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Revision 0

Summary Overview of Content Guidance for Early Site Permit Applications

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SUMMARY

The Early Site Permit (ESP) process offered under Title 10 Code of Federal Regulations (CFR) Part 52, Subpart A, was promulgated by the Nuclear Regulatory Commission (NRC) in 1989 to address industry concerns with the former licensing process under 10 CFR 50. Previously, the licensing process required large expenditures of time and money by applicants well before key site-specific environmental, safety, and emergency planning issues could be resolved. As envisioned, the ESP process is meant to resolve these issues well in advance of a decision to build a nuclear power facility and before substantial capital is invested in the construction of a new nuclear facility.

The ESP application is required to provide design information pertaining to structures, systems, and components along with site-specific parameters (such as meteorology, demographics, and hydrology) and address site safety, environmental protection, and emergency planning. Although an ESP applicant does not need to specify a particular nuclear-plant design, as in construction permit applications, it does need to provide sufficient surrogate-design information (developed to bound nuclear plant designs that are being considered by the applicant) so that the NRC can make a determination on the acceptability of the site and the environmental impacts and determine whether designs bounded by the surrogate design information provided by the applicant can be qualified for the proposed site.

In addition to administrative information on the applicant, including general information required by 10 CFR 50.33(a) through (d) and (j), the ESP application must include the following major elements:

- Site Safety Analysis Report
- Environmental Report
- Site Redress
- Emergency Planning.

Guidance for addressing the necessary content of these elements is contained in NRC regulatory guides, NUREGs, and interim staff guide, in addition to guidance developed by the Nuclear Energy Institute (NEI).

A combined license application may, as allowed by 10 CFR 52.73, reference an ESP issued under Subpart A of 10 CFR 52. By referencing an ESP, the combine license applicant acquires the established level of regulatory finality regarding the site as provided by 10 CFR 52.39. 10 CFR 52.39 states that, except in certain limited circumstances, issues resolved in a proceeding on an ESP shall be treated as resolved in any later proceeding on an application which references the ESP.

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ACRONYMS

AEA	Atomic Energy Act
COL	combined license
COLA	combined license application
CFR	Code of Federal Regulations
CP	construction permit
DC	design certification
EP	emergency plan
ER	environmental report
ESP	early site permit
FSAR	final safety analysis report
GDC	general design criteria
ISG	interim staff guidance
ITAAC	inspection, test, analysis, and acceptance criteria
LWA	limited work authorization
LWR	light water reactor
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NRC	U.S. Nuclear Regulatory Commission
OL	operating license
ONT	other new technology
PPE	plant parameter envelope
PSAR	preliminary safety analysis report
RAI	request for additional information
RG	regulatory guide
SAMA	severe accident mitigation alternative
SSAR	site safety analysis report
SMR	small modular reactor
SRP	standard review plan
TEDE	total effective dose equivalent
VEGP	Vogtle Electric Generating Plant

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Summary Overview of Content Guidance for Early Site Permit Applications

1. Background

The Early Site Permit (ESP) process offered under Title 10 Code of Federal Regulations (CFR) Part 52, Subpart A, was promulgated by the NRC in 1989 to address industry concerns with the former licensing process under 10 CFR 50. Previously, the licensing process required large expenditures of time and money by applicants well before key site-specific environmental, safety, and emergency planning issues could be resolved. As envisioned, the ESP process is meant to resolve these issues well in advance of a is made to build a nuclear power facility and before substantial capital is invested in the construction of a new nuclear facility.

An applicant may apply for an ESP without filing a construction permit (CP) under 10 CFR 50 or a combined license (COL) under 10 CFR 52 for the site. An ESP is valid for 10–20 years and may be renewed for another 10–20 years.

Under 10 CFR 52.26(c), an applicant for a COL may, at its own risk, reference in its application a site for which an ESP application has been docketed, but not granted. The COL applicant that plans to reference an ESP that has not yet been issued should discuss with the staff the practical considerations associated with developing and submitting a combined license application (COLA) environmental report (ER) prior to the completion of the ESP proceeding because of the potential effects on the scope and schedule of the environmental review.

Any person (as defined in 10 CFR 50.2) who may apply for a CP or a COL may file an application for an ESP. The applicant may not be a citizen, national or agent of a foreign country, or entity which is owned, controlled or dominated by an alien, a foreign corporation, or a foreign government. The applicant need not be a utility company or the entity that will subsequently build and operate a power plant. The financial qualifications of an ESP applicant are required to be commensurate with ESP responsibilities only. An ESP applicant need not own the site, but must have legal control over its use. As for other licenses, ESPs can be amended to add or substitute another qualified applicant.

An ESP is a Commission approval, issued under 10 CFR 52, for a site or sites for one or more nuclear power facilities. An ESP is a partial CP. The purpose of the ESP regulations in Part 52 is, in part, to make it possible to resolve safety and environmental issues related to siting before an applicant must make large commitments of resources. Having obtained an ESP, an applicant for a COL for a nuclear power plant or plants can then reference it in the COL application. In accordance with 10 CFR 52.39, site-related issues resolved at the ESP stage will be treated as resolved at the COL stage unless a contention is admitted that the selected reactor does not fit within one or more of the site parameters in the ESP. Pursuit of an ESP can provide a vehicle for resolving site-related issues early in the schedule.

In 2007, NRC revised the ESP rule to, in part, include changes to 10 CFR 52.17(a)(1) that removed requirements that made it difficult to address without referencing a specific reactor design and added requirements that better define expectations for what must be considered in an ESP. The revised rule also allowed an applicant to submit major features of emergency plans (EPs), in accordance with the pertinent standards of 10 CFR 50.47, and the requirements of Appendix E to 10 CFR 50, such as the exact size and configuration of the emergency planning zones (EPZ), instead of providing a complete and integrated EP.

An applicant may wish to perform site-preparation activities such as clearing, grading and construction of temporary access roads and temporary construction-support facilities. If an ESP applicant wishes to be able to perform the activities at the site allowed by 10 CFR 50.10(e) (“construction activities”) before issuance of the COL, the applicant must identify and describe the activities that are requested and propose a plan for redress of the site in the event that the activities are performed and either

construction is abandoned or the COL revoked. In such a case, the applicant must provide a plan for redress of the site in the event the activities are performed, but the site permit expires before an application for a CP or a COL for the site is filed. The applicant must demonstrate that there is reasonable assurance that redress carried out under the plan will achieve an environmentally stable and aesthetically acceptable site, suitable for any use that conforms to local zoning laws.

There have been six ESPs issued by the NRC. The latest, Clinch River Nuclear Site, was submitted for NRC review in May 2016. The ESP was issued in December 2019. The review schedule for Clinch River is shown below in Table 1. Section 4 of this report provides more information regarding the ESP application review process.

Table 1. Clinch River ESP Review Schedule

Key Milestone	Completion Date
Original ESP Application Submitted	05/12/16
NRC Acceptance Review Completed	12/30/16
NRC Safety Review – Preliminary Safety Evaluation Report and Requests for Additional Information Issued	08/04/17
NRC Safety Review Completed (Final Safety Evaluation Report)	06/14/19
NRC Environmental Review Started	04/13/17
NRC Environmental Review Completed – Final environmental impact statement (EIS) issued to EPA	04/03/19
Mandatory Commission Hearing	08/14/19
ESP Issued	12/19/19

2. ESP Content Overview

The ESP application is required to provide design information pertaining to structures, systems, and components, along with site-specific parameters (such as meteorology, demographics, and hydrology) and to address site safety, environmental protection, and emergency planning. Although an ESP applicant does not need to specify a particular nuclear plant design, as in construction-permit applications, it does need to provide sufficient surrogate-design information (developed to bound nuclear plant designs that are being considered by the applicant) so that the NRC can make a determination on the acceptability of the site and the environmental impacts and determine whether designs bounded by the surrogate-design information provided by the applicant can be qualified for the proposed site.

