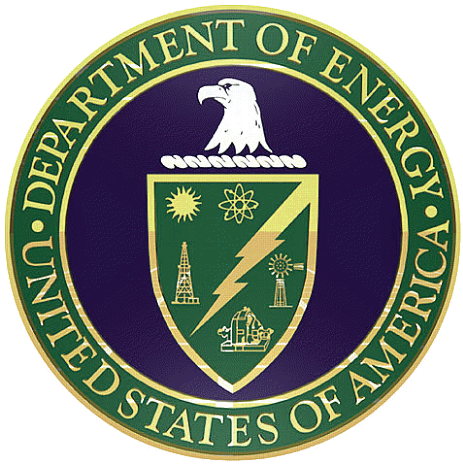
# Nuclear Safety Research and Development Program Operating Plan




**Office of Nuclear Safety**
**Office of Health, Safety and Security**
**U.S. Department of Energy**

June 2012

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## 1.0 Introduction

This operating plan outlines the mission, goals, and processes for the Department of Energy's (DOE) Nuclear Safety Research & Development (NSR&D) Program. This first version of the operating plan also discusses the startup phase of the program.

NSR&D involves a systematic search for knowledge to advance the fundamental understanding of nuclear safety science and technology through scientific study, analysis, modeling, and experiments. Maintaining an effective NSR&D program will support DOE and the National Nuclear Security Administration (NNSA) in standards development, validation of analytical models and methods, and improvements in operating practices. It will support DOE/NNSA in making technically justified and well informed nuclear safety decisions. It will also help maintain the technical expertise and the analytical tools and techniques to maintain a sufficiently qualified and experienced workforce with a robust infrastructure.

## 2.0 Background

On May 21, 2004, the Defense Nuclear Facilities Safety Board (DNFSB) issued Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*. In this Recommendation, the DNFSB identified that, as part of DOE/NNSA efforts to understand, minimize and control the likelihood of a low-probability, high-consequence nuclear accident; DOE/NNSA should take steps to "ensure continued integration and support of research, analysis, and testing in nuclear safety technologies." Accordingly, the Department addressed these concerns in an Implementation Plan for Recommendation 2004-1 (October 12, 2006), which committed to the following for NSR&D with the NNSA as the responsible organization:

> "Commitment 7: Develop processes to identify needed safety research and development needs across the DOE/NNSA and to determine if and to what extent those research needs are being addressed through current plans and budgets"; and
>
> "Commitment 8: Develop a method to ensure that nuclear safety research and development needs are identified and integrated into DOE/NNSA programming, planning, budgeting, and execution processes including methods to share the results of completed research and development."

In May 2011, the Office of Nuclear Safety was created within the Office of Health, Safety and Security (HSS). In August 2011, program management responsibility was transferred from NNSA to HSS, in order to develop and establish a corporate-wide approach for identifying, coordinating and managing the Department's existing and future NSR&D efforts.

## 3.0 Objectives

The objectives of the NSR&D Program are to:

- establish an enduring Departmental commitment and capability to utilize NSR&D in preventing and/or reducing the hazards and risks posed by DOE and NNSA nuclear facilities, operations, nuclear explosives, and environmental restoration activities;
- foster a Departmental culture that embraces NSR&D as a standard business practice for affecting continuous improvement in nuclear facility safety consistent with Integrated Safety Management (ISM) principles;
- optimize NSR&D resources in resolving existing and emerging nuclear facility safety concerns; and
- implement the Department's commitments on NSR&D as contained in DOE's Implementation Plan to DNFSB Recommendation 2004-1.

The Program is designed to:

- implement and utilize a technically sound and standardized consensus-based needs identification and prioritization process across DOE and NNSA program offices;
- allow flexibility for identifying and quickly responding to emerging and unanticipated issues that may arise outside of scheduled and funded NSR&D projects;
- foster and facilitate networking and information exchange on NSR&D needs and activities across the DOE and NNSA enterprise and with external national and international organizations;
- identify ongoing and completed NSR&D projects within DOE and NNSA program offices (e.g., Office of Science, Office of Environmental Management, Office of Nuclear Energy and Defense Programs), sites, and national laboratories that have applicability to nuclear safety needs[1];
- demonstrate linkage of NSR&D activities (and their schedules and results) to specific nuclear facilities, operations, or projects through the programming, planning, budgeting, and execution (PPBE) processes;
- dedicate, as appropriate, NSR&D funding to address specific immediate near-term needs; and
- utilize outreach and networking to obtain an awareness of research activities sponsored by other Federal, national (e.g., private sector), and international (i.e., Nuclear Energy Agency, International Atomic Energy Agency, etc.) organizations.

