REQUEST FOR INFORMATION
ON
NEAR TERM DEPLOYMENT OF NUCLEAR ENERGY PLANTS IN THE U.S.

This Request For Information (RFI) seeks input on nuclear plants that can be deployed and achieve commercial operational status in the United States by end of year (EOY) 2010. **This RFI is intended to solicit responses from reactor manufacturers, architect-engineering companies (A/Es), nuclear plant owners and operating companies, energy policy experts, and others in government, industry or academia with information or views on the conditions necessary for nuclear plant orders, construction and operation by 2010.** It also seeks information on any known technological, regulatory, and institutional gaps between the current state of the art and the necessary conditions to deploy new commercial nuclear plants in the United States before EOY 2010 – e.g., the need to demonstrate the 10CFR Part 52 processes for obtaining Early Site Permits and Combined Licenses. (Note: future references to 2010 in this RFI should be read as EOY 2010.)

This is the second of two independent RFIs from the U.S. Department of Energy Office of Nuclear Energy, Science and Technology (DOE-NE) related to advanced nuclear energy systems. The RFIs are:

- RFI on Generation IV Nuclear Energy System Concepts, issued March 2001
- RFI on Near Term Deployment of Nuclear Energy Plants in the U.S. (this RFI)

Both RFIs are available on the DOE Website (http://gen-iv.ne.doe.gov). These two RFIs are very different, serve different purposes, and will be analyzed separately. Many concepts provided to DOE-NE under the first RFI are not appropriate for submittal under this RFI, because they will not be ready for near-term deployment. Furthermore, this RFI seeks information on generic and design-specific issues that could be impediments to near term deployment.

All information in response to this request must be submitted by electronic mail to DOE-NE at neartermdeployment@hq.doe.gov as an attached file using the format specified below. **Submittals must be received by May 4, 2001.** Questions concerning this RFI may be directed to Tom Miller, NE-20, at Tom.Miller@hq.doe.gov.

Responses to this RFI should be submitted only for the purpose of informing DOE about potential nuclear plant design options for near term deployment and related gaps and barriers to deployment. This is not a solicitation for proposals. All information submitted will be made available to the public for comment. Proprietary information should not be submitted and will not be accepted.

Background

The U.S. Department of Energy initiated the Generation IV Nuclear Energy Systems project to encourage the development of new nuclear technologies to meet future energy needs. The purpose of "GEN IV" is to develop nuclear energy systems that would be available for worldwide deployment by 2030. A key deliverable for the Generation IV project will be a technology roadmap to guide DOE-NE's long-term research and development (R&D) activities.

DOE-NE recognizes the need for near term deployment (NTD) options as well. As part of the Generation IV project, DOE-NE is also seeking to identify the actions necessary to support near-term nuclear energy deployment in the U.S.

To meet this objective, a comprehensive NTD Roadmap developed by September, 2001, which will identify nuclear plant designs that could be deployed and operating in the U.S. by 2010, along with the resource requirements that are needed to ensure multiple options are available for this purpose. The NTD Roadmap will also identify technical, regulatory, and institutional gaps, prerequisites, and other issues, and the actions needed to appropriately address these issues. The information collected from this RFI will be a primary input to the NTD Roadmap.

Organization of Request for Information

This RFI consists of three sections:

Section 1: Information on Specific Candidate NTD Options
Nuclear design companies or teams are asked to show how their nuclear plant design (including nuclear systems and power conversion/balance-of-plant systems) meet six screening criteria. The six evaluation criteria are provided in Section 1, with an expanded discussion of each to guide respondents to the specific types of information requested. Responses to each of these six criteria should be as brief as possible (e.g., 2-4 pages each).

The primary audience for this section is the plant designer or design team (vendors, A/Es, etc.), although owner-operators and others are also invited to provide their inputs and perspectives (e.g., views on validity and priority of evaluation criteria).