In addition to administrative information on the applicant, including general information required by 10 CFR 50.33(a) through (d) and (j), the ESP application must include the following major elements.

- Site Safety Analysis Report (SSAR): The SSAR is similar in format to a COL Final Safety Analysis Report (FSAR). The SSAR content includes detailed site-specific characteristics and the potential reactor facility information that applies to the issuance of an ESP. The specific regulatory bases and associated guidance documents for the SSAR include:
  - Atomic Energy Act (AEA)
  - NRC Regulations, 10 CFR Parts 50, 52 and 100
  - NRC Regulatory Guide (RG) 1.70, *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants* (Reference 1)
  - NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants* (Reference 2)
  - NRC RG 1.206, Revision 1, *Applications for Nuclear Power Plants* (Reference 3)

- NRC RG 1.233, *Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors* (Reference 4)
- NRC RG 4.7, *General Site Suitability Criteria for Nuclear Power Stations* (Reference 5)
- Nuclear Energy Institute (NEI) guidance document NEI-10-01, *Industry Guideline for Developing a Plant Parameter Envelope in Support of an Early Site Permit*, Revision 1 (Reference 6)

- Environmental Report: The ER is a report required by 10 CFR 50.50(b) to be included in each application for an ESP. The ER contains a description of the proposed action and a statement of its purposes, characterization of the affected environment, and analyses of the potential environmental impacts associated with the proposed action. The applicant's ER is a source of information used by the NRC in preparing an environmental impact statement (EIS). The EIS is a detailed written statement prepared by the NRC to meet the requirements of Section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969, as amended. The specific regulatory bases and associated guidance documents for the ER include:
    - NEPA
    - NRC Regulations in 10 CFR Parts 51 and 52
    - NRC RG 4.2, *Preparation of Environmental Reports for Nuclear Power Stations* (Reference 7)
    - NUREG-1555, *Environmental Standard Review Plans* (Reference 8)
    - State environmental statues, as applicable.
- Site Redress: If an ESP applicant wishes to be able to perform the activities at the site allowed by 10 CFR 50.10(e) ("construction activities") before issuance of the COL, the applicant must identify and describe the activities that are requested and propose a plan for redress of the site in the event that the activities are performed and either construction is abandoned or the COL revoked. The site redress plan describes the actions that would be taken to ensure that the site is restored to an environmentally stable and aesthetically acceptable condition if certain limited construction activities are conducted, and then construction is later terminated. Descriptions of the activities to be conducted under 10 CFR 50.10(e), and the redress plan should be provided as separate documents in the application, outside of both the SSAR and the ER.
- Emergency Planning: The specific regulatory bases and associated guidance documents for the emergency planning information include:
    - NRC Regulations in 10 CFR Parts 50 and 52
    - NUREG-0396, *Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants* (Reference 9)
    - NUREG-0654, *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants* (Reference 10)
    - NRC RG 1.101, *Emergency Planning and Preparedness for Nuclear Power Plants* (Reference 11)
    - NRC RG 1.183, *Alternate Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors* (Reference 12)

3. ESP Content-Specific Guidance

3.1 Site Safety Analysis Report (SSAR)

3.1.1 SSAR Content Guidance

10 CFR 52.17, *Contents of applications; technical information*, (a)(1) requires that the ESP include an SSAR. Requested information is consistent with 10 CFR 50.33, *Contents of applications; general information*, (a) – (d), including:

- The specific number, type, and thermal power level of the facilities, or range of possible facilities, for which the site maybe used;
- The anticipated maximum levels of radiological and thermal effluents each facility will produce;
- The type of cooling systems, intakes, and outflows that may be associated with each facility;
- The boundaries of the site
- The proposed general location of each facility on the site;
- The seismic, meteorological, hydrologic, and geologic characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated;
- The location and description of any nearby industrial, military, or transportation facilities and routes;
- The existing and projected future population profile of the area surrounding the site;
- A description and safety assessment of the site on which a facility is to be located. The assessment must contain an analysis and evaluation of the major structures, systems, and components of the facility that bear significantly on the acceptability of the site under the radiological consequence evaluation factors identified above. In performing this assessment, an applicant shall assume a fission product release from the core into the containment assuming that the facility is operated at the ultimate power level contemplated. The applicant shall perform an evaluation and analysis of the postulated fission product release, using the expected demonstrable containment leak rate and any fission product cleanup systems intended to mitigate the consequences of the accidents, together with applicable site characteristics, including site meteorology, to evaluate the offsite radiological consequences. Site characteristics must comply with 10 CFR Part 100 The evaluation must determine that:
    - An individual located at any point on the boundary of the exclusion area for any 2 hour period following the onset of the postulated fission product release, would not receive a radiation dose in excess of 25 rem total effective dose equivalent (TEDE).
    - An individual located at any point on the outer boundary of the low population zone, who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a radiation dose in excess of 25 rem TEDE;
- Information demonstrating that site characteristics are such that adequate security plans and measures can be developed (note that an ESP application has no security plan requirements);
- A description of the quality assurance program applied to site-related activities for the future design, fabrication, construction, and testing of the structures, systems, and components of a facility or facilities that may be constructed on the site. The description of the quality assurance program for a nuclear power plant site shall include a discussion of how the applicable requirements of 10 CFR 50, Appendix B will be satisfied;

- An evaluation of the site against applicable sections of NUREG-0800 [the Standard Review Plan (SRP)] revision in effect 6 months before the docket date of the application. The evaluation required by this section shall include an identification and description of all differences in analytical techniques and procedural measures proposed for a site and those corresponding techniques and measures given in the SRP acceptance criteria. Where such a difference exists, the evaluation shall discuss how the proposed alternative provides an acceptable method of complying with the Commission's regulations, or portions thereof, that underlie the corresponding SRP acceptance criteria.

The application must contain (typically within the SSAR) among other things, the specific number, type (e.g., sodium-cooled fast reactor), and thermal-power level of the facilities, or range of possible facilities, for which the site may be used; the anticipated maximum levels of radiological and thermal effluents each facility will produce; the type of cooling systems, intakes, and outflows that may be associated with each facility; the boundaries of the site; and the proposed general location of each facility on the site.

As part of the description of the proposed general location of each facility on the site [10 CFR 52.17(a)(1)(v)], the applicant should describe the footprint for all structures and external safety-related design features proposed for the site.

The application must also include the seismic, meteorological, hydrologic, and geologic characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. This information is to ensure that future plants built at the site would be in compliance with General Design Criterion 2 from 10 CFR 50, Appendix A (or equivalent plant-specific design criteria for a non-LWR), which requires that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

The application must also include the location and description of any nearby industrial, military, or transportation facilities and routes, and the existing and projected future population profile of the area surrounding the site. The application must contain an analysis and evaluation of the major structures, systems, and components of the facility that bear significantly on the acceptability of the site from a radiological-safety standpoint. In addition, the application must demonstrate that adequate security plans and measures can be developed for the site and must provide a description of the quality-assurance program applied to site-related activities.