[1] See DOE Order 241.1B, *Scientific and Technical Information Management*.

## 4.0 NSR&D Program Processes

### 4.1 NSR&D Program Process and Startup

The NSR&D Program will have three main processes: (1) gather input on NSR&D needs and current activities, (2) analyze the input to support decision making on prioritization and collaboration of NSR&D projects, and (3) disseminate information on NSR&D activities and results. Each of the processes mentioned above will be conducted annually to continuously improve and reflect the Department's mission. A phased approach will be utilized to startup the NSR&D Program.

Phase 1:

The first phase will be to stand up a NSR&D Committee to identify completed and ongoing research projects and set in place the framework for which the committee will operate. During the first phase, the program will develop a website and initiate development and information gathering for a database that will contain a corporate-wide list of NSR&D activities and links to points of contacts and associated NSR&D project information. Initially, information will be gathered for activities that have been conducted within the last 10 years. The database will be made accessible to all DOE Federal and contractor employees.

Concurrently while working with internal DOE networks, the NSR&D Program will also hold discussions with external safety organizations to discuss their programs for performing safety research and development. The program will reach out to other Federal agencies, the private sector, international organizations, Energy Facilities Contractors Group (EFCOG), national laboratories, and universities for lessons learned and also to network on common NSR&D activities.

Phase 2:

During the second phase, the NSR&D Program will complete the development of the NSR&D database, populate the database, and develop a NSR&D report that discusses completed, ongoing, and planned NSR&D activities gathered through input from the program offices on their respective NSR&D. The NSR&D Program, along with the NSR&D Committee, will also analyze the information gathered in phase 1 to identify gaps and overlaps in nuclear safety research and identify program and corporate NSR&D needs. Each DOE/NNSA program office should prioritize their respective needs and proposals under their PPBE process.

The majority of the funding for NSR&D projects would come from within and be managed by the DOE/NNSA program offices, either as part of their internal ongoing NSR&D activities, or operations-related activities at the Headquarters and site level. DOE/NNSA program offices should communicate applicable activities through the NSR&D Committee. In order to fully realize the potential benefits of shared NSR&D activities it is important that relevant research and development from program directed, laboratory directed[2], and cooperative research be included in the NSR&D database.

[2]See DOE Order 413.2B Admin Chg 1, *Laboratory Directed Research and Development*

Although each Program Office will fund their respective NSR&D efforts, the NSR&D Program will implement the processes to annually identify, prioritize, and fund NSR&D efforts not already funded through DOE/NNSA specific programs, but demonstrates the potential for Department-wide benefit in support of safe nuclear facility design, construction, and/or operations.

### 4.2 Standardized NSR&D needs identification and prioritization process

The NSR&D Program, with the support of the NSR&D Committee, will utilize each DOE/NNSA program office's annual NSR&D input to prepare an annual report to summarize the progress on existing projects, projects proposed and approved for funding, and the impact of funded and/or unfunded projects in perspective on the safety of the DOE complex.

The NSR&D Program will coordinate the following information with respect to the program needs and identification process:

(1) Proposals from the DOE/NNSA program offices;

(2) Summary list of ongoing program-funded NSR&D activities; and

(3) A list of NSR&D activities for which funding is being requested.

The NSR&D Committee will review the information provided to ensure that ongoing and future NSR&D work being conducted and/or identified under DOE/NNSA program offices adequately addresses DOE/NNSA user needs, are not overlapping, and that the results are well coordinated Department-wide (e.g., collaborative research[3]).

### 4.3 NSR&D Program Funding

Proposals for funding through the NSR&D Program must meet the requirements outlined in the *NSR&D Program Proposal Submittal Instructions*, contained in Attachment 2 of this document. The NSR&D projects that can be funded will depend on the availability of funds within HS-30[4] (or via multiple offices if a joint effort is identified and agreed upon).

