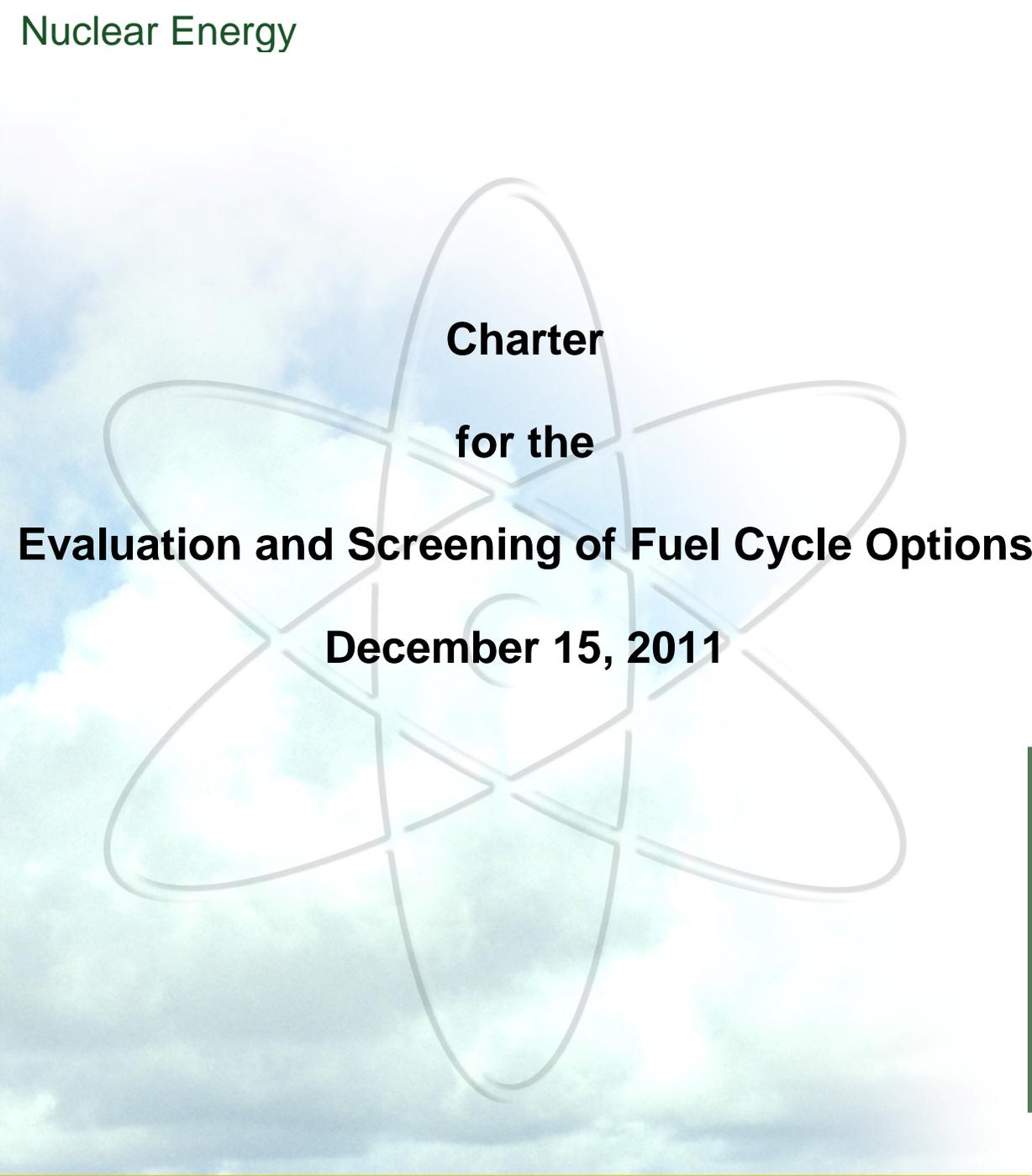




U.S. DEPARTMENT OF
ENERGY

Nuclear Energy



**Charter
for the
Evaluation and Screening of Fuel Cycle Options
December 15, 2011**

Evaluation and Screening of Nuclear Fuel Cycle Options - Charter

Purpose

The purpose of this document is to authorize and charge the Office of Fuel Cycle Technologies to conduct an evaluation and screening of nuclear fuel cycle options, by the end of 2013 using an objective, independently reviewed evaluation process and to provide requirements and constraints for its conduct.

Objective

The objective of the proposed evaluation and screening process is to provide information about the potential benefits and challenges of nuclear fuel cycle options (i.e., the complete nuclear energy system from mining to disposal) that can be used to strengthen the basis and provide guidance for the activities undertaken by the DOE-NE Fuel Cycle Research and Development (FCRD) program.

Scope

To achieve the objective, a comprehensive set of fuel cycle options will first be defined and then evaluated, followed by screening to identify a relatively small number of promising fuel cycle options with the potential for achieving substantial improvements compared to the current nuclear fuel cycle in the United States. Improvements will be measured in terms of broadly defined economic, environmental, safety, non-proliferation, security, and sustainability goals. The required characteristics of the promising fuel cycle options can be used to establish specific technical objectives for the essential supporting technologies. This information can strengthen the basis for R&D decisions, particularly with respect to narrowing the focus of program activities. These R&D decisions could include eliminating support for technologies no longer considered relevant to program objectives, continuing or increased support for technologies already under development, as well as support for technologies that are currently not being investigated.