Section 2: Gap Analysis:
This section identifies all of the technical, institutional, and regulatory barriers and gaps that must be addressed to achieve near term deployment. The format for this section is structured for consistency and for assisting in the prioritization, planning, and resource management of actions designed to close these gaps. Respondents are requested to discuss each specific barrier or gap using a format provided in Section 2. Each gap analysis response should be limited to 2 pages.

The points addressed under each gap analysis are:

- Gap (short definition of issue)
- Solution or outcome required
- Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10. A simple table to fill-in this data is included in Section 2.
- Responsibility (primary organization(s) and supporting organization(s))
- Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

This section is comprised of two sub-sections:

Section 2A: This subsection addresses generic gaps and barriers. These are primarily in the institutional and regulatory areas, but some crosscutting technical gaps (e.g., generic construction technologies) are also included. For this section, significant known gaps are already identified here in the RFI. Respondents are requested to add the necessary detail to the gap analysis (e.g., costs to close gap, responsibility, benefits, etc.). Respondents are requested to identify and analyze any generic gaps not already noted in this Section. Also, respondents should identify instances, if any, where it is judged that an identified gap has been filled or partially filled, giving references to the work done in this respect.

The primary audiences for this section are owner/operators, although vendors, A/Es, energy policy experts, etc., are invited to provide their inputs and perspectives as well.

Section 2B: This subsection addresses design-specific gaps. It focuses primarily on technical gaps, but may include design-specific institutional gaps as well. Although this section is formatted the same as Section 2A, there is no discussion of potential gaps. There is no specified limit to the number of design-specific gaps that can be identified, but an overall limit of 25 pages per design is encouraged for this sub-section.

This section is intended to be filled out by the design teams who respond to Section 1.

Section 3 (Optional): Supporting information and comments:
Respondents are invited to provide any additional inputs, comments, and recommendations, as they may desire. Please keep these additional inputs brief.

Near Term Deployment Screening Criteria
Six screening criteria have been established to help identify which nuclear power plant designs qualify for inclusion in the near term deployment category. These criteria, which form the basis for design-specific inputs to this RFI, are as follows.

1. Credible plan for gaining regulatory acceptance - Candidate technologies must show how they will be able to receive either a construction permit for a demonstration plant or a design certification by the U.S. Nuclear Regulatory Commission (NRC) within the time frame required to permit plant operation by 2010 or earlier.

2. Existence of industrial infrastructure - Candidate technologies must be able to demonstrate that a credible set of component suppliers and engineering resources exist today, or a credible plan exists to assemble them, which would have the ability and the desire to supply the technology to a commercial market in the time frame leading to plant operation by 2010 or earlier.

3. Credible plan for commercialization - A credible plan must be prepared which clearly shows how the technology would be commercialized by 2010 or earlier, including market projections, supplier arrangements, fuel supply arrangements and industrial manufacturing capacity.

4. Cost-sharing between industry and government - Technology plans must include a clear delineation of the cost categories to be funded by government and the categories to be funded

by private industry. The private/government funding split for each of these categories must be shown along with rationale for the proposed split.

5. Demonstration of economic competitiveness - The economic competitiveness of candidate technologies must be clearly demonstrable. The expected all-in cost of power produced is to be determined and compared to existing competing technologies along with all relevant assumptions.

6. Reliance on existing fuel cycle industrial structure - Candidate technologies must show how they will operate within credible fuel cycle industrial structures, i.e., they must utilize a once-through fuel cycle with low enriched uranium (LEU) fuel and demonstrate the existence of, or a credible plan for, an industrial infrastructure to supply the fuel being proposed.

The design-specific information requested from respondents is provided in Section 1 to this RFI.

Use of RFI Responses:

The information provided by respondents to this RFI will be used to develop an NTD Roadmap. That document is intended to include complete estimates of the resources (schedule and funding levels) required to close the gaps in time to meet the deployment goals (achieving new nuclear plant orders by 2005 and a range of options with robust implementation infrastructure on or before 2010).

Submittal Requirements:

This information request is not limited to U.S. citizens or U.S. companies. However, the information sought is limited to deployment of nuclear plants in the United States, under U.S. laws and regulations. Respondents are allowed and encouraged to team in their responses, in keeping with likely venture organizations or structures. All team members should be identified.

