January 10, 2007

CCN 208195

Mr. T. L. Cook
NGNP Project Manager
NE-20
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874

SUBJECT: Contract No. DE-AC07-05ID14517 – Milestone Completion for G-IN07NG0802 – Next Generation Nuclear Plant Project Site Selection and Characterization

Dear Mr. Cook:

One part of moving forward with the Next Generation Nuclear Plant (NGNP) project is considering the potential environmental impacts that this facility may have, if constructed here at the Idaho National Laboratory (INL). The National Environmental Policy Act (NEPA) of 1969 provides Department of Energy (DOE) decision makers with a process to systematically consider potential environmental consequences of agency decisions.

The attached deliverable includes a draft plan that provides an overview of the proposed steps for selecting a site for the NGNP and the DOE/NRC (NEPA) process for assessing the potential environmental impacts from such a facility. Discussion includes the basis for the initial site selection, and an overview of the DOE EIS process, a description of how the NEPA review fits within the NRC licensing process, and a proposed high-level schedule for site characterization-related activities.

The attached report documents completion of this Level 2 Milestone. If you have any questions, please contact me at (208) 526-4250 or Mark Holbrook, NGNP Licensing Coordinator, by telephone at 208-526-4362, or e-mail at mark.holbrook@inl.gov.

Sincerely,

Rafael Soto, Deputy Project Director
Next Generation Nuclear Plant Project

MH:cn

Attachment

cc: M. L. Adams, DOE-ID, MS 1221
C. P. Fineman, DOE-ID, MS 1235
L. A. Sehlke, INL, MS 3810
R. M. Versluis, DOE-HQ

Attachment
January 10, 2007
CCN 208195
Page 1 through 10, inclusive

NGNP

SITE SELECTION & CHARACTERIZATION PLAN

January 12, 2007

1. PURPOSE

In the near future, the U.S. Depart of Energy (DOE) will need to make important decisions regarding design and construction of the Next Generation Nuclear Plant (NGNP). One part of making these decisions is considering the potential environmental impacts that this facility may have, if constructed here at the Idaho National Laboratory (INL). The National Environmental Policy Act (NEPA) of 1969 provides DOE decision makers with a process to systematically consider potential environmental consequences of agency decisions. In addition, the NEPA provides important opportunities for public input.

The *Energy Policy Act of 2005* (Title VI, Subtitle C, Section 644) states that the "Nuclear Regulatory Commission shall have licensing and regulatory authority for any reactor authorized under this subtitle." This stipulates that the Nuclear Regulatory Commission (NRC) will license the NGNP for operation. The NRC NEPA Regulations (10 CFR Part 51) require that the NRC prepare an Environmental Impact Statement (EIS) for a permit to construct a nuclear power reactor. The applicant is required to submit an Environmental Report (ER) to aid the NRC in complying with NEPA, and the NRC is responsible for evaluating the reliability of any of the information that it uses to prepare the EIS.

This plan provides an overview of the proposed steps for selecting a site for the NGNP and the DOE/NRC (NEPA) process for assessing the potential environmental impacts from such a facility. Discussion includes the basis for the initial site selection, and an overview of the DOE EIS process, a description of how the NEPA review fits within the NRC licensing process, and a proposed high-level schedule for site characterization-related activities.

2. INITIAL NGNP SITE SELECTION

In 1983, a site selection was performed by the DOE for the New Production Reactor (NPR) at the INL. In 1989, the original site selection process was reviewed to determine if the primary site selected in 1983 was still considered the best site in light of the most recent site characterization data (see Report EGG-NPR-8517, Rev. 1, "*Site Selection Report for the New Production Reactor at the Idaho National Engineering Laboratory,*" dated July 1989).

This report determined that there was no reason to alter the previously selected primary location (called "Site E") for the NPR. It is important to note that this activity was taken with the understanding that suitability would be based on NRC siting criteria. Site E is close to established roads, the railroad, and the INL site electrical transmission loop. Considerable resources were expended in characterizing the

selected site that is located east of the INTEC facility. Given the type of facility that planned, it is logical that Site E would be a prime candidate for the initial preconceptual design studies associated with locating the NGNP facility.