As appropriate, each DOE/NNSA office should apply the following guidelines to determine which projects qualify for funding through the NSR&D Program:

- Research topics should be limited to those in support of safe nuclear facility design, construction, and/or operations for DOE/NNSA nuclear facilities, nuclear explosives, and environmental restoration activities.
- The topics must have a demonstrated potential to:
  - Improve nuclear safety practices (through applied NSR&D).

[3] See DOE Order 483.1, *DOE Cooperative Research and Development Agreements*.

[4] HS-30 is working to establish funds to support NSR&D projects with complex-wide benefit and may coordinate with program offices for support.

  - Reduce uncertainties in current nuclear safety analyses (to gain higher confidence in the results or result in savings on engineering or administrative controls by reducing excessive conservatism included in safety basis documentation).
  - Identify or clarify new hazards and accident scenarios.
  - Justify changes to directives and technical standards to strengthen the Department's technical basis for requirements.
- Research should not repeat previous or ongoing research completed by DOE/NNSA line organizations or other agencies, unless there is a strong demonstrated need to validate, verify, or extend such research.

The general attributes to be used for the prioritization of NSR&D projects requesting funding are:

- Multi-program applicability;
- Potential for cost savings through synergistic research; and
- Impact on nuclear safety knowledge basis.

## 5.0 NSR&D Committee

DOE will charter and establish an NSR&D Committee to develop and implement a process which results in NSR&D activities being coordinated and integrated across all affected DOE/NNSA organizations. The NSR&D Committee members will consist of representatives from the National Nuclear Security Administration, the Office of Environmental Management, the Office of Science, the Office of Nuclear Energy, the Chief of Defense Nuclear Safety, the Chief of Nuclear Safety for Environmental Management, the Chief of Nuclear Safety for Science, the Chief of Nuclear Safety for Nuclear Energy, and will be chaired by HSS (see Charter in Attachment 1). The NSR&D Committee will hold quarterly scheduled working meetings to identify, collect, and evaluate NSR&D needs in support of safe nuclear activities and operations.

## 6.0 Roles and Responsibilities

### 6.1 Office of Health, Safety and Security

The NSR&D Program will be managed out of HSS's Office of Nuclear Safety with two dedicated staff positions, a program manager and a project manager. The roles of the dedicated staff are to lead the NSR&D Committee and to coordinate the identification, collaboration, and prioritization of complex-wide NSR&D activities. The NSR&D Program staff will also manage HSS-related NSR&D activities and provide information on these activities through the NSR&D Committee. NSR&D database development and maintenance will be funded through HSS.

The NSR&D Program will function as a clearinghouse to collect and communicate NSR&D efforts throughout the DOE/NNSA complex. The NSR&D Program, along with the NSR&D Committee, will focus near-term efforts on identifying the portfolio of NSR&D activities already

completed and ongoing through DOE/NNSA program offices, sites, and national laboratories; and identifying and prioritizing NSR&D needs that exist more broadly across the DOE complex.

The HSS NSR&D Program Manager will:

- chair the NSR&D Committee;
- evaluate existing information gathering and exchange networks including utilization of NNSA NSR&D data gathering processes, office networks, Facility Representatives, Safety System Oversight personnel, facility managers, and various EFCOG working groups;
- develop and manage a database of NSR&D projects for use by the DOE complex to assist in planning future projects, facility design, and the development of policy, directives and technical standards;
- annually solicit external perspectives and recommendations on the operation and strategic direction of the program from within DOE/NNSA, the DNFSB, and other agencies and experts; and
- lead the development of the annual report on NSR&D activities.

### 6.2 DOE/NNSA Program Offices

DOE and NNSA program offices participate through the NSR&D Committee. Information provided by each program office will be utilized by the NSR&D Program and the NSR&D Committee.

Each program office will:

- provide status on ongoing and completed NSR&D activities in their respective program(s);
- communicate NSR&D program needs and prioritization to their respective Program Secretarial Officer;
- communicate respective program related NSR&D needs and prioritization to the NSR&D Committee;
- assist in the development of an NSR&D database, including the collection of information and results;
- assist in the development of a corporate process to identify NSR&D needs and gaps;
- provide information on related NSR&D program activities for the annual NSR&D report;
- assist in reviews of proposed research efforts and related results; and
- work with program offices to help coordinate crosscutting planned research.

