located above major water resources are preferred.

Basis

A site should be so located that regulations for preserving ground-water quality are not violated by the construction or operation of an MRS facility. Siting outside the recharge area for a sole-source aquifer or a wellhead-protection area as determined by the Environmental Protection Agency will protect from potential contamination a sole or principal drinking-water source for an area. This does not preclude the siting of an MRS facility in recharge areas for multiple-source aquifers or areas with more than one water source. If an MRS site is located over one of these aquifers, measures must be taken to protect ground-water quality from hazardous or radioactive materials.

References

Safe Drinking Water Act, 42 U.S.C. 300f et seq.

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart F, "General Design Criteria," Section 72.122(b)(4).

Site Development Planning, DOE 4320.1B.

2.2.2.3 Preservation of Air Quality

Consideration

To facilitate compliance with air-quality regulations, it would be preferable to site an MRS facility such that air-quality Class I areas are not adversely affected by emissions from the MRS facility.

Basis

For sites near Class I areas, it may be difficult to obtain a permit under the Clean Air Act if the operation of an MRS facility will increase either sulfur dioxide or particulate matter concentrations in Class I areas.

References

Clean Air Act, 42 U.S.C. 7401 et seq.

Site Development Planning, DOE 4320.1B.

2.2.2.4 Protected Species

Consideration

Areas where an MRS facility would not adversely affect protected species—that is, species listed by the Federal Government as threatened or endangered (e.g., bald and golden eagles, migratory birds, and wild free-roaming horses and burros) and species protected by the State—are preferred.

Basis

In siting, consideration should be given to possible effects on federally protected species. Endangered, threatened, or otherwise protected species and their habitats should not be jeopardized. If endangered or threatened species are present at a candidate site, biological assessments must be conducted to evaluate the potential effects on the species.

References

Bald and Golden Eagles Act, 16 U.S.C. 668 et seq.

Migratory Bird Treaty Act, 16 U.S.C. 703 et seq.

Wild Horses and Burros: Protection, Management, and Control Act, 16 U.S.C. 1331 et seq.

Endangered Species Act, 16 U.S.C. 1531 et seq.

Site Development Planning, DOE 4320.1B.

2.2.2.5 Historical, Cultural, or Archaeological Resources

Consideration

Sites not containing significant historical, cultural, or archaeological resources and where the MRS facility would not interfere with Native American religious activities are preferred.

Basis

In identifying potential sites, consideration should be given to avoiding or minimizing adverse effects on historical, cultural, or archaeological resources. If the construction and operation of the MRS facility could affect such resources, then it will be necessary to identify any adverse effects and prepare a plan for reducing, offsetting, or otherwise mitigating those effects.

It will also be necessary to consider the effects of the MRS project on the traditional beliefs and practices of Native Americans, including access to sites, the use and possession of sacred objects, and the ability to continue conducting traditional religious practices.

References

Antiquities Act, 16 U.S.C. 431 et seq.

Historic Sites, Buildings and Antiquities Act, 16 U.S.C. 461 et seq.

Archeological and Historic Preservation Act, 16 U.S.C. 469.

National Historic Preservation Act, 16 U.S.C. 470 et seq.

Archaeological Resources Protection Act, 16 U.S.C. 470aa et seq.

American Indian Religious Freedom Act, 42 U.S.C. 1996 et seq.

Protection of Archaeological Resources: Uniform Regulations, 36 CFR Part 296.

Protection of Historic and Cultural Properties, 36 CFR Part 800.

Protection of Archaeological Resources: Uniform Regulations, 43 CFR Part 7.

Protection and Enhancement of Cultural Environment, Executive Order 11593.

Site Development Planning, DOE 4320.1B.

Table 4. Site considerations: environmental factors

<u>Category</u>	<u>Consideration</u>	<u>References</u>
Wetlands and coastal zones (Section 2.2.2.1)	Sites outside wetlands and coastal zones are preferred.	16 U.S.C. 1451 et seq. 10 CFR Part 1022 Executive Order 11990 DOE 4320.1B
Preservation of ground-water quality (Section 2.2.2.2)	Sites outside the recharge areas for sole-source aquifers or well-head protection areas or sites not located above major water resources are preferred.	42 U.S.C. 300f et seq. 10 CFR 72.122(b)(4) DOE 4320.1B
Preservation of air quality (Section 2.2.2.3)	To facilitate compliance with air-quality regulations, preferred sites are those where air-quality Class I areas would not be adversely affected by emissions from the MRS facility.	42 U.S.C. 7401 et seq. DOE 4320.1B
Protected species (Section 2.2.2.4)	Areas where an MRS facility would not adversely affect protected species (i.e., species listed by the Federal Government as threatened or endangered, such as bald and golden eagles, migratory birds, and wild free-roaming horses and burros) and species protected by the State in which the site is located are preferred.	16 U.S.C. 668 et seq. 16 U.S.C. 703 et seq. 16 U.S.C. 1331 et seq. 16 U.S.C. 1531 et seq. DOE 4320.1B
Historical, cultural, or archaeological resources (Section 2.2.2.5)	Sites not containing significant historical, cultural, or archaeological resources and where the MRS facility would not interfere with Native American religious sites or activities are preferred.	16 U.S.C. 431 et seq. 16 U.S.C. 461 et seq. 16 U.S.C. 469 et seq. 16 U.S.C. 470 et seq. 16 U.S.C. 470aa et seq. 42 U.S.C. 1996 et seq. 36 CFR Part 296 36 CFR Part 800 43 CFR Part 7 Executive Order 11593 DOE 4320.1B