The information gained from the concept designs will provide a basis for the next level of technical and functional requirements, and should provide DOE with important decisional information needed to focus future research and development.

In the longer term, once this information has been assessed and a decision has been made to go forward with the project, the conceptual design phase is initiated. Selecting an expected location for the NGNP facility is one of the important activities that take place during conceptual design. This will include a reassessment of the viability of the original Site E selection in light of current siting requirements. This should serve as verification that the original NPR site down-selection remains valid under current licensing regulations. In association with this activity, the DOE would make an announcement to the public and to initiate development of an EIS. That process is discussed in the next section.

Current Status:

1. The INL has initiated preconceptual design activities to focus and prioritize research and development work and to prepare for the Conceptual Design for the NGNP. The preconceptual design work will include evaluation of a range of design parameters and alternatives and based on the justification for the parameters and alternatives so-developed, prepare a preconceptual design for the NGNP prototype facilities. This work will include a site study that assumes a "Greenfield" location at the INL. NPR Site E is the assumed site for this study.

2. Based on the work that was done in the 1980s for the NPR project, it would be cost beneficial to gather any existing data from the NPR Site E characterization effort and not redo the site characterization activities. However, much of that data is currently controlled by the Idaho Cleanup Project (ICP). Therefore, activities have been initiated to determine the location of existing NPR site characterization data and to collect these data into a controlled locations.

3. DOE ENVIRONMENTAL IMPACT STATEMENT

Prior to constructing a nuclear facility, the DOE must assess the potential impacts that the facility may have on the environment. This is to ensure that the following NEPA goals are met:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4. Preserve important historic, cultural, and natural aspects of national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
5. Achieve a balance between population and resource use which will permit high standards of living and wide sharing of life's amenities; and
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The following figure lays out the overall NEPA process that starts with a decision on the part of DOE to prepare an EIS.

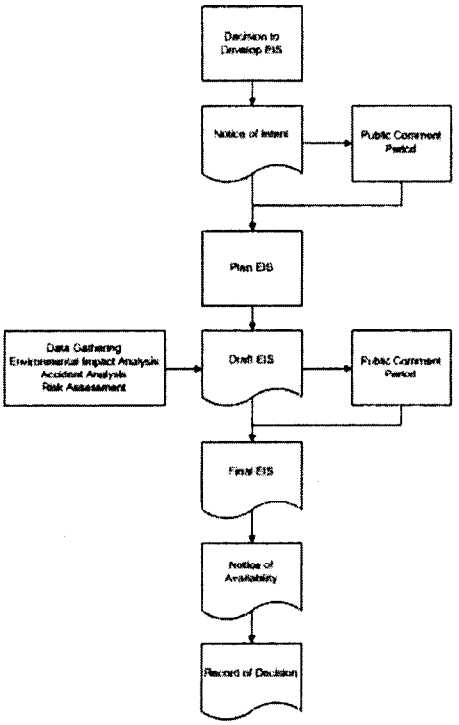


Figure 3-1 DOE NEPA Process

At the end of this process (if no significant environmental impacts are found), DOE issues a Finding of No Significant Impact (FONSI) and announces that it will move forward with the NGNP project.

However, this is not the end for the site evaluation process. The NGNP preliminary design process continues and moves toward development of the products needed for NRC licensing of the NGNP. This includes development of an Environmental Report (ER) that uses much of the same information included in the DOE EIS, but is then reviewed by the NRC. The next section describes the NRC review process.

4. NRC LICENSING & NEPA REVIEW PROCESS

The NRC maintains oversight of the construction and operation of a facility throughout its lifetime to assure compliance with the Commission's regulations for the protection of public health and safety, the common defense and security, and the environment. To implement this process, all nuclear power plant applications must undergo a safety review, an environmental review, and antitrust review by the NRC.