## 6.3 Chief of Defense Nuclear Safety and Chiefs of Nuclear Safety

The Chief of Defense Nuclear Safety (CDNS) and Chiefs of Nuclear Safety (CNSs) are responsible for supporting the Department's Central Technical Authorities[5] on nuclear safety matters, including identification, prioritization, and review of NSR&D activities under their purview[6].

The CDNS/CNSs will:

- communicate completed and ongoing NSR&D activities under their purview that are not provided by the program offices;
- assist in the development of an NSR&D database, including the collection of results;
- assist in the development of a corporate process to identify NSR&D needs and gaps;
- provide information on related NSR&D program activities for the annual NSR&D report; and
- assist in reviews of proposed research efforts and related results.

## 6.4 NSR&D Committee

The NSR&D Committee will coordinate the review and prioritization of NSR&D program needs and proposals in order to identify program overlaps, gaps, and opportunities where joint funding may be mutually beneficial to multiple DOE/NNSA program offices. The NSR&D Committee will review proposals for corporate NSR&D application and joint funding for projects that have application across multiple DOE/NNSA program offices. The NSR&D Committee will support development of the NSR&D annual report and in its dissemination to their respective program secretarial offices.

## 6.5 Nuclear Safety and Security Council

Under the guidance of the Department's Nuclear Safety and Security Council (NSSC), which is comprised of senior representatives from DOE and NNSA, the NSR&D Committee will present potential NSR&D activities to be evaluated for providing corporate benefit across the Department. The NSSC's evaluation will not be for approval, but rather for additional insights on the advantages or disadvantages of pursuing the NSR&D which will be considered by the NSR&D Committee in its decision making process.

[5] See DOE Order 410.1, *Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements*.
[6] Memorandum from the Deputy Secretary to the Under Secretaries, dated March 13, 2012, *Roles and Responsibilities for the Central Technical Authority, Chief Nuclear Safety/Chief Defense Nuclear Safety, and Chief Operating Officer.*

## 7.0 Deliverables and Resource Needs

### 7.1 Phase 1 Deliverables

- Establish the NSR&D Committee (by end of June 2012).
- Develop a NSR&D website that will serve as the principal "information gateway" to foster information exchange and operational awareness of the Program (by July 2012).
- Establish outreach communications with the DNFSB, EFCOG, and other agencies to solicit information on lessons learned and feedback on NSR&D related programs and activities (by September 2012).
- Brief the NSSC on the NSR&D Program (by end of December 2012).
- Report on NSR&D activities across DOE/NNSA (and their sources) of relevance to nuclear safety to include identified needs, based on the initial information collection effort (by end of December 2012).

### 7.2 Phase 2 Deliverables

- Annual data call for information on status of completed and ongoing projects (fourth quarter of each Fiscal Year (YR), starting YR 2012).
- Annual call for proposals for NSR&D projects (fourth quarter of each FY, starting FY 2012, as the HSS budget allows).
- Annual briefing to the DNFSB (April of each year, starting in FY 2013).
- Annual NSR&D Conference for communication and integration of projects with DOE Federal and contractor employees (third quarter of each FY, starting FY 2013).
- NSR&D Annual Report to consist of completed, ongoing and proposed projects (second quarter of each FY).
- Develop a NSR&D database that will serve as a centralized repository of information on Department-wide NSR&D activities (by end of January 2013).

### 7.3 Resource Needs

- Funding to develop prototype NSR&D database of direct-funded research projects, and an information gateway (i.e., a website having links to existing DOE/NNSA NSR&D projects; one-stop shop for briefings, reports, workshop results, and related information).
- Longer term dedicated funding for new NSR&D projects.

## Attachment 1: Nuclear Safety Research and Development Committee Charter

### I. Purpose

The intent of the Nuclear Safety Research and Development (NSR&D) Committee is to identify nuclear safety research needs and opportunities within the Department of Energy (DOE) and National Nuclear Security Administration (NNSA) and their program offices. The Committee promotes communication and coordination among DOE and NNSA program offices to enhance synergy on NSR&D efforts that can benefit the Department. The Committee will foster and facilitate networking and information exchange on NSR&D needs and activities across DOE/NNSA programs and with external national and international organizations. The Committee should not be construed to have any authority to direct DOE and/or NNSA program funds.