The results of the evaluation and screening will answer the following questions:

1. Which nuclear fuel cycle system options have the potential for substantial beneficial improvements in nuclear fuel cycle performance, and what aspects of the options make these improvements possible?
2. Which nuclear material management approaches can favorably impact the performance of fuel cycle options, e.g. extended decay storage (spent or used fuel, products, or wastes), specific disposal environments, processing of used fuel, minor actinide separation and transmutation, etc.?
3. Where is DOE R&D investment needed to support the set of promising fuel cycle system options and nuclear material management approaches identified above, and what are the technical objectives of associated technologies?

Evaluation and Screening Process

The successful pilot demonstration of the evaluation and screening process completed in FY11 will be used as the basis for this comprehensive evaluation. The 2013 Evaluation and Screening of Fuel Cycle

Options will address feedback from internal¹ and external² reviews of the pilot demonstration, which identified the required areas of refinement and improvement of the process.

Fuel Cycle Options

A nuclear fuel cycle option is a set of technologies and nuclear materials operating together in a unique and specific system arrangement to perform all the functions, from obtaining initial fuel resources through ultimate disposal of fuel and/or wastes, needed to produce useful energy. The set of fuel cycle options that will be evaluated must be as comprehensive as possible with respect to the potential performance of fuel cycle options. To make efficient use of resources and commensurate with the objectives of the 2013 screening, it is envisioned that the fuel cycle options will be evaluated in groups using representative options similar to the approach used in the pilot demonstration of the evaluation and screening process. The fuel cycle options that were identified as having only “minor benefit” in the pilot screening will be excluded from the 2013 screening, since the initial evaluation indicated little promise of such fuel cycles for providing significant beneficial impact on the performance goals. The approach for ensuring that a comprehensive set of fuel cycle options is considered, will be documented³ and subject to approval by the Deputy Assistant Secretary for Fuel Cycle Technologies (DAS FCT).

Evaluation Criteria and Metrics

The 2013 Evaluation and Screening of Fuel Cycle Options will use high-level evaluation criteria identified in numerous prior fuel cycle studies and used in the pilot demonstration of the evaluation and screening process:

- **Nuclear Waste Management**
- **Proliferation Risk**
- **Nuclear Material Security Risk**
- **Safety**
- **Financial Risk and Economics**
- **Environmental Impact**
- **Resource Utilization**
- **Development and Deployment Risk (including technical maturity, development time and cost, and licensing)**
- **Institutional Issues**

Through this charter, these high-level evaluation criteria are specified. If additional high-level criteria are identified as a result of interactions with stakeholders, they may be added to this list, subject to approval by the Assistant Secretary for Nuclear Energy (or appointed designee).

In a manner similar to the pilot demonstration of the evaluation and screening process in FY10-11, authority is delegated to the FCRD program to define appropriate evaluation metrics. Development of

¹ Described in *A Screening Method for Guiding R&D Decisions: Pilot Application to Nuclear Fuel Cycle Options*, August 2011

² GAO Report to Congressional Requesters, GAO-12-70, *Nuclear Fuel Cycle Options*, October 2011

³ The document, describing the approach for developing the set of fuel cycle options for the 2013 Evaluation and Screening of Fuel Cycle Options, will include the list of fuel cycle options that were deemed as having “minor benefit” in the Pilot Screening as well as a justification of why they were determined as having “minor benefit”.

the metrics will be coordinated with relevant stakeholders leading to a proposed set of metrics along with justification, calculation methodology, applicability, and evaluation basis. The proposed set of metrics and supporting information will be subject to approval by the Deputy Assistant Secretary for Fuel Cycle Technologies (DAS FCT).

Relative Importance of High-Level Criteria for Screening

The screening of the fuel cycle options to identify the most promising alternatives requires assessing the relative importance of the evaluation criteria. The screening process will explore the impacts of different criteria weighting factors that reflect the range of possible policy guidance and illustrate the effects of specific policy choices.

Participants

The FCRD program will develop the evaluation and screening methodology and the technical information on fuel cycle options with assistance from industry, university collaborators, and other stakeholders outside of DOE-NE, as appropriate. The evaluation and screening process will be conducted and reviewed internally by FCRD by an Evaluation and Screening team approved by the DAS FCT

One or more review groups will be assembled for the purpose of providing independent reviews of the evaluation and screening process, and the resulting set of promising fuel cycle options. It is anticipated that review team members would be technical experts who are versed in the overall performance of nuclear fuel cycles, their associated technologies, and the technical bases for the issues with nuclear power, as well as those who reflect the viewpoints of other stakeholders. An Independent Review procedure will be developed for these reviews. The review team composition(s) will be subject to approval by the DAS FCT.

Schedule

The screening will be conducted during calendar year 2013 with a draft final report delivered no later than December 31, 2013.

Deliverable(s)

- A draft detailed schedule for the nuclear fuel cycle evaluation and screening – Jan 31, 2012
 - Conduct briefing(s) during FY 12 and FY 13 on the set of fuel cycle options, grouping, evaluation metrics, screening process, and the importance weighting criteria, including names of peer review panel members
- Briefing of results during 1Q FY2014
- Draft Final Report by December 31, 2013
- Final Report no later than March 31, 2014
- Summary report of screening no later than May 31, 2014

The final reports of the Evaluation and Screening and Independent Review Team(s) will be made available to the public.

Funding

Funding for the fuel cycle evaluation and screening, the FCRD program activities supporting the evaluation and screening, the peer review team, all data and analyses needed to support the screening, and presentation and publication of the results will be provided by the FCRD program.

Submitted:



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12/12/11

Date

Concurred:



Monica Regalbuto
Deputy Assistant Secretary for Fuel Cycle Technology

12/14/11

Date

Approved:



Peter Lyons
Assistant Secretary for Nuclear Energy

12/15/11

Date