Inputs must be in English in Microsoft Word or compatible file format. Margins of at least one inch must be provided around all pages, and text no smaller than 10 points must be used, with a line spacing of at least 15 points. Figures should be limited to a few simple electronically inserted figures that do not use excessive computer memory. Figures may not have text smaller than 6 points. The submittal should be limited to a file size of about 1-Megabyte, if possible, for Sections 1 and 2. All of the information required by this RFI must be included in these sections.

Section 3 may include additional descriptive information in any format desired by the respondent. Section 3 and each attachment to it should also be limited to a file size of about 1-Megabyte each, and should be transmitted separately to DOE-NE, per page 1 of this RFI.

Cover page: A cover page should be attached to each RFI response, consisting of a brief (1-2 sentence) summary of the submittal, the principal point of contact and his/her organization, mailing address, telephone and fax number and e-mail address. See Attachment A.

Section 1:
Request for Information on Specific Candidate Near Term Deployment Options

The primary audience for this section is the plant designer or design team (vendors, A/Es, etc.), although owner-operators and others are also invited to provide their inputs and perspectives (e.g., views on validity and priority of evaluation criteria).

Nuclear design companies or teams are asked to show how their nuclear plant designs (including nuclear systems and power conversion/balance-of-plant systems) satisfy the six screening criteria. The six evaluation criteria are provided below, with an expanded discussion of the specific types of information requested. Responses to each of these six criteria should be as brief as possible (e.g., 2-4 pages each).

For each criterion, the text below provides a description of the specific information requested and/or a series of questions to be answered. It is important that the respondent provide as much relevant information as possible, within the suggested limit above. However, if the specific questions or information requested are not directly applicable to the respondent's design, or the information is not yet available in the form or detail requested, please provide the best available input.

Criterion 1: Regulatory Acceptance:

"Credible plan for gaining regulatory acceptance - Candidate technologies must show how they will be able to receive either a construction permit for a demonstration plant or a design certification by the U.S. Nuclear Regulatory Commission (NRC) within the time frame required to permit plant operation by 2010 or earlier."

For already certified designs, this criterion requires that the respondent provide a credible plan to resolve any remaining design-specific COL issues and to show that any other regulatory considerations (e.g., construction inspection) can be managed so as to permit operation by 2010.

For designs that are not certified, this criterion requires that the respondent provide a credible plan for gaining regulatory approval for the design, to include obtaining a design certification or a construction permit and operating license for a first plant, as well as a credible plan for managing the regulatory aspects of construction, test and start up of the first unit by 2010.

In responding to this criterion, the plan for obtaining a construction permit or design certification should include (but is not limited to) answers to the following:

1. Describe how the technology will comply with current regulatory requirements or a proposed alternative regulatory approach, and summarize the scope of the documentation that will be submitted to the NRC.

2. Summarize the most significant issues expected in the review by the NRC.

3. Identify the most significant risks to completion of the NRC review on schedule, accompanied by explanations of how those risks will be managed, etc.

4. Provide a timeline and identify major milestones in the submittal and the review schedule for conducting the NRC review, including Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC) implementation during construction.

5. Summarize interactions that have already taken place with the NRC concerning plans for review of the candidate technology.

Criterion 2: Industrial Infrastructure:

"Existence of industrial infrastructure - Candidate technologies must be able to demonstrate that a credible set of component suppliers and engineering resources exist today, or a credible plan exists to assemble them, which would have the ability and the desire to supply the technology to a commercial market in the time frame leading to plant operation by 2010 or earlier."

(Note: no discussion of fuel cycle infrastructure should be included here, since that is covered under Criterion 6.)

Please answer the following, addressing generic and design-specific issues as well as hardware and personnel issues.
:

1. Describe the industrial infrastructure in place today to construct one nuclear unit in the U.S. by 2010. If an element of infrastructure is not in place, please identify it and give anticipated dates for when the element is needed and will be in place.