### II. Membership and Applicability

The Program Manager for the NSR&D Program within the Office of Nuclear Safety under the Office of Health, Safety and Security (HSS) will chair the Committee. The Committee will be comprised of DOE and NNSA offices indicated below, and each shall designate a primary member and a backup (members may represent multiple offices upon approval by the Committee):

- Program Manager, Nuclear Safety Research and Development Program, HSS
- Chief of Defense Nuclear Safety
- Chief of Nuclear Safety for Environmental Management
- Chief of Nuclear Safety for Science
- Chief of Nuclear Safety for Nuclear Energy
- Office of Science
- Office of Nuclear Energy
- Office of Environmental Management
- National Nuclear Security Administration

### III. Mission

- Identify the portfolio of NSR&D activities already completed and/or ongoing through DOE and NNSA program offices, sites, and national laboratories.
- Assist the development of an NSR&D database that captures these activities in a manner that will facilitate sharing of information on these activities and results across the Department, consistent with DOE O 241.1B, *Scientific and Technical Information Management*.

- Evaluate existing information gathering and exchange networks including utilization of NNSA NSR&D data gathering processes, program office networks, Facility Representatives, Nuclear Safety Specialists, Subject Matter Experts, Safety System Oversight personnel, facility managers, and various Energy Facility Contractors Group working groups.
- Update current process for assessing proposed NSR&D activities across DOE and NNSA Program Offices to support prioritization for potential funding.
- Review NSR&D projects, proposals, and coordinating activities that benefit multiple programs.

## IV. Roles of the NSR&D Committee

### A. NSR&D Committee Chair

- Organizes Committee meetings;
- Establishes, implements, and maintains the Committee mission, goals, and objectives;
- Monitors the work of the Committee to ensure that operations are consistent with the needs and requirements of the NSR&D Program;
- Coordinates input on program NSR&D activities for the NSR&D Program annual report;
- Prepares agendas and meeting minutes;
- Oversees the development and maintenance of the NSR&D database.

### B. NSR&D Committee Vice-Chair

- Serves as Chairperson of the Committee in the absence of the Chair;
- Coordinates input on NSR&D program activities for the NSR&D Program annual report;
- Leads development of the annual Committee progress report;
- Ensures that actions of the Committee, upon approval, are implemented.

### C. NSR&D Committee Members

- Provide solutions, ideas, and suggestions for complex-wide NSR&D activities, and obtain review and concurrence from the Central Technical Authorities[1];
- Provide a status on ongoing and completed NSR&D activities in their respective program(s);
- Communicate NSR&D program needs and prioritization to their respective Program Secretarial Officer;

[1] Memorandum from the Deputy Secretary to the Under Secretaries, dated March 13, 2012, Roles and Responsibilities for the Central Technical Authority, Chief Nuclear Safety/Chief Defense Nuclear Safety, and Chief Operating Officer.

- Communicate their respective program NSR&D needs and prioritization to the Committee on behalf of their respective Central Technical Authority;
- Assist in the development of an NSR&D database, including the collection of information and results;
- Assist in the development of a corporate process to identify NSR&D needs and gaps;
- Provide information on related NSR&D program activities for the annual report;
- Assist in the review of proposed research efforts and related results and provide feedback on the potential corporate value;
- Assist in the development and maintenance of the NSR&D Program Operating Plan;
- Work with program offices to help coordinate crosscutting planned research.

## V. Administrative Procedures and Reporting

A. Meetings

- The NSR&D Committee will meet quarterly. Additional meetings will be held upon a majority vote by the Committee.
- Attendance or participation of the Chair and five members shall constitute a quorum of the Committee. Members who represent multiple offices shall have as many votes as offices they represent.
- The Committee should gain consensus on decisions involving prioritization, needs, or review of NSR&D proposals and results. When consensus is not attainable, a majority vote may be conducted verbally or via e-mail as long as a quorum has been met.
- Committee meetings are open; however, attendees that are not presenting to the Committee or providing information shall be limited to observing the meeting.

B. Reporting

- The NSR&D Committee will prepare an annual progress report on all Committee activities.
- Meeting minutes will document decisions made by the Committee.