In accordance with 10 CFR Part 50, an application for a NRC Construction Permit (CP) must contain four types of information:

1. Preliminary safety analyses,
2. An environmental review,

3. Financial and antitrust statements, and
4. Assessment of the need for the power plant.

The CP application includes a Preliminary Safety Analysis Report (PSAR). This document contains the design information and criteria for the proposed reactor and comprehensive data on the proposed site. It also discusses various hypothetical accident situations and the safety features of the plant that prevents accidents or, if accidents should occur, lessens their effects. In addition, the application must contain a comprehensive assessment of the environmental impacts and information for antitrust reviews of the proposed plant.

Site Technical Review

The NRC staff reviews the CP application to determine whether the plant design meets all applicable regulations (10 CFR Parts 20, 50, 73, and 100). The review includes, in part:

- Characteristics of the site, including surrounding population, seismology, meteorology, geology and hydrology,
- Design of the nuclear plant,
- Anticipated response of the plant to hypothetical accidents,
- Plant operations including the applicant's technical qualifications to operate the plant,
- Discharges from the plant into the environment (i.e., radiological effluents), and
- Emergency plans.

When the NRC completes its review, it prepares a Safety Evaluation Report (SER) summarizing the anticipated effect of the proposed facility on public health and safety.

NEPA Review

The NRC NEPA Regulations, at 10 CFR Part 51, require that the NRC prepare an Environmental Impact Statement (EIS) for a permit to construct a nuclear power reactor. The permit applicant is required to submit an ER to aid the NRC in complying with NEPA, and the NRC is responsible for evaluating the reliability of any of the information that it uses to prepare the EIS. After completing this review, the NRC issues a Draft Environmental Impact Statement (EIS) for comment by the appropriate Federal, State, and local agencies as well as by the public. Afterwards, the agency issues a Final EIS that addresses all comments received.

The ER includes an analysis that considers and balances the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects. The analysis in the ER will also include consideration of the economic, technical, and other benefits and costs of the proposed action and of alternatives, and will contain sufficient data to aid the NRC in its development of an independent analysis. See Appendix A of this report for a detailed description of the organization and content of the ER.

Sections 51.50 and 51.53 of 10 CFR Part 51 require that applicant to submit two ERs. The first is for the "Construction Permit Stage," which is submitted with the construction permit application. The second, "Operating License Stage," is submitted later with the operating license application. Thus, the initial focus for the NGNP project will be on developing the construction permit ER.

NRC Environmental Review Process

The following figure lays out the overall process for ER development, submittal as part of the construction permit, and the NRC staff's subsequent development of the EIS.

