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Notice of Intent to Conduct Scoping Process and Prepare Supplement to Draft Environmental Impact Statement TRISO-X Fuel Fabrication Facility

Comment On: NRC-2022-0201-0001
Notice of Intent To Conduct Scoping Process and Prepare Environmental Impact Statement; TRISO–X Special Nuclear Material License

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General Comment

This responds to the Nuclear Regulatory Commission's request for comment on the TRISO-X, LLC proposal for a first-of-a-kind Category II licensed TRISO-based fuel fabrication facility.

The Environmental Report for the TRISO-X Fuel Fabrication Facility (September 2022) states that manufacturing operations consist of receiving HALEU in the form of triuranium octoxide (U3O8) powder enriched to less than 20 weight percent 235U; converting the U3O8 into a uranyl nitrate solution, into gel spheres, and then into fuel kernels; and processing the fuel kernels through coating, overcoating, fuel form pressing, and high temperature carbonization. These operations are supported by shipping and receiving, laboratory, quality control, research and development, uranium recovery, and waste disposal processes." (Section 1.3).

Beginning with the High Assay Low Enriched Uranium (HALEU), at 20 weight percent 235U, this will be a totally new form of enriched uranium that is currently not produced anywhere in the U.S. Several issues need to be addressed:

From where will the HALEU be obtained? Provide background on how the HALEU is made, including its conversion ostensibly from uranium hexafluoride to triuranium octoxide powder, the source of the uranium and any environmental impacts of the production process, from mining to finished product. Will there be an alternate or backup source for HALEU?

How will the HALEU be shipped to and from the facility? What procedures will be in place to protect the general public during transport? What steps will be involved in handling it upon receipt? What procedures will be in place to protect workers?

What are the steps necessary to convert the HALEU into a uranyl nitrate solution? Into gel spheres? Into fuel

kernels? What are the safety and security procedures that'll be in place to protect worker and possible pollution of the environment? What chemicals will be used, how will they be obtained and disposed?

Describe the various steps from a safety and security perspective in processing the fuel kernels for coating, overcoating, form pressing and high temperature carbonization. Again, what chemicals will be used and how will they be disposed? What other toxic/hazardous materials will be used in the process, how will they be handled and disposed?

How will the HALEU be handled throughout the entire process in order to prevent the possibility of criticality?

The NOI states: "TRISO-X is requesting a license to possess and use special nuclear material for the manufacture of high-assay low-enriched uranium (HALEU) fuel at a fuel fabrication facility (FFF) to be located in Oak Ridge, Roane County, Tennessee."

What is meant by "manufucture?" The use of the word manufacture would seem to suggest TRISO-X FFF intends to up blend or down blend 235U in order to arrive at 20 weight percent 235U HALEU. Does TRISO-X FFF intends to alter the percentage of 235U in any way and if so, by how much and why?

Will TRISO fuel particles last 60 years?

Please explain: why it lasts so long, what causes its degradation, the resulting waste and how it will be disposed. Will there be issues of criticality and if so, how will they be addressed? What will be the environmental impact and how will that be addressed? How will the fuel be stored both in the short term and once it has completely degraded. What step or steps within the process pose(s) risk of contamination, what are those risks, and how is that risk to be mitigated?

What procedures/safeguards will be in place to prevent the possibility of radioactive or chemical releases from the facility into the atmosphere and/or groundwater? Discuss the hydrogeology of the proposed site(s) where this facility is located and how monitoring will be done.

What safeguards will be in place to prevent the possibility of fires throughout the fabrication process? What are the safeguards against direct terrorist attacks or other possible assaults against the facility such as cyber-terrorism? Identify the stages in the process that could jeopardize human health or safety should there be a total loss of power onsite?

How would a serious accident be handled? Especially one with widespread offsite contamination? What is the financial ability of TRISO-X, LLC to address such a catastrophic accident? Identify the quality assurance requirements applicable to the facility, who will be responsible and how they will operate?

What are the various steps in the uranium recovery process? Identify all security and risk safeguards. Provide the step-by-step procedures in the waste disposal processes and all safeguards involved.

Will the perimeter of the facility be monitored for radioactive and chemical contamination, how often and if not, why not? Will rainwater be retained onsite and monitored for contaminants?