## VI. Review

The Committee shall review the charter annually, in conjunction with the NSR&D Program Operating Plan, for update and/or modifications.

## VII. Approval

William A. Eckroade
Principal Deputy Chief for Mission Support Operations
Office of Health, Safety and Security

Dae Y. Chung
Principal Deputy Chief for Nuclear Safety Technical Matters
Office of Health, Safety and Security

6/21/12
Joseph McBrearty
Deputy Director for Field Operations
Office of Science

Carol Sohn
Chief of Nuclear Safety
Office of Science

6/11/12
Matthew Moury
Deputy Assistant Secretary for Safety, Security, & Quality Programs
Office of Environmental Management

Richard Lagdon
Chief of Nuclear Safety
Office of Environmental Management

Dennis Miotla
Deputy Assistant Secretary for Nuclear Facility Operations
Office of Nuclear Energy

Raymond Furstenau
Chief of Nuclear Safety
Office of Nuclear Energy

6/18/2012
James McConnell
Assistant Deputy Administrator for Nuclear Safety, Nuclear Operations, and Governance Reform
National Nuclear Security Administration

Don Nichols
Chief of Defense Nuclear Safety
National Nuclear Security Administration

## Attachment 2: Nuclear Safety Research and Development Program Proposal Submittal Instructions

### 1.0 INTRODUCTION

The Nuclear Safety Research and Development (NSR&D) Program was created to provide corporate-level leadership supporting nuclear safety research and development throughout the Department of Energy (DOE) and the National Nuclear Security Administration (NNSA). The NSR&D Program is managed by the Office of Nuclear Safety (HS-30), under the Office of Health, Safety and Security (HSS).

Nuclear safety research and development involves a systematic search for knowledge to advance the fundamental understanding of nuclear safety science and technology through scientific study, analysis, modeling, and experiments. The NSR&D Program functions as a clearinghouse to collect and communicate NSR&D efforts throughout the DOE/NNSA complex to support standards development, validation of analytical models and methods, and improvements in operating practices. It supports DOE in making technically justified and well informed nuclear safety decisions and will also help maintain the technical expertise and the analytical tools and techniques to maintain a sufficiently qualified and experienced workforce with a robust infrastructure.

### 1.1 GENERAL INFORMATION FOR PROPOSERS

The NSR&D Program will collect proposals submitted that are not already funded through DOE/NNSA specific programs, and evaluate the potential for Department-wide benefit in support of safe nuclear facility design, construction and/or operations. The objective of these proposals should be to acquire the data necessary to demonstrate proof of concept or reduction of risk for high consequence, low probability events.

Each proposal should be reviewed and endorsed by the local site office, with the endorsement letter submitted as an appendix to the proposal. For sites with multiple proposal submittals, the site office should evaluate the proposals for project overlap and submit a single endorsement letter with all proposals to be submitted as a single package. When an endorsement is submitted for multiple proposals, the site should rank the proposals with the relative need both to the DOE complex and the individual site. The endorsement letter should also address why each proposal was not selected for direct program funding, indirect (site) funding, line directed and program directed research and development.

### 2.0 FULL PROPOSAL INSTRUCTIONS

Full proposals shall contain four sections, as described below: Cover Page, Abstract, Technical Section, and Cost Section. Your proposal will be considered officially submitted upon receipt by the NSR&D Program Manager. A portable document format (PDF) of your proposal package must be submitted.

The topics must have a demonstrated potential to:

- Improve nuclear safety practices through applied NSR&D.
- Reduce uncertainties in current nuclear safety analyses (to gain higher confidence in the results or result in savings by reducing excessive conservatism included in safety basis documentation).
- Identify or clarify new hazards, accident scenarios and risks.
- Justify changes to practices and directives that will better address the new risk perspective gained.

## 2.1 ABSTRACT

In two pages or less, provide a brief summary of the following information found in the proposal.

Use the headers listed below:

a. Objective: A brief description of the problem to be addressed, emphasizing its relevancy and importance to NSR&D, followed by a concise objective of the proposed project. Summarize what the project will accomplish and how the result will be applied to the problem.

b. Technical Approach: A concise summary of the science and technology that will be researched to achieve the objective (e.g., the chemical process that will be evaluated or the analysis behind conservatisms in the design basis and overall project duration (i.e., months, years, etc.)).

c. Benefits: A brief description of the expected benefits to DOE/NNSA and the scientific community.

d. Linkage: A list of DOE Directives and Technical Standards that the research is driven by or that the results have possibility to affect.

