NEAC International Subcommittee Observations as a Foundation for a Path Forward

June 2014 Status

NEAC International Subcommittee Charge (February 2012)

Review the full scope of NE-6 international activities in order to evaluate:

- How to most effectively use limited program resources in engaging in bilateral and multilateral agreements in a prioritized and synergistic manner,
- Multilateral and regional approaches to advancing commercially based comprehensive fuel services, and
- How to most effectively support U.S. nuclear exports and overall U.S. international nuclear commercial leadership as part of a "Team USA approach," that has been proposed by the Civil Nuclear Energy Trade Advisory Committee (CINTAC).

Activities Currently Being Conducted by the Office of International Nuclear Energy Policy and Cooperation (NE-6)

While NE-6 engages in activities to support much broader U.S. policy issues and commercial goals, including climate change, energy security, commercial nuclear reactor safety, and non-proliferation, addressing these broader issues and goals are not in the Subcommittee's charge. Nevertheless, these are overarching themes in most of what NE does and the Subcommittee understands the importance of these. Furthermore, the Subcommittee appreciates that NE (and therefore NE-6) is utilizing an "Enterprise-Wide" collaboration approach to civil nuclear power, working with other departments of DOE and other federal agencies – the Subcommittee believes that this approach is entirely appropriate and only through this collaborative approach can the efforts of NE-6 yield the benefits desired.

NEAC Interactional Subcommittee Activities

The Subcommittee has reported its progress on the above stated Charge at past NEAC meetings and has now set the December 2014 NEAC meeting as the deadline to complete the above charge.

Our path forward, which is framing the recommendations that we will make later, is based on the understanding that NE is primarily a Research & Development (R&D) organization, and we need to capitalize on this core competency when making our recommendations. However, NE has a broad reach in working with other U.S. government agencies and commercial companies. Its influence goes well beyond R&D and this needs to be utilized.

As background for our current initial observations, it is important to recognize that U.S. commercial nuclear companies are at a disadvantage to many other international nuclear companies because U.S. companies are not "state owned enterprises". It may be possible to overcome this disadvantage or at least help "level the playing field" by proper packaging/bundling U.S. commercial nuclear companies' activities with U.S. government nuclear capabilities.

Over the next six months, the Subcommittee in cooperation with NE-6, will further investigate six (6) initial observations that will help answer our Charge. In no particular order of priority they are:

- With the understanding that the U.S. Government has responsibility for and substantial expertise in the handling and/or disposing of U.S. high-level nuclear wastes, it could provide leadership in the international nuclear community in this area. In this regard, the U.S. government should consider teaming with other countries that already have or are currently implementing significant nuclear programs to seek cooperation in the international deployment of the once-through fuel cycle. What is new here is, to the extent that other countries are interested in working with the U.S., we could share our experiences by proactively engaging one or more candidate countries to collaborate on strategies that advance this direction. The key element that needs to be investigated is the "value proposition" that the U.S. would use to help progress such cooperation on this fuel cycle approach. The obvious benefits are that this approach supports U.S. non-proliferation policy, helps gain improved global nuclear security, and it could potentially help U.S. commercial nuclear companies in competition against other international state owned enterprises that can offer a more comprehensive solution to the fuel cycle. The question posed, "Is there anything that the U.S. government can do to further its policies in non-proliferation and the safe expansion of nuclear energy on the back end?" This observation is consistent with that from the Blue Ribbon Commission on America's Nuclear Future (January 2012) which stated:
    - "The U.S. should support the use of multi-national fuel cycle facilities, under comprehensive IAEA safeguards…"
    - "The U.S. government should propose that the IAEA lead a new initiative, with active U.S. participation, to explore the creation of one or more multi-national spent fuel storage or disposal facilities."
    - "In addition, the U.S. should support the evolution of spent fuel 'take-away' arrangements as a way to allow some countries, particularly those with relatively small nuclear programs, to avoid the costly and politically difficult step of providing for spent fuel disposal on their own soil and to reduce associated safety and security risks."
- As a complement to the first observation, the U.S. needs to remain abreast of what other countries are doing in closing the fuel cycle, i.e., reprocessing and recycling recovered materials. This will help us understand their motivations (be they energy security, waste reduction, resource utilization,

etc.) so that we can better further broad U.S. policy objectives that are framed around the once-through fuel cycle. This work can be beneficial to the U.S. government from both non-proliferation and safety perspectives. This observation infers that U.S. R&D priorities need to include some fuel cycle work, but gear this work toward understanding what others are doing rather than fundamental development of our own. This may include a certain amount of collaborative work in the fuel cycle to leverage limited U.S. DOE resources.

- With full appreciation that the U.S. still has highly valued intellectual assets, including our universities, national laboratories, and our nuclear regulator, NE could develop a truly relevant and valuable (in the eyes of selected/targeted nations) catalog of potential training that could be given to nations embarking on new commercial nuclear programs. The types of curricula envisioned would include specific subjects like probabilistic safety assessments, nuclear security, safety culture, etc., that would help further the broader policy objectives of the U.S. government. Some effort has already begun by non-government organizations, but it will likely fall short of actually formulating curricula that meets specific policy objectives. It is envisioned that these training curricula could be bundled with U.S. commercial supplier offerings as part of their bid packages for new nuclear power plants. The actual delivery of such training curricula would be at the expense of the any U.S. commercial company bidding in the international market, but the assets that would deliver the training could draw upon the full capabilities of the U.S. nuclear community.
- New emerging nuclear nations need to develop substantial infrastructure to have a safe and successful commercial nuclear power program. What better country than the U.S. to help with this task. Currently, the IAEA has a many step process that they suggest to such countries. This process has very good elements, but the issue is "what nuclear culture" should be implanted in these countries and by whom? The types of activities envisioned include nuclear regulatory framework, codes & standards implementation, safety culture, INPO type processes, etc. This observation could have many areas in common with the second observation, but has a distinct and possibly subliminal influence on both the emerging country and U.S. commercial companies. By the U.S. offering to help in this regard, it can again address the U.S. government policy objectives that were mentioned previously.
- Part of the problem with respect to creation of U.S. jobs when a U.S. commercial company is successful in the international marketplace is that a large fraction of the total cost of supply goes elsewhere! This is a result of the reduced domestic supply chain that exists today. It is believed that there are a number of non-traditional manufacturers in the U.S., e.g., from the fossil power plant industry, that have the capability to supply a significantly greater portion of a new plant! The potential is that U.S. domestic jobs could be doubled if, in fact, this capability exists, but such manufacturers are not currently on Qualified Suppliers Lists (QSLs) of U.S. commercial nuclear

companies and therefore are not included in international proposals. It is suggested that a study be conducted in cooperation with Commerce and selected commercial supplier companies to ascertain the full capability of U.S. manufacturers to supply a much greater portion of new nuclear power plant equipment. Various SMR proposers have indicated that they could manufacture the big reactor pressure vessels for their designs in the U.S.! The Subcommittee has heard that such a study has been suggested, but needs some minimal funding to takeoff, provided that it is not duplicating efforts already underway.

- Finally, U.S. nuclear suppliers are at a significant disadvantage in international bidding, because of the financing package that they can offer compared to other state owned enterprise companies. U.S. companies can bring traditional Export Credit Agency (ECA) financing and the U.S. Ex-Im Bank has been doing an excellent job in this regard; they have been very supportive. The question remains what can the U.S. government do in support of U.S. commercial nuclear companies beyond this traditional financing? Serious "out of the box" thinking is required in cooperation with Ex-Im Bank and other U.S. government agencies to progress this issue.