In accordance with 10 CFR 52.17(b)(1), the SSAR also must identify physical characteristics of the proposed site, such as egress limitations from the area surrounding the site, that could pose a significant impediment to the development of EPs (refer to Section 3.3 below). If physical characteristics are identified that could pose a significant impediment to the development of EPs, the application must identify measures that would, when implemented, mitigate or eliminate the significant impediment.

3.1.2 SSAR-FSAR Chapter Alignment

The SSAR contains a subset of the chapters in a COL FSAR. The following summarizes the scope of the SSAR chapters:

- Chapter 1, Introduction and Interfaces, is analogous to a COL FSAR for the potential future facility and reactor designs.
- Chapter 2, Site Characteristics and Site Parameters, is analogous to a COL FSAR. For an ESP that uses a plant-parameter envelope (PPE) instead of specific reactor facility information, the PPE is given here.

- Chapter 3, Design of Structures, Components, Equipment, and Systems, is generally limited to Section 3.5 on aircraft hazards.
- Chapter 11, Radioactive Waste Management, is limited to addressing whether effluent releases and public dose limits can be met for the site.
- Chapter 12, Radiation Protection, is limited to addressing doses to construction workers, especially from onsite sources of direct radiation, and possible direct dose contributors to offsite members of the public.
- Chapter 13, Conduct of Operations, is generally limited to Section 13.3 on emergency planning and Section 13.6 on site characteristics for adequate security planning.
- Chapter 14, Initial Test Program and Inspections, Tests, Analyses and Acceptance Criteria, is optional and addresses inspections, tests, analyses, and acceptance criteria (ITAAC) that apply to an EP or a limited work authorization (LWA).
- Chapter 15, Transient and Accident Analysis, is analogous to a COL FSAR for the potential reactor designs but is limited to Section 15.0.3, addressing the evaluation of the radiological consequences of design basis
- Chapter 17, Quality Assurance, is analogous to a COL FSAR, but addresses the quality assurance applied to site-related activities for the design, construction, and testing of the potential future facility.

An ESP that is issued prior to selection of a reactor design will follow the PPE approach, which establishes postulated values of design parameters that provide design information to support the NRC staff's review of an ESP application. A controlling PPE value, or bounding parameter value, is one that necessarily controls the value of a site characteristic in the context of site suitability (e.g., default atmospheric dispersion parameter (χ/Q) values established within the PPE for the purposes of evaluating the postulated design performance). As the PPE is intended to bound multiple reactor designs, the actual design selected in a COLA referencing an ESP must fit within the bounding parameter values. Following selection of a design, if a design value exceeds the PPE bounding value, an applicant must request and justify a variance from the ESP.

3.1.3 Plant Parameters Envelope Approach

ESP applicants may use the PPE approach as a surrogate for actual facility information to support required safety and environmental reviews. That is, the applicant for an ESP need not provide a detailed design of a reactor or reactors and associated facilities, but must provide sufficient bounding parameters and characteristics of the reactor or reactors and the associated facilities so that an assessment of site suitability can be made. Consequently, the ESP application may refer to a PPE, which is a set of values of plant design parameters that an ESP applicant expects will bound the design characteristics of the reactor or reactors that might be constructed at a given site. The PPE values are a surrogate for actual reactor-design information. This approach provides an equivalent level of finality to that achieved through an ESP based on a specific reactor design. Analysis of environmental impacts based on a PPE approach permits an ESP applicant to defer the selection of a reactor design until the CP or COL stage.

As described in NEI-10-01, the use of an ESP that is based on a PPE allows the deferral of the technology selection until the applicant submits the COL application to the NRC. This deferral of the technology decision is a key to maintaining commercial flexibility and lowering overall commercial risk. A two-step licensing process that includes a technology-neutral, site-specific ESP, followed by a technology-specific COLA, provides an optimum approach to balancing licensing and financial risks by enabling:

- Early resolution of site-specific issues
- Deferral of technology selection

- Technology selection concurrent with commercial agreement.

Figure 1 illustrates the PPE concept (this figure comes from NEI 10-01).

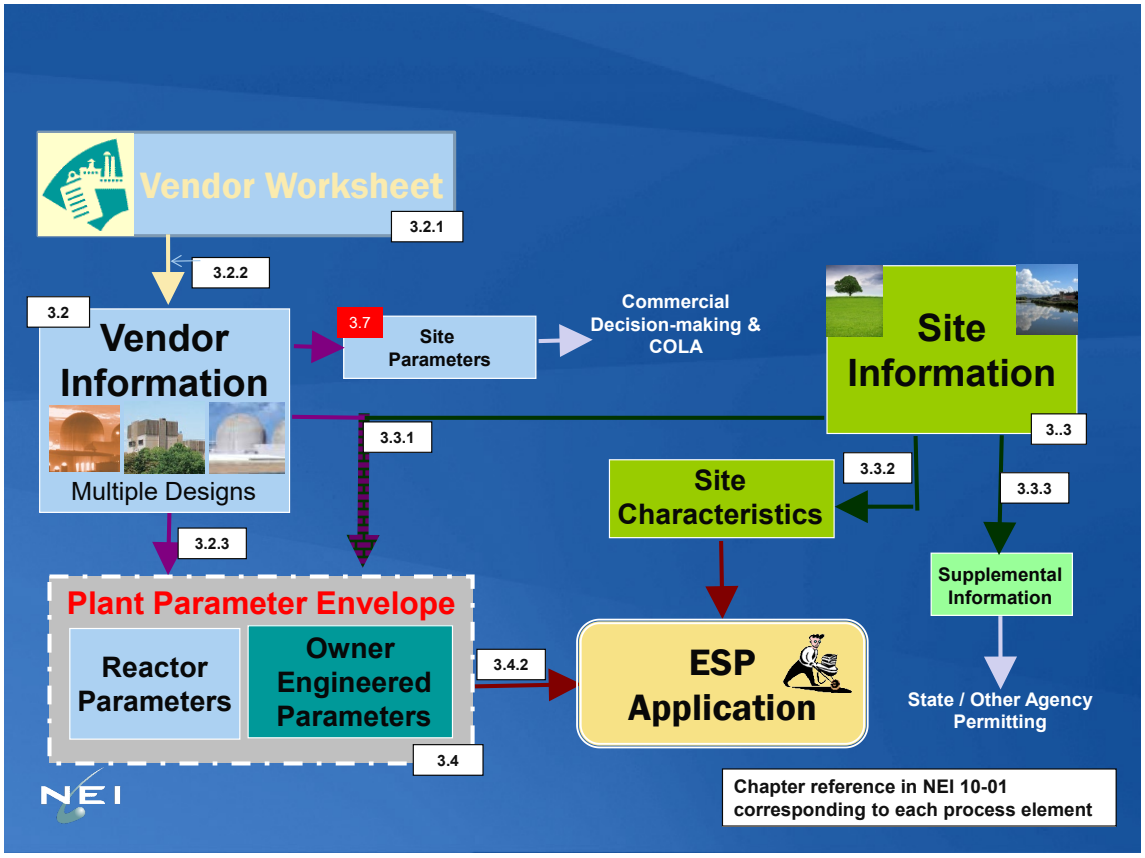

Figure 1. Plant Parameter Envelope Concept

The PPE reflects upper bounds of the values for each parameter that it encompasses, rather than the characteristics of any specific reactor design. The NRC staff will determine whether the PPE values are reasonable for consideration by the staff when making its findings in accordance with Subpart A of 10 CFR Part 52. Typical PPE values used in an ESP may include:

- Maximum thermal power
- Condenser/heat-exchanger duty
- Normal heat-sink parameters
- Ultimate heat-sink parameters
- Water requirements (cooling-tower makeup, sanitary, potable, demineralizer, fire protection)
- Hazardous chemicals
- Release-point elevations
- Radioactive source terms (normal effluent offsite and accident—offsite and control room)
- Minimum distances to the site boundary
- Construction population.