Note: The abstract will be the basis for the project description that will be posted on the NSR&D database. As such, it should be a stand-alone summary that is professionally written and edited for public release[1].

## 2.2 TECHNICAL SECTION

Provide a detailed description of the research to be undertaken. The description shall include the following:

a. NSR&D Relevance: Provide a brief statement describing how the proposed research project responds to complex-wide NSR&D needs.

[1] See DOE Order 241.1B, *Scientific and Technical Information Management.*

b. Technical Objective: State concisely the research objective. Outline specific technical questions to be answered by the research.

c. Technical Approach (Background, Methods, and Milestones): Outline the research activities. Articulate specific technical goals, methods, milestones, and conditions for each year of the proposed project. While some allowance is made for encountering problems and the unexpected that are part of research, the proposer is expected to meet the provisions and milestones specified in this section.

d. Research Team: Identify the principal investigator (PI) and the key co-performers and their respective organizations.

e. Cooperative Development: Identify government or contractor organizations that will be contributing direct funding or in-kind resources to the research effort.

f. Transition Plan: To the extent possible, describe how the project results will be implemented in the field or transitioned for further nuclear safety research. Indicate efforts to identify a receiver of the product(s), and any commitments to transition this technology by the completion of the project.

## 2.3 COST SECTION

The cost section of the full proposal is an estimate of the total project cost. The cost sheet for the lead organization should reflect the entire project costs. Separate cost sheets are required for each co-performer or sub-contractor whose costs cumulatively exceed $10,000 in any fiscal calendar year. Cost information should be rounded to the nearest thousand dollars. An accompanying narrative is permitted, if necessary, but not required.

NSR&D projects will be funded incrementally, with funds provided in the year in which they are expected to be expended. The cost section should be structured to indicate total and annual funding required including quarterly funding profiles. For planning purposes, proposers should assume a project initiation date of December 1 for the first year, October 1 for each subsequent year, and should run through September 30, until anticipated project completion.

## 3.0 EVALUATION FACTORS FOR FULL PROPOSALS

The following evaluation factors will be the basis for reviewing full proposals pursuant to the NSR&D Program. Relevance is a pass/fail gate. Corporate benefit and technical merit are most important, followed by cost and transition plan.

NSR&D Relevance (Pass/Fail)
An assessment will be made whether the submission (1) responds to DOE-wide NSR&D needs and (2) falls within the NSR&D Program objectives to support nuclear safety research. If the full proposal does not pass the relevance gate, no further evaluation will be made.

Technical Merit
The overall scientific and technical merit of the proposal must be clearly identifiable. The evaluation will consider the depth of the research conducted leading to the proposed approach

and the substantiation by calculations, test data, and references. Emphasis will be placed on the proposer's demonstration of a thorough understanding of the NSR&D problem. The proposer must demonstrate the ability to execute work by providing a comprehensive, logical, orderly, and concise plan that indicates major tasks, milestones, critical paths, go/no-go decision points and key events, leading to the completion of the project in the proposed time frame. Strong consideration will be given to innovation and its potential benefit; however, the degree of risk associated with individual proposals will be weighed against potential benefits. The proposal should clearly articulate how the research will advance DOE's state of nuclear safety.

Cost

The reasonableness of the proposed cost will be considered, as well as the appropriateness and substantiation of costs for the technical complexity described. Potential cost benefit, cost sharing and/or leveraged resources will also be considered.

Transition Plan

The transition plan of the proposed research product(s) should demonstrate a clear understanding of how the project's results will transition to implementation, either directly, through future demonstrations, or future development. The transition plan should also show the linkage between the work proposed, the needs of the ultimate end user of the results, the immediacy of the nuclear safety issue, and the implementation feasibility (including a timeline). Coordination between the proposer and targeted end user community is of value for late-stage development projects.

## 4.0 SUBMITTAL

Once your proposal has been finalized, create a single PDF that contains all required sections. Your proposal will be considered officially submitted upon receipt by the NSR&D Program Manager.

All submissions should be sent to: nsrdprogram@hq.doe.gov