2. Describe the industrial infrastructure in place today to construct multiple nuclear units in the U.S. by 2010. If not in place, please identify the missing element(s) and give the anticipated dates for when the element(s) are needed and will be in place.

3. Identify the top 3-5 generic areas where today's available infrastructure is not adequate to permit construction and startup of multiple units of your nuclear design. This question is intended to identify common infrastructure needs (e.g., n-stamp valve manufacturers, reactor core physics engineers) that many or most near term deployment options see as important gaps in the nuclear infrastructure. Prioritize if possible.

4. Describe the extent to which structures, systems and components can be constructed, manufactured, or procured according to commercial standards (as opposed to safety grade).

5. Identify the longest lead time component for your design and the time required to manufacture it.

Criterion 3: Commercialization Plan:

"Credible plan for commercialization - A credible plan must be prepared which clearly shows how the technology would be commercialized by 2010 or earlier, including market projections, supplier arrangements, fuel supply arrangements and industrial manufacturing capacity."

Commercialization requires bringing a nuclear plant based on proven technology to the market with a predictable schedule and within the owner(s) targeted cost. Commercialization also entails meeting the established operating performance requirements so as to meet the shareholders expected return on investment (ROI).

Provide a realistic plan that clearly shows how your design would be commercialized. Include a general description of project responsibilities and financial participation by team members.

Criterion 4: Cost Sharing Plan:

"Cost-sharing between industry and government - Technology plans must include a clear delineation of the cost categories to be funded by government and the categories to be funded by private industry. The private/government funding split for each of these categories must be shown along with rationale for the proposed split."

1. Delineate the cost categories (for all activities, including licensing, engineering, construction, etc.) that you believe should be funded, all or in part, by the government, and those categories that should be funded by private industry or non-government sponsors. Identify which private industry organizations (or, at least, types of organizations) would be expected to provide the funding. If funding is already being provided toward your particular design, identify the sources, to the extent possible.

2. For any of the above activities that you suggest any government funding, please describe the recommended funding split between government and private industry and non-government partners, as well as the rationale for the proposed split. The rationale should identify the responsibilities of individual parties that would justify their expenditure.

3. Describe any non-direct cost-share provisions or incentives that you believe the government should provide, e.g., loan guarantees, tax credits, etc. Identify whether any of these are viewed as necessary to assure success of your candidate technology.

Criterion 5: Economic Competitiveness:

"Demonstration of economic competitiveness - The economic competitiveness of candidate technologies must be clearly demonstrable. The expected all-in cost of power produced is to be determined and compared to existing competing technologies along with all relevant assumptions."

Respondents are requested to provide plant-specific cost data in order to compute the all-in total generation costs of near-term nuclear plants, likely to reach commercial operation by 2010.

Plant Capital Cost Data

The data requested should be provided in units of Million Dollars or $/KWe in year 2000 dollars. For all the data items requested please provide your nominal value as well as a high-low range around the nominal value. Information is requested here for:

1. Net plant electric capacity, (for modular plants, please specify the configuration and number of modules); plant engineering, procurement, construction (EPC) cost; project startup and

development costs; owners costs and contingency; and post construction costs. Please indicate the particular site (or which NERC region) these costs estimates are based upon.
2. Project start date; project development period from order until construction starts; project construction time period; post-construction time period; and commercial operation date.
3. Cost escalation rate during construction, above inflation (inflation assumptions are not required if input is provided in constant year 2000 dollars).
4. For modular plants, if more than one module is expected to reach commercial operation before 2010, please provide the above information request for each module.
5. Please provide the above requested data for the first-of-a-kind (FOAK) plant expected to reach commercial operation by 2010, and for the subsequent Nth-of-a-kind (NOAK) plant. Please specify your definition for NOAK.