Engineering design scope necessary to establish reasonable PPEs would include, but not be limited to, the following:

- Reactor core analysis needed to establish maximum thermal power and source term information
- Identification of off normal events and types of accidents
- Mechanistic source term analysis
- Primary system and containment/confinement analysis needed to establish source term leakage and retention information
- Secondary plant analysis needed to establish (if part of the design) transmission-line requirements, makeup-water needs, and normal and emergency heat-sink requirements, emergency-power requirements
- General plant design necessary to support customer process needs, hazardous chemical requirements, site boundary requirements, and potential construction workforce requirements.

NEI 10-01 provides generic guidance for the development of a PPE in support of an ESP. The purpose of this guidance is to provide a logical, consistent, and workable framework for developing a PPE that supports finality on siting issues prior to selecting a specific reactor technology. Standardization of PPE development has significant benefits to both the applicants and the NRC in assuring that common expectations on how to appropriately construct a PPE are in place and consistently met.

NEI 10-01, Appendix A, provides context for the use of a PPE by providing a summary of general information relevant to and the regulatory basis for an ESP application. Appendix B of this guidance provides a blank vendor information worksheet for prospective ESP applicants to use.

3.2 Environmental Report

3.2.1 Environmental Report Content Guidance

10 CFR 52.17(a)(2) requires that the ESP include a complete ER as required by 10 CFR 51.50(b). The ER would include the following:

- The information specified in 10 CFR 51.45, 51.51, and 51.52, as modified by 10 CFR 51.50(b); this would include:
  - A description of the proposed action, a statement of its purposes, a description of the environment affected, and discussion of the considerations described in 51.45(b)
  - 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, as described in 10 CFR 51.45(c)
  - A list of all federal permits, licenses, approvals and other entitlements which must be obtained in connection with the proposed action, as described in 51.45(d).
- An evaluation of alternative sites to determine whether there is any obviously superior alternative to the site proposed.
- The ER may address one or more of the environmental effects of construction and operation of a reactor, or reactors, which have design characteristics that fall within the site characteristics and design parameters for the ESP application provided, however, that the ER addresses all environmental effects of construction and operation necessary to determine whether there is any obviously superior alternative to the site proposed.
- As stated in 10 CFR 51.23, no discussion of the environmental impacts of the continued storage of spent fuel is required in this report.

- For other than light-water-cooled nuclear power reactors, the ER must contain the basis for evaluating the contribution of the environmental effects of fuel-cycle activities for the nuclear power reactor (light-water-cooled nuclear power reactors would address the environmental effects of transportation of fuel and waste in accordance with 10 CFR 51.52).
- The procedures for reporting and keeping records of environmental data, and any conditions and monitoring requirements for protecting the non-aquatic environment proposed for possible inclusion in the license as environmental conditions in accordance with 10 CFR 50.36b.

As stated in 10 CFR 51.50(b)(2) an ER for an ESP should contain all of the information necessary for a COLA ER with the following exceptions based on 10 CFR 51.50(b)(2):

- The ESP ER need not include an assessment of the economic, technical, or other benefits (e.g., need for power) and costs of the proposed action.
- The ESP ER need not include an evaluation of alternative energy sources.
- The ESP ER need not include an evaluation of severe accident mitigation design alternatives (SAMDAs) because this is a benefit-cost evaluation.

Topics such as alternative energy sources and need for power may be treated in an EIS supplement at the COL application stage when the detailed planning for the project is completed. However, an ESP applicant can, at its discretion, provide in the ESP ER the economic, technical, or other benefits (e.g., need for power) and costs of the proposed action, an evaluation of SAMDAs and an analysis of alternative energy. An applicant might choose to address any or all of these issues in its ESP application in order to gain early resolution of the issues.

NRC RG 4.2 summarizes general guidance for developing the format and content of ERs under 10 CFR Part 51 for applications for licenses, permits, and authorizations for new reactors pursuant to 10 CFR Part 50 and 52. Appendix A, Section A1, of this RG provides guidance for ERs for ESPs. Appendix C provides additional guidance on the preparation of ERs under 10 CFR Part 51 for applications for small modular reactors (SMRs) and non-light water reactors (non-LWR). The amount of information needed for an SMR or a non-LWR would depend on application-specific factors such as the size of the reactor, its footprint, and the amount of resource (e.g., water) it uses. An applicant for an SMR or a non-LWR should engage with the NRC staff in accordance with 10 CFR 51.40, "Consultation with NRC Staff," to discuss the appropriate level of environmental studies or information—(e.g., additional information about the fuel cycle, radiological effluents, and accidents should be provided)—which should be provided for a non-LWR design.

Additionally, while preparing EISs for the first group of COL applications, the NRC staff identified a number of issues that necessitated changes to staff guidance. In 2014, the NRC staff documented these changes in two interim staff guidance (ISG) documents, COL/ESP-ISG-026, *Interim Staff Guidance on Environmental Issues Associated with New Reactors* (Reference 13), and COL/ESP-ISG-027, *Interim Staff Guidance on Specific Environmental Guidance for Light Water Small Modular Reactor Reviews* (Reference 14), which address changes to environmental statutes, regulations, and executive orders which directly affect the information required by the NRC to develop EISs. Guidance from the ISGs as it relates to information that applicants should include in an ER was incorporated into RG 4.2,5 as appropriate. The entirety of interim staff guidance in ISG-026 and ISG-027 will be terminated when it is incorporated into permanent staff guidance in NUREG-55, *Environmental Standard Review Plan: Standard Review Plans for Environmental Reviews for Nuclear Power Plants*.

Some related documents offer guidance in the development of reference sources that may be useful in the development of an ER, but, unlike RG 4.2, none are specifically intended to offer guidance directly pertinent to preparing the ER itself.

- RG 4.7 discusses the major site characteristics related to public health and safety and environmental issues that the NRC staff considers in determining the suitability of sites for light-water-cooled nuclear power stations.
- RG 4.11, *Terrestrial Environmental Studies for Nuclear Power Stations*, (Reference 15) provides technical guidance that the NRC staff considers acceptable for terrestrial environmental studies and analyses supporting licensing decisions for nuclear power reactors.
- RG 4.24, *Aquatic Environmental Studies for Nuclear Power Stations*, (Reference 16) provides technical guidance that the NRC staff considers acceptable for aquatic environmental studies and analyses supporting licensing decisions for nuclear power reactors.
- NUREG-1555 provides the criteria used by the NRC staff for reviewing ERs submitted with nuclear power plant license applications.