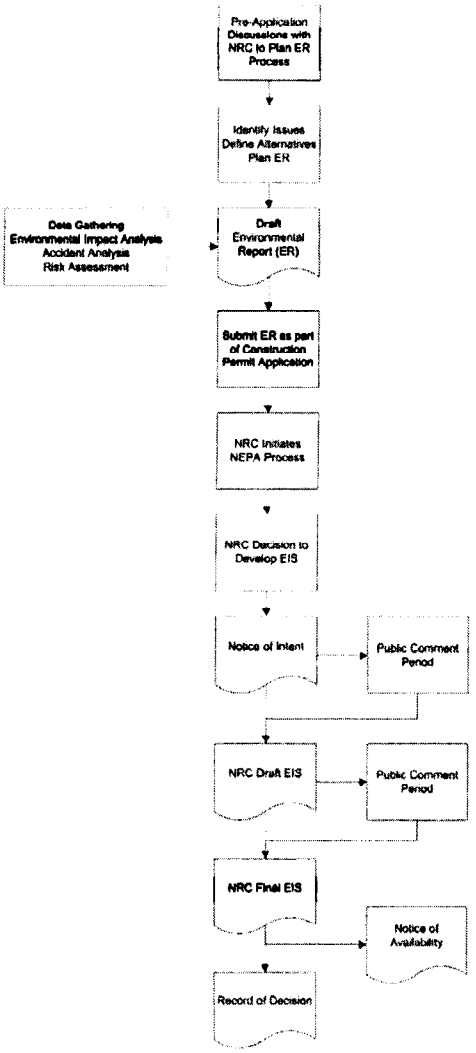


Figure 4-1 Environmental Report Review Process

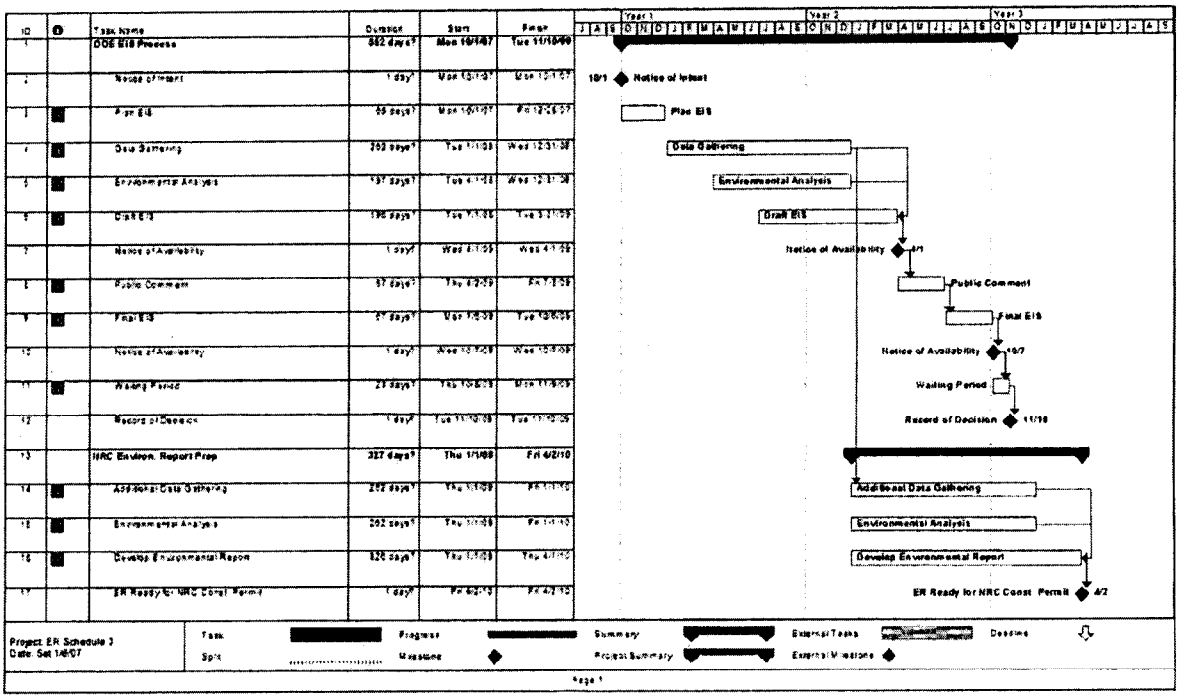
Key points associated with Figure 3-1 include the following:

- The NGNP project is responsible for identifying issues, defining alternatives, planning the ER development, gathering the necessary data, and performing the various analyses and risk assessments. It is expected that some of this work will be performed by subcontractors.
- Once the ER is completed and submitted to the NRC as part of the construction permit, the NRC takes over and uses the ER as a reference for their EIS development and assessment. This EIS is then made available to the public and comments are incorporated into the final EIS and a record of decision is issued.

- As noted earlier, some issues may not be fully addressed at the Construction Permit Stage. These issues are carried over and are resolved during the Operating License Stage after the necessary information is available and evaluated.