First Deployment Costs vs. Nth of a Kind (NOAK) Costs

Please provide your assessment and cost breakdown for the difference between the FOAK and the NOAK plants. The first plant deployment costs are defined as the incremental costs of specific activities that need to be completed to deploy the first nuclear plants in this decade. These would be costs above and beyond those included in the FOAK costs above. Typical costs could include estimates of the following: completing the ESP licensing process, resolving all NRC COL procedural issues and of obtaining the first COL from NRC, resolving any remaining generic licensing issues, reactivating domestic U.S. equipment components manufacturing infrastructure, Incremental costs of manufacturing long lead-time heavy components abroad, hiring and training A-E and vendor nuclear manpower required for the plant construction/deployment process, incremental contingency costs for FOAK plant, and any additional factors.

Other Plant Cost Components

Other cost components of the total life-cycle generation costs for the near-term plants. These costs can be expressed in cost accounting units such as $/MWh, $/Yr-Yr, or M$/Yr, all reported in year 2000 dollars. Please provide information for the following cost components:

1. Annual O&M costs, and breakdown of annual O&M costs into fixed and variable cost components.
2. Annual fuel costs, and full-load net heat rate.
3. Annual capital addition costs (if any).
4. Expected plant operating lifetime.
5. Projected availability and annual averaged capacity factors.
6. Decommissioning sinking-fund annual payment.
7. Other annual costs such as G&A, taxes

Please indicate if you expect escalation (above inflation) in any of the cost components mentioned above.

Criterion 6: Fuel Cycle Industrial Structure:

"Reliance on existing fuel cycle industrial structure - Candidate technologies must show how they will operate within credible fuel cycle industrial structures, i.e., they must utilize a once-through fuel cycle with LEU fuel and demonstrate the existence of, or a credible plan for, an industrial infrastructure to supply the fuel being proposed."

Respondents should provide answers to the following questions:

1. What fuel production facilities, including enrichment, conversion, and fabrication, now exist or will exist (with a time line for operation) to reliably supply the fuel for reactor operation? Your response should include a review of fuel manufacturing capacity for sufficiency and flexibility to handle unanticipated maintenance, QA problems and fuel design changes, while also meeting the plant requirements for an adequate fuel supply for the plant(s) life.

2. If required, what is the strategy for fuel qualification and licensing?

3. How will fuel reliability be assured (e.g., such that the production facilities will meet QA requirements necessary for the plant to operate reliably and within technical specifications)?

4. What assumptions are made regarding the on-site spent fuel storage capability?

Section 2:
Request for Information on Barriers to Near Term Deployment Options

This section identifies all the technical, institutional, and regulatory barriers and gaps that must be addressed to achieve near term deployment. The format for this section is structured for consistency and for assisting in the prioritization, planning, and resource management of actions designed to close these gaps. Respondents are requested to discuss each specific barrier or gap using the format provided below. Each gap analysis response should be limited to 2 pages.

The points addressed under each gap analysis are:

- Gap (short definition of issue)
- Solution or outcome required
- Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10. A simple table to fill-in this data is provided below.
- Responsibility (primary organization(s) and supporting organization(s))
- Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

This section is comprised of two sub-sections:

SECTION 2A: Generic Gaps and Barriers

The primary audiences for this section are owner/operators, although vendors, A/Es, energy policy experts, etc., are invited to provide their inputs and perspectives as well.

This subsection addresses generic gaps and barriers. These are primarily in the institutional and regulatory areas, but some crosscutting technical gaps (e.g., generic construction technologies) are also included. For this section, significant known gaps are pre-identified below. Respondents are requested to provide their views and recommendations to the gap analysis (e.g., costs to close gap, responsibility, benefits, etc.). Respondents are requested to identify and analyze any generic gaps not already noted below. Also, respondents should identify instances, if any, where it is judged that an identified gap has been filled or partially filled by other past or ongoing activities, giving references to the work done in this respect.

Known Gaps for Analysis

This section summarizes six gaps and solutions or required outcomes for each. These gaps and solutions are then transcribed into "Gap Analysis for Near Term Deployment" forms later in this section. Respondents are requested to provide further discussion on each of these gaps and solutions on the forms provided. Respondents are also requested to assign a priority to each solution in the table below, using H for High, M for Medium, and L for Low.