2.2.3 Socioeconomic Factors

Socioeconomic conditions and potential effects on the local community, the region, the State, and Indian Tribes should be considered in siting the MRS facility. The socioeconomic factors addressed here are limited to land use and ownership. Other factors will be addressed in the environmental assessment that is to accompany the submittal of a proposed agreement to the Congress. The DOE will prepare this assessment upon request of the Negotiator. The assessment will include a detailed statement of the potential socioeconomic effects, as well as environmental and other effects, of constructing and operating an MRS facility at a particular site.

2.2.3.1 Land Use and Ownership

Consideration

Sites located so that land-use and ownership issues do not cause unacceptable delays in siting and constructing an MRS facility are preferred.

Basis

Consideration should be given to existing land ownership, the ease of land acquisition, and the time required to obtain access to, and control of, the land. Sites should be evaluated in terms of whether their use for an MRS facility would conform to existing land-use and zoning plans. If an MRS facility represents a nonconforming use under current plans, the feasibility of timely siting in that location should be assessed.

Consideration should also be given to minimizing the extent to which the MRS facility would contribute to the unnecessary and irretrievable conversion of farmland to nonagricultural uses. Criteria developed by the U.S. Department of Agriculture would be used to identify and evaluate the adverse effects of the MRS facility on the preservation of farmland, especially prime and unique farmland, including an evaluation of alternatives.

Pertinent regulations promulgated by such agencies as the U.S. Department of Agriculture and the U.S. Department of the Interior (i.e., the Bureau of Land Management, the National Park Service, and other agencies) should also be evaluated and considered.

References

- Farmland Protection Policy Act, 7 U.S.C. 4201 et seq.
- National Forest Organic Act, 16 U.S.C. 521 et seq.
- National Trails System Act, 16 U.S.C. 1246 et seq.
- Wild and Scenic Rivers Act, 16 U.S.C. 1273 et seq.
- Preservation of Parklands Act, 23 U.S.C. 138 et seq.
- Taylor Grazing Act, 43 U.S.C. 315 et seq.
- Federal Land Policy Management Act, 43 U.S.C. 1701 et seq.
- Farmland Protection Policy Act regulations, 7 CFR Part 658.
- Rights-of-Way, Principles and Procedures, 43 CFR Part 2800.
- Site Development Planning, DOE 4320.1B.

Table 5. Site considerations: socioeconomic factors

<u>Category</u>	<u>Consideration</u>	<u>References</u>
Land use and ownership (Section 2.2.2.3.1)	Sites located so that land-use and ownership issues do not cause unacceptable delays in siting and constructing an MRS facility are preferred.	7 U.S.C. 4201 et seq. 16 U.S.C. 521 et seq. 16 U.S.C. 1246 et seq. 16 U.S.C. 1273 et seq. 23 U.S.C. 138 et seq. 43 U.S.C. 315 et seq. 43 U.S.C. 1701 et seq. 7 CFR Part 658 43 CFR Part 2800 DOE 4320.1B

2.2.4 Transportation

Consideration

Sites with access to an adequate transportation infrastructure that would enable safe and reasonable passage are preferred. It is also preferred that the natural terrain in the area of the site not include steep grades, sharp switchbacks, rivers, lakes, landslides, and rock slides.

Basis

The evaluation of a site should include (1) the extent of existing suitable road, rail, and/or barge access to the site (regional transportation effects on the environment), (2) the extent to which local-community traffic-flow patterns would be altered, and (3) the extent to which regional and local routes to the site minimize routing constraints.

If the construction of extensive new roads or rail systems or the extensive upgrading of existing facilities is required, the potential environmental effects of these activities also should be considered. If the existing transportation infrastructure in the region is inadequate, then additional consideration should be given to the time required to obtain right-of-way approvals and to construct improvements.

Reference

Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, 10 CFR Part 72, Subpart E, "Siting Evaluation Factors," Section 72.108, "Spent fuel or high-level radioactive waste transportation."

Site Development Planning, DOE 4320.1B.