In February 2020, the NRC issued draft ISG-029, *Micro-Reactor Applications - Environmental Considerations Associated with Micro-Reactors* (Reference 17) for public comment. The purpose of this ISG is to modify existing guidance and provide supplemental guidance to assist the NRC staff in determining the scope and scale of environmental reviews of microreactor applications. The guidance highlights unique considerations for microreactors in each resource area typically covered in the staff's environmental review. This document also offers guidance on scaling the analyses. While this ISG is designed to aid the NRC staff in developing a microreactor EIS, the staff recognizes the value of this guidance as a supplemental source of insight into the NRC's environmental review process that can inform the development of an applicant's ER. Applicants should scale their level of effort appropriately when preparing ERs, commensurate with the significance of the impact on the resource area being addressed.

The scope of ISG-029 is limited to environmental review considerations specific to microreactors, such as the following (as discussed above not all of these topics are required to be addressed in an ESP ER):

- Preapplication interactions
- Purpose and need for the proposed project
- Size of the proposed project and resources used
- Land use
- Water resources
- Terrestrial and aquatic ecology
- Socioeconomics and environmental justice
- Historic and cultural resources
- Need for power and alternatives
- Meteorology and air quality
- Radiological and nonradiological health
- Postulated accidents
- Severe accident mitigation alternatives (SAMAs)
- Acts of terrorism
- Fuel-cycle impacts, transportation of fuel and waste, and continued storage of spent fuel
- Cumulative impact analysis

- Consistency with safety licensing documents.

3.3 Emergency Plans

3.3.1 Emergency Plan Content Guidance

In accordance with 10 CFR 52.17(b)(2), the ESP must include either of the following regarding emergency planning:

(i.) Major features of the EPs, in accordance with the pertinent standards of 10 CFR 50.47 and the requirements of 10 CFR 50, Appendix E, such as the exact size and configuration of the EPZ, in the absence of complete and integrated EPs; or

(ii.) Complete and integrated EPs in accordance with the applicable standards of § 50.47 and the requirements of Appendix E to Part 50. To the extent approval of EPs is sought, the application must contain the information required by 10 CFR 50.33(g) and (j).

On May 12, 2020, the NRC published a proposed rule regarding emergency planning in the Federal Register for a 75-day public comment period. The new proposed rule (10 CFR 50.160) addresses EP requirements for SMRs and other new technologies (ONTs). The major provisions of the proposed rule included a new alternative performance-based EP framework, a hazard analysis of any NRC licensed facility, and a scalable approach for determining the plume exposure pathway EPZ size. ESP applicants choosing to comply with proposed 10 CFR 50.160 would need to describe how their EPs will meet the performance-based requirements in proposed 10 CFR 50.160(c).

Under the proposed new emergency-planning rule (10 CFR 50.160), ESP applicants would need to continue to include emergency planning information in their SSAR. Proposed 10 CFR 52.17(b)(2), 52.18, and 52.79(a)(21) would clarify that the information should describe how the applicant would comply with either the applicable requirements in 10 CFR 50.47 and Appendix E to 10 CFR 50, or the proposed requirements in 10 CFR 50.160.

3.3.2 Major Features of EPs

As define in 10 CFR 52.1, major feature of the EPs means an aspect of those plans necessary to:

(i.) Address in whole or part one or more of the 16 standards in 10 CFR 50.47(b); or

(ii.) Describe the EPZ as required in 10 CFR 50.33(g).

A proposed revision to 10 CFR 52.1, “Definitions” (part of the 10 CFR 50.160 rule change proposal), would clarify that, for applicants choosing the performance-based approach, the definition for “major feature of the emergency plans” includes aspects of plans necessary to address the requirements of proposed 10 CFR 50.160(c). Under the new proposed 10 CFR 50.160 rulemaking, an application for an ESP that submits major features of the EP under 10 CFR 52.17(b)(2)(i), and describes the EPZ, and if the EPZ extends beyond the site boundary, then the exact configuration of the plume exposure pathway EPZ surrounding the facility shall be determined in relation to the local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries.

10 CFR 52.17(b)(4) requires that for an ESP following 52.17(b)(2)(i), major features, the SSAR must include a description of contacts and arrangements made with federal, state, and local governmental agencies with emergency-planning responsibilities. The SSAR must contain any certifications that have been obtained. If these certifications cannot be obtained, the SSAR must contain information, including a utility plan, sufficient to show that the proposed plans provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the site.

Major features of an emergency plan submitted under paragraph 52.17(b)(2)(i) may include proposed ITAAC (refer to Section 3.6 of this report).

3.3.3 Complete and Integrated EPs

10 CFR 52.17(b)(3) requires that EPs submitted under paragraph 52.17(b)(2)(ii) must include the proposed inspections, tests, and analyses that the holder of a COL referencing the ESP shall perform and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will be operated in conformity with the EPs.

Under the new proposed 10 CFR 50.160 rulemaking, if the application is for an ESP that contains plans for coping with emergencies under 10 CFR 52.17(b)(2)(ii), and if the plume exposure pathway EPZ extends beyond the site boundary:

- The applicant shall submit radiological emergency-response plans of tribal, state, and local governmental entities in the United States that are wholly or partially within the plume exposure pathway EPZ
- The exact configuration of the plume exposure pathway EPZ surrounding the facility shall be determined in relation to local emergency-response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries.

Under the option set forth in paragraph 52.17(b)(2)(ii), fully integrated plans, the applicant shall make good-faith efforts to obtain from the same governmental agencies certifications that:

- The proposed EPs are practicable
- These agencies are committed to participating in any further development of the plans, including any required field demonstrations
- These agencies are committed to executing their responsibilities under the plans in the event of an emergency.

The EP section of the ESP should include, as applicable, the following or provide cross-references to other parts of the application as indicated:

- A table of contents
- The applicant's onsite EP [for (b)(2)(ii)]
- A description of the size and configuration of the EPZ
- State and local (offsite) EPs or an offsite utility EP ([for (b)(2)(ii)]
- A description of contacts and arrangements with federal, state, and local governmental agencies with EP responsibilities, including letters of agreement or certificates of approval, or both
- an evacuation time estimate;
- identification of physical characteristics of the proposed site that could pose a significant impediment to the development of an emergency plan, including measures that would, when implemented, mitigate or eliminate the significant impediment (to be included in the SSAR);
- EP program implementation milestones, including a discussion of implementation of the proposed emergency plan at a site with an operational emergency plan supporting existing reactors (to be included in the SSAR)
- An evaluation of the applicability and implementation of EP requirements associated with the receipt, possession, and use of source, byproduct, and special nuclear materials (to be included in the SSAR)
- For an ESP application that includes the PPE approach for choosing a reactor technology, a description of how this will affect the EP at the COLA stage

- Requested exemptions, departures, and variances related to EP
- EP ITAAC (see ITAAC discussion below)
- proposed EP-related COL license conditions or ESP permit conditions.

3.4 Limited Work Authorizations

The LWA process allows COL applicants and applicants for and holders of ESPs to request approval to perform certain limited construction activities before the issuance of a COL. The regulations in 10 CFR 50.10, "License Required; Limited Work Authorization," govern the issuance of LWAs and specify the information to be included in an LWA application. The regulations clarify that activities defined as "construction" are those that fall within the NRC's regulatory authority and require an LWA because they have a reasonable nexus to radiological health and safety or common defense and security. Those activities that are not considered "construction" are referred to as "preconstruction" and do not require an NRC licensing action.