Note that spent fuel management and non-proliferation concerns are considered to be longer term fuel cycle issues, and are not appropriate for this near term gap analysis. Adequate progress is being made on these issues to allow near term new plant construction.

Gap	Solution or Required Outcome	Priority (H, M, L)
Lack of demonstrated process for obtaining an Early Site Permit	1. Develop generic guidance on all aspects of ESP and obtain NRC concurrence in advance of ESP filings	
	2. Demonstrate NRC's ESP process for each likely siting scenario	
Lack of demonstrated process for obtaining a Combined Construction and Operating License	1. Develop generic guidance on all aspects of COL and obtain NRC concurrence in advance of COL filings	
	2. Demonstrate NRC's COL process for each NTD design option	
Lack of an appropriate Risk-Informed, Performance-Based regulatory process for licensing decisions	1. Develop risk-informed performance-based regulatory framework for future design certifications of new plants	
	2. Develop a means for streamlined demonstration, regulatory approval, & infusion of new technologies	
Lack of closure with NRC on major COL issues that can affect construction schedule and cost-effective plant operation	1. Establish an efficient process for construction inspection and ITAAC sign-off	
	2. Develop a generic, risk-informed, and appropriate basis for new Plant physical plant security.	
	3. Develop a generic, risk-informed regulatory basis for appropriate emergency planning.	
Lack of assurance that nuclear plants will be cost leader in new generation (with focus on generic solutions that will further reduce busbar costs relative to competing options)	1. Adapt advanced fabrication, modularization and construction technologies including time-sequenced virtual construction	
	2. Adapt and standardize advanced information management system open architectures for life-cycle design, procurement, construction, maintenance, and engineering/licensing management	
	3. Develop standardized advanced man-machine interface systems for plant safety and control, including advanced sensors, programmable controllers, fiber optics, self-diagnostics, and human performance technologies	
	4. Systematically evaluate other opportunities (in addition to those above) to reduce plant construction time. Evaluate technologies, techniques, and human resource opportunities	
Lack of assurance that nuclear plants will be cost leader in new generation (design-specific)	Design-specific refinements – see Section 2 B	

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of demonstrated process for obtaining an Early Site Permit

2. Solution or outcome required

Develop generic guidance on all aspects of ESP and obtain NRC concurrence in advance of ESP filings

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year / Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of demonstrated process for obtaining an Early Site Permit

2. Solution or outcome required

Demonstrate NRC's ESP process for each likely siting scenario

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year / Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of demonstrated process for obtaining a Combined Construction and Operating License

2. Solution or outcome required

Develop generic guidance on all aspects of COL and obtain NRC concurrence in advance of COL filings

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year / Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of demonstrated process for obtaining a Combined Construction and Operating License

2. Solution or outcome required

Demonstrate NRC's COL process for each NTD design option

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of an appropriate Risk-Informed, Performance-Based regulatory process for licensing decisions

2. Solution or outcome required

Develop risk-informed performance-based regulatory framework for future design certifications of new plants

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of an appropriate Risk-Informed, Performance-Based regulatory process for licensing decisions

2. Solution or outcome required

Develop a means for streamlined demonstration, regulatory approval, & infusion of new technologies

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year / Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of closure with NRC on major COL issues that can affect construction schedule and cost-effective plant operation

2. Solution or outcome required

Establish an efficient process for construction inspection and ITAAC sign-off

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of closure with NRC on major COL issues that can affect construction schedule and cost-effective plant operation

2. Solution or outcome required

Develop a generic, risk-informed, and appropriate basis for new Plant physical plant security.

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of closure with NRC on major COL issues that can affect construction schedule and cost-effective plant operation

2. Solution or outcome required

Develop a generic, risk-informed regulatory basis for appropriate emergency planning.