Table 6. Site considerations: transportation

<u>Category</u>	<u>Consideration</u>	<u>References</u>
Transportation (Section 2.2.4)	<p>Sites with access to an adequate transportation infrastructure that would enable safe and reasonable passage are preferred.</p> <p>Sites in areas where the natural terrain does not include steep grades, sharp switchbacks, rivers, lakes, landslides, and rock slides are preferred.</p>	10 CFR 72.108 DOE 4320.1B

2.2.5 Cost and Development Time

No specific considerations for cost and development time are specified, as there are no specific statutory or regulatory bases for such considerations. However, in the event that potential sites are compared, and the siting considerations of Section 2.2 do not clearly indicate preference for a particular site, then cost and development time could be considered.

Cost may be of significance if conditions at a site may require extensive or complex design and construction measures to meet applicable regulatory requirements or to permit efficient operations. The cost implications of relative distances from utilities, a railhead, or a major highway system and the potential economic penalties of new accesses and upgrades of transportation networks could be factors to be considered.

Development time may also be of significance if conditions at a site require extensive time for permitting or could result in extensive licensing time before the start of construction.

Reference

Cost Estimating, Analysis, and Standardization, DOE 5700.2C.

Table 7. Site considerations: cost and development time

<u>Category</u>	<u>Consideration</u>	<u>References</u>
Cost and development time (Section 2.2.5)	No specific considerations for cost and development time are specified, as there are no specific Federal statutory or regulatory bases for such considerations. However, if potentially suitable sites are compared, and the site considerations of Section 2.2 do not clearly indicate preference for a particular site, then cost and development time could be considered.	DOE 5700.2C

**LIST OF PERTINENT STATUTES, REGULATIONS,
EXECUTIVE ORDERS, AND DOE ORDERS**

Statutes

- 7 U.S.C. 4201 et seq. Farmland Protection Policy Act
- 16 U.S.C. 1 et seq. The Organic Act of the National Park Service
- 16 U.S.C. 431 et seq. Antiquities Act
- 16 U.S.C. 461 et seq. Historic Sites, Buildings, and Antiquities Act
- 16 U.S.C. 469 et seq. Archeological and Historic Preservation Act
- 16 U.S.C. 470 et seq. National Historic Preservation Act
- 16 U.S.C. 470aa et seq. Archaeological Resources Protection Act
- 16 U.S.C. 521 et seq. National Forest Organic Act
- 16 U.S.C. 668 et seq. Bald and Golden Eagle Act
- 16 U.S.C. 668dd et seq. National Wildlife Refuge System Administration Act
- 16 U.S.C. 703 et seq. Migratory Bird Treaty Act
- 16 U.S.C. 1131 et seq. National Wilderness Preservation Act
- 16 U.S.C. 1246 et seq. National Trails System Act
- 16 U.S.C. 1273 et seq. National Wild and Scenic Rivers System
- 16 U.S.C. 1331 et seq. Wild Horses and Burros: Protection, Management, and Control Act
- 16 U.S.C. 1451 et seq. Coastal Zone Management Act
- 16 U.S.C. 1531 et seq. Endangered Species Act
- 16 U.S.C. 3501 et seq. Coastal Barrier Resources Act
- 23 U.S.C. 138 et seq. Preservation of Parklands Act
- 42 U.S.C. 1996 et seq. American Indian Religious Freedom Act
- 42 U.S.C. 300f et seq. Safe Drinking Water Act
- 42 U.S.C. 7401 et seq. Clean Air Act
- 42 U.S.C. 10101 et seq. Nuclear Waste Policy Act of 1982 as amended
- 43 U.S.C. 315 et seq. Taylor Grazing Act
- 43 U.S.C. 1701 et seq. Federal Land Policy Management Act

**LIST OF PERTINENT STATUTES, REGULATIONS,
EXECUTIVE ORDERS, AND DOE ORDERS**
(continued)

Regulations

7 CFR Part 658	Farmland Protection Policy Act
10 CFR Part 72	Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste
10 CFR Part 100	Reactor Site Criteria, Appendix A
10 CFR Part 1022	Compliance with Floodplain/Wetlands Environmental Review Requirements
36 CFR Part 293	Wilderness-Primitive Areas
36 CFR Part 296	Protection of Archaeological Resources: Uniform Regulations
36 CFR Part 800	Protection of Historic and Cultural Properties
43 CFR Part 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
43 CFR Part 7	Protection of Archaeological Resources: Uniform Regulations
43 CFR Part 2800	Rights-of-Way, Principles and Procedures
43 CFR Part 8560	Wilderness Areas
50 CFR Part 29	Land Use Management
50 CFR Part 35	Wilderness Preservation and Management

Executive Orders

Executive Order 11593	Protection and Enhancement of Cultural Environment
Executive Order 11988	Floodplain Management
Executive Order 11990	Protection of Wetlands

DOE Orders

DOE 4300.1B Chg 1	Real Property Management
DOE 4320.1B	Site Development Planning
DOE 5700.2C	Cost Estimating, Analysis, and Standardization
DOE 6430.1A	General Design Criteria

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**OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300**

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