5. PROJECT SCHEDULING

The following figure lays out a proposed schedule for development of the site evaluation, DOE EIS, and the eventual ER that is necessary for NRC licensing. This activity assumes that the NPR Site E will become the preferred location for the NGNP. However, as noted above, separate engineering studies will occur to evaluate the suitability of Site E for our purposes. In any case, understanding the usefulness of existing NPR Site E data will be critical to the site selection decision-making process.



Notes:

- A decision on the part of DOE to issue a Notice of Intent for construction of the NGNP provides the starting point for the schedule provided above.
- The task breakdown and durations will be reevaluated once the preconceptual design activities are complete and the recommendations have been evaluated.
- These work activities may be refined as the public/private partnership is developed and as the NRC licensing strategy is finalized.
- The NRC ER data analysis builds upon the data and analysis work performed during development of the DOE EIS. NRC licensing requires a total of 24 months of site meteorological data gathering.

Funding Impacts

Fiscal Year 2007 funding is currently limited by the Congressional continuing resolution budgetary process. This makes it difficult to commence planning activities or to evaluate and obtain any necessary site monitoring equipment needed to support development of the DOE EIS.

The impact of these changes must be reflected in the overall project schedule to determine if key licensing milestones will be affected (e.g., submittal of the NRC Construction Permit application). This will be assessed once the funding issues are resolved and the integrated project schedule is developed.

Appendix A

Environmental Report Contents

The contents for an ER are specified in 10 CFR 51.30. The ER contains a description of the proposed action, a statement of its purposes, and a description of the environment affected, and discusses the following considerations:

- The impact of the proposed action on the environment, discussed in proportion to their significance.
- Any adverse environmental effects that cannot be avoided should the proposal be implemented.
- Alternatives to the proposed action. The discussion of alternatives must be sufficiently complete to aid the NRC in developing and exploring, pursuant to section 102(2)(E) of NEPA, "appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." To the extent possible, the environmental impacts of the proposal and the alternatives should be presented in comparative form.
- The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity.
- Any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented.

The following subsections cover the ER organization and content, including a description of the various types of environmental data that must be gathered in advance to support development of the ER. The basis for this information is found in NRC Regulatory Guide 4.2, Rev 2, "Preparation of Environmental Reports for Nuclear Power Stations," dated July 1976.

Chapter 1 – Purpose of Proposed Facility

This first chapter of the ER documents the purpose and the benefits of the NGNP with respect to the power requirements to be satisfied, the system reliability to be achieved, and any other primary objectives for the facility. Given the uniqueness of the NGNP and its associated hydrogen/process heat generation capabilities, this first chapter will contain descriptive information that differs significantly from a typical commercial power plant proposal.

Chapter 2 – Site and Environmental Interfaces

This chapter contains the applicable information related to the physical, biological, and human characteristics of the site's environment that could be affected by the construction and operation of the NGNP facility. This includes a discussion of the geography and demography of the site and surrounding area. Other types of data presented in this chapter include the following:

- **Ecology** – Describe the flora and fauna in the vicinity of the site, their habitats, and their distribution. Establish the identity of the majority of terrestrial and aquatic organisms on or near the site and their relative abundances. Identify any definable preexisting environmental stresses from sources such as pollutants. Information should be presented in two separate subsections ("Terrestrial Ecology" and "Aquatic Ecology").
- **Meteorology** – Provide a meteorological description of the NGNP site and its surrounding area. Include the use of at least **one annual cycle** from the onsite meteorological program for a

construction permit application and at least **two annual cycles**, including the most recent 1-year period for an operating license application.