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of assurance that nuclear plants will be cost leader in new generation

2. Solution or outcome required

Adapt advanced fabrication, modularization and construction technologies including time-sequenced virtual construction

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year / Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of assurance that nuclear plants will be cost leader in new generation

2. Solution or outcome required

Adapt and standardize advanced information management system architectures for life-cycle design, procurement, construction, maintenance, and engineering/licensing management

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of assurance that nuclear plants will be cost leader in new generation

2. Solution or outcome required

Develop standardized advanced man-machine interface systems for plant safety and control, including advanced sensors, programmable controllers, fiber optics, self-diagnostics, and human performance technologies

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year / Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

Lack of assurance that nuclear plants will be cost leader in new generation

2. Solution or outcome required

Systematically evaluate other opportunities (in addition to those above) to reduce plant construction time. Evaluate technologies, techniques, and human resource opportunities

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year / Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s))

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Gap Analysis for Near Term Deployment
[SAMPLE, TAKEN FROM EPRI ENERGY SUPPLY ROADMAP, JAN. 1999]

1. Gap (short definition of issue)
Generic enhancements that translate to busbar cost reductions compared with the nuclear power plant deployment options currently available.

2. Solution or outcome required
Contributing Solution: [1 of 5 listed for this gap] Adapt advanced modularization and construction technologies to establish applicability to future nuclear power plant construction

Modularization and construction technologies affect plant capital cost both directly through construction cost and indirectly through construction duration and the depended interest during construction. A cooperative, and thereby cost-effective development effort can assess, in detail, emerging modularization and construction technologies potentially applicable to nuclear power plant construction. Technologies endorsed by this assessment are then adapted and/or refined as necessary to assure applicability and to confirm construction cost and schedule benefits. Comprehensive electronic modeling of the plant to be constructed, automation of information gathering and management, and automation of repetitive deductive conclusion-deriving functions are the essence of several advanced construction technology candidates currently emerging.

The primary science and technology challenge is likely to be that of demonstrating cost-effective functionality of the candidate technologies selected.

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

$2M to $4M per year over the first two decades of the next century

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE	$2M	$2M	$2M	$2M	$2M	$2M	$2M	$2M	$2M	$18M
Industry	$2M	$2M	$2M	$2M	$2M	$2M	$2M	$2M	$2M	$18M
TOTAL	$4M	$4M	$4M	$4M	$4M	$4M	$4M	$4M	$4M	$36M

4. Responsibility (primary organization(s) and supporting organization(s)

Nuclear power plant vendor teams, supported by the associated government(s), possibly with self-funded integration by the nuclear power plant owner community.

U.S. initiative is encouraged, both to minimize costs to owners of future U.S. plants and to maximize U.S. vendors' share of global plant deployments.

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)
1-2 mills/kWh, experienced through reductions to the capital cost contribution to busbar cost.

SECTION 2A: Project-Specific Gaps and Barriers

This subsection addresses design-specific gaps. It focuses primarily on technical gaps, but may include design-specific institutional gaps as well. Although this section is formatted the same as Section 2A, there is no discussion of potential gaps. There is no specified limit to the number of design-specific gaps that can be identified, but an overall limit of 25 pages per design is established for this sub-section.

This section is intended to be filled out by the design teams who respond to Section 1.

Gap Analysis for Near Term Deployment

1. Gap (short definition of issue)

2. Solution or outcome required

3. Resource requirements to close gap (total needs, irrespective of source, estimated on an annual basis, FY02-FY10.

Year Source	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	**TOTAL**
DOE										
Industry										
TOTAL										

Note: All funding requirements in $M

4. Responsibility (primary organization(s) and supporting organization(s)

5. Anticipated benefits of gap closure in economic and/or schedule terms (e.g., reduction in busbar costs), if feasible. (Note: some gaps are prerequisites that cannot be quantified.)

Attachment A

This cover page should be included with the RFI input and submitted to
neartermdeployment@hq.doe.gov

Near Term Deployment Nuclear Energy Plants -- Cover Page

Description of Input (nuclear design and/or gap analysis)

Name of principal point-of-contact

Organization

E-mail address

Mailing address

Telephone number

Fax number