An ESP applicant may submit an application for an LWA as part of its application for an ESP, and a holder of an ESP may submit a request for an LWA as an amendment to the ESP. 10 CFR 50.10 defines activities that are considered "construction" and those that are not considered "construction."

As required by 10 CFR 50.10, the LWA application should include a safety analysis report that describes the activities requested to be performed along with the information otherwise required for an ESP application by 10 CFR 52.17. The LWA application should also include an ER in accordance with the applicable section(s) of 10 CFR 51.49, *Environmental Report—Limited Work Authorization*. Further, the LWA applicant should include a redress plan (see Section 3.5 below) that describes the scope of the actions to be taken following suspension of construction activities and addresses the mitigation of impacts incurred resulting from the performance of construction activities.

As required by 10 CFR 50.10, if the LWA request is submitted as part of an ESP or ESP amendment application, the application should include the following:

- An SSAR required by 10 CFR 52.17 (see Section 3.1 above); the SSAR should include:
  - The final design for any foundation or other work being requested under the LWA
  - The final design for any structures that would be supported by the foundation or other work being requested under the LWA
  - A safety analysis for any foundation or other work being requested under the LWA
  - A safety analysis for structures that would be supported by the foundation or other work being requested under the LWA (e.g., stability (static and dynamic) analyses).
- Description of the LWA activities that the applicant seeks to perform
- Proposed inspections, tests, and analyses (for the LWA activities that the applicant seeks to perform) that the applicant will perform and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the portion of the facility covered by the LWA has been constructed and will be operated in conformity with the LWA, the provisions of the Atomic Energy Act (AEA), and the Commission's rules and regulations
- An ER that meets the requirements in 10 CFR 51.49; in accordance with 10 CFR 51.49, the ER for an LWA should include:
  - A description of the activities to be conducted under the LWA
  - A statement of the need for the activities

- A description of the environmental impacts that may reasonably be expected to result from the activities
- A description of the mitigation measures the applicant proposes to implement
- A discussion of the reasons why the applicant rejected additional mitigation measures under consideration
- A description of the process used to identify new and significant information for an ESP holder or for a site where an EIS has been prepared, but the facility construction was not completed.

- A plan for redress of activities performed under the LWA if: (1) LWAs are terminated by the holder of the LWAs, (2) the LWA is revoked by the NRC, or (3) the Commission denies the associated COLA
- The technical qualifications of the applicant to engage in the proposed activities.

As an example, the NRC issued an LWA as the Vogtle Units 3 and 4 ESP and LWA (ESP-004) in August 2009. The NRC staff's safety and environmental reviews supporting issuance of the ESP and LWA are publicly available as NUREG-1923, *Safety Evaluation Report for an Early Site Permit (ESP) at the Vogtle Electric Generating Plant (VEGP) ESP Site*, issued July 2009, and NUREG-1872, *Final Environmental Impact Statement for an Early Site Permit (ESP) at the Vogtle ESP Electric Generating Plant Site*, issued August 2008.

Additional guidance regarding LWAs is contained in a COL/ESP-ISG-04, *Interim Staff Guidance on the Definition of Construction and on Limited Work Authorizations* (Reference 18)

3.5 Redress Plan

10 CFR 52.17(c) requires than an ESP applicant provide a plan for redressing the site if the applicant wishes to perform activities allowed pursuant to 10 CFR 50.10(e)(1). The primary purpose of the redress plan is to address activities that were authorized under the LWA, such as the placement of piles and installation of foundations, should the LWA activities be discontinued. Redress of site impacts resulting from preconstruction activities are not required under the redress plan. In addition, although redress of LWA impacts may have the practical effect of mitigating some environmental impacts, the redress plan is not a substitute for a thorough evaluation of environmental impacts or the development of mitigation measures that may be necessary to provide relief from environmental impacts associated with the proposed LWA activities.

In general, the site-redress plan should describe the scope of actions to be taken following the suspension of construction. Applicants for and holders of ESPs should consider the requirements in 10 CFR 52.25, "Extent of Activities Permitted," which allow the applicant to redress the site for alternative uses that were not considered at the time it prepared the original site-redress plan.

As required by 10 CFR 50.10(g), if construction is terminated by the LWA holder, the underlying application is withdrawn by the applicant or denied by the NRC, or the LWA is revoked by the NRC, the holder must begin implementation of the redress plan in a reasonable time. The holder must complete the redress of the site no later than 18 months after termination of construction or revocation of the LWA or upon effectiveness of the Commission's final decision denying the associated CP application or the underlying COLA, as applicable.

Additional guidance regarding redress plans is contained in a COL/ESP-ISG-04.

3.6 Inspections, Tests Analysis, and Acceptance Criteria

For an ESP applicant that does not seek an LWA, the ITAAC requirements are limited to emergency planning. Under 10 CFR 52.17(b)(3), the ESP applicant has three alternatives:

- EP ITAAC shall be included if the application contains proposed complete and integrated EPs in accordance with 10 CFR 52.17(b)(2)(ii)
- EP ITAAC may be included if the application contains the proposed major features of the EPs in accordance with 10 CFR 52.17(b)(2)(i)
- EP ITAAC do not apply if the application is limited to addressing physical-site characteristics that could pose significant impediments to the development of EPs in accordance with 10 CFR 52.17(b)(1).

ITAACs other than those related to EPs or LWAs (if requested) are not applicable to an ESP application.

4. ESP Development and Review Process

While preliminary site hazards-assessment activities should begin early in the ESP development process, it is expected that generic licensing issues applicable to ESP development (e.g., EPZ sizing, co-location, and emergency planning) will require NRC interaction and resolution prior to initiation of any site-specific ESP work. Once the plant design and applicable generic licensing activities have progressed to the point where it is reasonable to begin site-specific ESP development work, several tasks will need to be initiated related to site selection and initial evaluation:

- Finalize the evaluation of site-specific hazards and capabilities to accommodate the range of reactor plants being considered
- Address site-specific co-location and emergency-planning issues in order to begin emergency planning portion of the ESP
- Begin development of the ER.

Following resolution of the generic issues and completion of adequate design, the ESP development process may take approximately 17–22 months. Expected durations of ESP activities include (some of these activities may proceed in parallel), roughly:

- Six months site-specific pre-ESP activities
- Between 12 and 14 months of site-characterization work
- Between 5 and 8 months data synthesis and analysis
- Between 33 and 37 months for NRC review and approval.

NRC office instruction NRO-REG-100, *Acceptance Review Process for Early Site Permit, Design Certification, and Combined License Applications*, (Reference 19), provides detailed guidance to the staff in preparing and conducting acceptance reviews for ESP and design certification (DC) applications and COLAs. Although it was developed for use by the staff, this publicly available document is a resource that gives: (1) all stakeholders a general understanding of the acceptance review process and (2) applicants a detailed understanding of the staff's acceptance review activities and schedule, the staff's expectations of applicants, and the docketing decision process. Figure 2 illustrates the typical ESP review flow path.