- **Hydrology** – Describe, in qualitative terms, the physical, chemical, biological, and hydrological characteristics, the typical seasonal ranges and averages, and the historical extremes for surface and ground water bodies. Information is needed only for those waters that may affect station effluents and water supply or that may be assumed to be affected by the construction or operation of the NGNP facility. For those water bodies and systems that may receive radionuclides from the NGNP facility, the data should be supplied out to a 50 mile radius from the facility.
- **Geology** – Describe the major geological aspects of the site and its immediate environs. Except for those specific features that are relevant to the environmental impact assessment, the discussion may be limited to noting the broad features and general characteristics of the site and environs (i.e., topography, stratigraphy, and soil and rock types).
- **Historic, Archeological, Architectural, Scenic, Cultural, and Natural Features** – The ER should include a brief discussion of the significance of any of these issues relative to the NGNP site, with specific attention to the sites and areas listed in the *Natural Registry of Natural Landmarks* and properties included in or eligible for inclusion in the *National Register of Historic Places*.
- **Noise** – Ambient noise levels obtained from the surrounding biotic communities within five miles of the NGNP site location should be reported. Particular attention should be directed toward obtaining acoustic noise levels where high voltage transmission lines are located.

Chapter 3 – The Station

The NGNP facility and the transmission system are described in this chapter. Since environmental effects are of particular interest in the ER, NGNP effluents and other facility systems that interact with the environment should be described in detail. Depending on the timing of the completion of the NGNP design, this chapter could present a real challenge. Detailed system knowledge will be required to estimate and identify the radioactive source terms and chemical effluents that will result from the NGNP facility. Therefore, development of a NGNP-applicable plant parameter envelop (PPE) may be necessary if adequate design information is not available during preparation of the construction permit ER. Some issues may also be resolved in the Final ER provided during the Operating License Stage.

Chapter 4 – Environmental Effects of Site Preparation and Construction

This chapter should discuss the expected effects of site preparation, and NGNP and transmission facility construction. The effects are to be presented in terms of the impact on the resources and populations described in Chapter 2. Methods used to determine these impacts should be described.

Chapter 5 – Environmental Effects of Station Operation

This chapter is intended to describe the interaction of the NGNP facility (discussed in Chapter 3) and the environment (discussed in Chapter 2). Planned actions to reduce undesirable effects caused by NGNP operation should be described in detail. Effects that are temporary or subject to later amelioration should be distinguished from other effects that are unavoidable and irreversible.

Chapter 6 – Effluent and Environmental Measurements and Monitoring Programs

The means by which baseline data presented in the other chapters should be described in this chapter. This description should include plans and programs for monitoring the environmental impacts of NGNP site preparation, facility construction, and NGNP operation.

Chapter 7 – Environmental Effects of Accidents

This chapter should discuss the potential environmental effects of accidents involving the NGNP facility. This discussion should include accidents involving radioactivity, chemical explosions, fires, and oil or toxic material spills.

Chapter 8 – Economic and Social Effects of Construction and Operation

This chapter should describe our assessment of the economic and social effects of the NGNP facility. Given the difficult task of accurately assessing the economic benefits and costs related to operation of a facility over a long period of time, this assessment should focus on those benefits and costs that are measurable, such as the generated electricity and the capital, operating, and maintenance costs.

Chapter 9 – Alternative Energy Sources and Sites

The basis for the NGNP site selection should be documented in this chapter. Normally, this chapter would discuss the range of alternatives and the rationale that led to selection of the site and the choice of nuclear power as the selected energy source. However, the directed research and development mission of the NGNP project may require us to be creative as we develop this chapter.

Chapter 10 – Station Design Alternatives

This chapter should describe how the NGNP project arrived at the facility design through consideration of alternative designs for systems.

Chapter 11 – Summary Cost-Benefit Analysis

The NGNP project should develop an analysis that demonstrates that the total benefits outweigh the total costs.

Chapter 12 – Environmental Approvals and Consultation

This chapter should list all Federal permits, licenses, approvals, and other entitlements that must be obtained and describe the status of compliance with these requirements. The ER should also include a discussion of the status of compliance with applicable environmental quality standards and requirements including, but not limited to, applicable zoning and land-use regulations, and thermal and other water pollution limitations or requirements that have been imposed by federal, state, regional, and local agencies having responsibility for environmental protection.

Chapter 13 – References

This chapter provides a bibliography of the sources used in preparation of the ER.