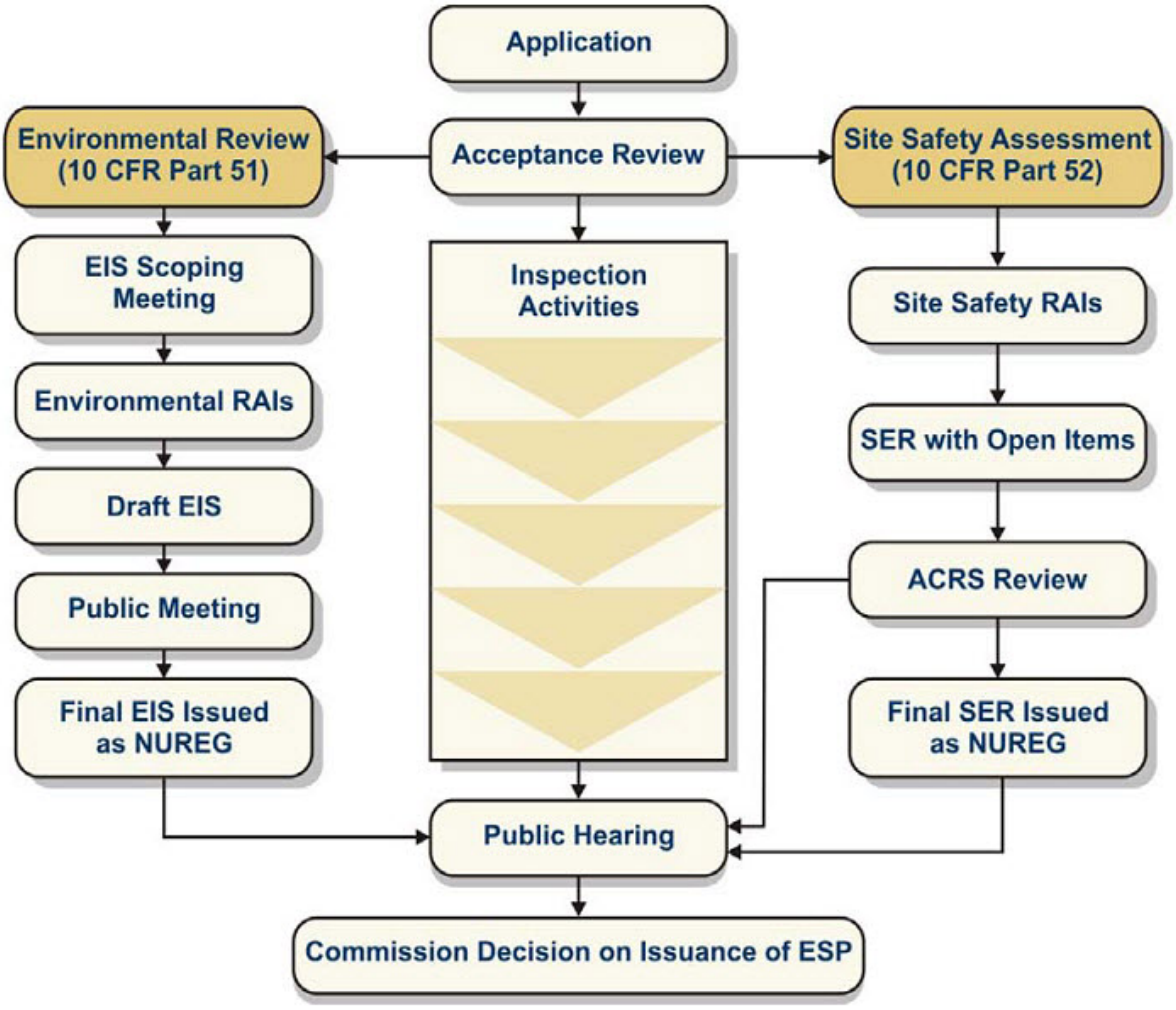

Figure 2. ESP Application review path.

4.1 Pre-Submission Interactions with NRC

As described in RG 1.206, Revision 1, prospective ESP applicants are encouraged to participate in environmental preapplication activities to ensure the NRC staff's effective and timely review of the application's ER. It is recommended that the prospective applicant and the staff begin discussions on environmental preapplication activities soon after completion of introductory meetings. A site tour and discussions on design features that will directly affect environmental resources such as rivers, wetlands, terrestrial and aquatic habitats, threatened or endangered species, and groundwater should be completed early in the preapplication process. Though strongly recommended, a site tour is at the discretion of the pre-applicant and may be deferred until after submission of the application.

For prospective ESP applicants, the NRC typically will request that the U.S. Army Corps of Engineers (USACE) be a cooperating agency in the preparation of the EIS for the application. For construction activities detailed in ESP applications, USACE develops an EIS for the issuance of licenses and permits that cover those construction activities in U.S. jurisdictional waters. The prospective applicant should brief USACE on its planned activities so that USACE can begin its work planning and funding activities. Additionally, the NRC staff will brief other federal, state, and local government

agencies, as well as appropriate tribal authorities (if applicable) on the agency's scope and schedule for the ESP application no later than one year before submission of the application. It is recommended that the prospective applicant brief these federal, state, and local agencies and tribal authorities (if applicable) before the NRC does because the prospective applicant is more knowledgeable about the site and the surrounding environment, the reactor design, and the application schedule.

An ESP applicant may choose to participate in a voluntary preapplication readiness assessment that is intended to inform and benefit both the prospective applicant and the NRC staff. The NRC staff anticipates conducting an assessment of each prospective applicant's readiness to tender an application for an ESP approximately 6 months before the planned submittal date. Although a readiness assessment is voluntary, the report entitled, *New Reactor Licensing Process Lessons Learned Report: 10 CFR Part 52*, issued April 2013 (Reference 20), identified it as one of the means of enhancing the quality of applications. The NRC staff highly recommends a readiness assessment for each prospective applicant. Applicants should discuss with the NRC any activities they wish to have included in the preapplication readiness assessment, including the schedule, level of documentation, or desired outcome. The readiness assessment allows the NRC staff to: (1) identify information gaps between the draft application and the technical content that should be included in the application submitted to the agency, (2) identify major technical or policy issues that may adversely impact the acceptance or technical review of the application, and (3) become familiar with the application, particularly in areas involving proposed new concepts or novel design features.

NRC internal guidance document NRO-REG-104, *Pre-application Readiness Assessment*, (Reference 21), provides detailed guidance to the staff in preparing and conducting preapplication readiness assessments for, in part, ESP applications. Although it was developed for use by the staff, this publicly available document is a resource that gives: (1) all stakeholders a general understanding of the preapplication readiness-assessment process and (2) applicants a detailed understanding of the staff's preapplication readiness-assessment activities and schedule and the staff's expectations of applicants.

Both DOE and NRC will need to address the NEPA provisions for preparing an EIS addressing their decisions about an ESP. If DOE is the applicant for an ESP application, then it is the lead agency. Environmental regulations for implementing NEPA define "cooperating agency" in 40 CFR 1508.5 as meaning, "any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal...." NRC has both jurisdiction by law and special expertise. as either a cooperating or commenting agency, NRC will have the option of adopting all or part of the DOE EIS in place of or in support of NRC completing its own EIS. As a cooperating agency for the DOE EIS, NRC may participate directly in the development and information flow during all phases of the DOE EIS. In a commenting agency role, NRC participation and information will be limited to public comment periods and observations during public scoping meetings and other publicly available information. Finally, as a commenting agency, there is greater likelihood that NRC will need to produce its own EIS, rather than being able to adopt all or part of the DOE EIS. The NRC decision regarding its role in the EIS process would most likely be addressed in a memorandum of understanding between it and the DOE.

4.2 Pre- Application Interactions with Agencies other than NRC During the ESP Process

The receipt of input from federal, state, and local agencies prior to the submittal of an ESP application to the NRC has the potential to provide significant efficiencies for all involved in the ESP process. NEI 10-07, *Industry Guideline for Effective Pre-Application Interactions With Agencies Other Than NRC During the Early Site Permit Process* (Reference 22), provides a logical, consistent, and workable framework to guide interactions between prospective ESP applicants and the wide range of federal, state, and local agencies other than NRC that become involved in the licensing and permitting processes at the time an ESP application is being developed for submittal to the NRC. Raising and addressing siting issues

to the maximum extent practicable at the earliest possible stage of the ESP process will benefit all participants by providing for a more effective and efficient process.

Taken cumulatively, pre-application interactions with other agencies can be viewed as an informal predecessor to the NEPA scoping process, whereby the applicant identifies and addresses relevant issues prior to initiation of the NRC's EIS development. Making the most of this pre-scoping opportunity can lead to enhanced dialogue with both the NRC and other agencies, fewer requests for additional information (RAIs) during the ESP review, a reduced number of design and licensing document revisions, a streamlined ER review and EIS development schedule, and lower overall costs for the applicant. Furthermore, when significant environmental issues are identified and addressed by the applicant and the NRC at the ESP stage, the potential for new and significant information to arise at the COL application stage is likely to be diminished.

5. Referencing an ESP in a COLA

A COLA may, as allowed by 10 CFR 52.73, reference an ESP issued under Subpart A of 10 CFR Part 52 By referencing an ESP, the COL applicant acquires the established level of regulatory finality regarding the site as provided by 10 CFR 52.39. The ESP may contain COL action items that identify certain matters that should be addressed in the FSAR or ER by a COL applicant that submits a COLA that references an ESP.

As required by 10 CFR 52.79(b), if the COL application's FSAR does not demonstrate that the design of the facility falls within the site characteristics and design parameters of the ESP, the COLA should include a request for a "variance" that complies with the requirements of 10 CFR 52.39 and 10 CFR 52.93. A variance is a plant-specific deviation from one or more of the site characteristics, design parameters, or terms and conditions of an ESP or from the SSAR. In addition, the COL applicant may, at its option, request a variance from the permit terms and conditions or from the SSAR. In addition, 10 CFR 51.50(c)(1)(i) requires the ER to contain information to demonstrate that the design of the facility falls within the site characteristics and design parameters specified in the ESP. Therefore, the ER should analyze the environmental impact of the variance.

Historically, only one COL applicant has referenced one ESP, even though the ESP may address more than one reactor site within its boundaries. There was no regulatory guidance identified that addressed the concept of more than one COL applicant referencing the same ESP. If such an approach is contemplated, then the ESP applicant should engage the NRC staff on this topic early on during preapplication interactions.

A COLA referencing an ESP need not contain information or analyses submitted to the NRC in the ESP ER or resolved in the NRC's ESP EIS, but must contain:

- Information to demonstrate that the design of the facility falls within the site characteristics and design parameters specified in the ESP.
- Information to resolve any significant environmental issue that was not resolved in the ESP proceeding.
- Any new and significant information for issues related to the impacts of construction and operation of the facility that were resolved in the ESP proceeding.
- A description of the process used to identify new and significant information regarding the NRC's conclusions in the ESP EIS. The process must use a reasonable methodology for identifying such new and significant information.
- A demonstration that all environmental terms and conditions that have been included in the ESP will be satisfied by the date of issuance of the combined license. Any terms or conditions of the ESP that

could not be met by the time of issuance of the combined license, must be set forth as terms or conditions of the combined license.

6. Finality

10 CFR 52.39 states that, except in certain limited circumstances, issues resolved in a proceeding on an ESP shall be treated as resolved in any later proceeding on an application that references the ESP. The degree of regulatory finality achieved with an ESP is dependent on the degree and accuracy of design information provided. If the proposed facility does not fall within the parameters specified in the ESP, then the regulatory issues tied to those parameters will not have finality at the COL stage. Additionally, the NRC staff must conclude that the parameters included in the ESP are reasonable in order for them to write the final safety evaluation report and EIS.

The ESP EIS resolves environmental issues within certain bounding conditions; therefore, such issues are considered resolved at the COL stage as long as no "new and significant" information has become available. For issues resolved at the ESP stage, if no new and significant information is identified at the COL stage, the NRC staff may rely on or "tier off" the ESP EIS and will state in the COL EIS its conclusion as set forth in the ESP EIS. For the ESP stage, 10 CFR 51.50 (b)(1) states that the ER "must address all environmental effects of construction and operation necessary to determine whether there is any obviously superior alternative to the site proposed. The ER need not include an assessment of the economic, technical, or other benefits (for example, need for power) and costs of the proposed action or an evaluation of alternative energy sources." Conversely, if a given environmental issue was not resolved at the ESP stage for rare instances in which sufficient information outside the control of the applicant was not available to permit resolution (e.g. pending a biological assessment by U.S. Fish and Wildlife Service) or because the ESP applicant was permitted to defer the issue (e.g., benefits assessment), the COL applicant should address the issue in the COL ER.

7. References

1. NRC Regulatory Guide 1.70, *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants.*
2. NRC NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants.*
3. NRC Regulatory Guide 1.206, Revision 1, *Applications for Nuclear Power Plants.*
4. NRC Regulatory Guide 1.233, *Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors.*
5. NRC Regulatory Guide 4.7, *General Site Suitability Criteria for Nuclear Power Stations.*
6. NEI 10-01, Revision 1, *Industry Guideline for Developing a Plant Parameter Envelope in Support of an Early Site Permit.*
7. NRC Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations.*
8. NRC, NUREG-1555, *Environmental Standard Review Plan: Standard Review Plans for Environmental Reviews for Nuclear Power Plants.*
9. NUREG-0396, *Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants.*
10. NUREG-0654, *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.*
11. NRC Regulatory Guide 1.101, *Emergency Planning and Preparedness for Nuclear Power Plants.*

12. NRC Regulatory Guide 1.183, *Alternate Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors.*
13. NRC interim staff guidance COL/ESP-ISG-026, *Interim Staff Guidance on Environmental Issues Associated with New Reactors.*
14. NRC interim staff guidance COL/ESP-ISG-027, *Interim Staff Guidance on Specific Environmental Guidance for Light Water Small Modular Reactor Reviews.*
15. NRC Regulatory Guide 4.11, *Terrestrial Environmental Studies for Nuclear Power Stations.*
16. NRC Regulatory Guide 4.24, *Aquatic Environmental Studies for Nuclear Power Stations.*
17. NRC draft interim staff guidance COL-ISG-029, *Micro-Reactor Applications - Environmental Considerations Associated with Micro-Reactors.*
18. NRC interim staff guidance COL/ESP-ISG-04, *Interim Staff Guidance on the Definition of Construction and on Limited Work Authorizations*.
19. NRC Office Instruction NRO-REG-104, *Pre-application Readiness Assessment.*
20. NRC report *New Reactor Licensing Process Lessons Learned Report: 10 CFR Part 52*, April 2013.
21. NRC Office Instruction NRO-REG-104, *Pre-application Readiness Assessment.*
22. NEI 10-7, *Industry Guidelines for Effective Pre-Application Interactions with Agencies Other Than the U.S. Nuclear Regulatory Commission during the Early Site Permit Process.*