

INITIATIVES IN TRANSPORT CASK LICENSING

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ABSTRACT

The variations in research reactor fuel form, configuration, irradiation characteristics, and transport cask have required a substantial number of transport cask licensing actions associated with foreign research reactor spent fuel transportation. When compounded by limited time for shipment preparations, due to contract timing or delayed receipt of technical data, the number and timing of certifications has adversely impacted the ability of regulatory agencies to support intended shipping schedules. This issue was brought into focus at a April, 1998 meeting among DOE, the US Nuclear Regulatory Commission, and DOE's spent fuel transportation contractors.

As a consequence of the meeting, NAC performed a strategic assessment of factors contributing to the number and timing of cask licensing actions. A set of proposals was developed identifying actions that could be taken by NAC, and those requiring DOE and NRC cooperation to streamline or expedite the licensing process. The paper will elaborate on the actions identified by NAC, the potential for regulatory process improvement, and the current status of approval and implementation.

INTRODUCTION

The Department of Energy's (DOE) "Urgent Relief" spent nuclear fuel returns program and subsequent Foreign Research Reactor Spent Nuclear Fuel program have been in place since 1994. A considerable body of experience is now available with which to judge opportunities for cost and efficiency gains in the program conduct. One area that has been a routine complication in the execution of the spent fuel shipments has been the need for cask licensing or certification actions by the U.S. Department of Transportation (DOT) or Nuclear Regulatory Commission (NRC), often late in the shipment planning cycle. The need for such actions has arisen as a result of the expiration of cask certificates, changes in regulatory criteria, or identification of fuel characteristics which exceed the bounding conditions of the cask certificate. The effect has been to adversely affect foreign reactor shipment planning and to disrupt the U.S. regulatory agency work assignments due to the high priority for regulatory support requested by DOE. It also threatened to adversely affect the NRC's commercial licensing of U.S. cask vendors. It became abundantly clear to DOE, NRC and DOE's transportation contractors that improvement in this situation would be needed to effectively support the return of foreign research reactor spent fuels.

DISCUSSION

During the four years of foreign research reactor spent fuel shipments under the “Urgent Relief” and Foreign Research Reactor (FRR) spent fuels returns programs, almost all shipments required some certification action by U.S. regulatory agencies. Often the need for these actions occurred late in the planning cycle, dictating a request by DOE for priority action on the part of DOT and NRC. NRC had reorganized several years earlier creating a Spent Fuel Project Office to deal with the growing volume of domestic cask license applications from U.S. vendors. The priority requests submitted by DOE were having an adverse affect on NRC’s ability to project their work volume and maintain advertised review schedules of domestic applications. If this continued, it had the potential of undermining the relationships between NRC, DOE, transportation contractor, and cask vendors.

This problem was widely recognized in the spring of 1998. DOE, to its credit, took the lead and requested a meeting with NRC involving not only the two Federal agencies, but DOE’s transportation contractors as well. The objectives of the meeting were to permit each of the agencies, DOE and NRC, to describe their programmatic responsibilities, their respective schedules and work loads, and the complications imposed by the actions or requirements of the other agency. In addition, each transportation contractor was to outline the upcoming certification actions envisioned in their shipment planning. A final objective was to examine the ramifications of the foreign research reactor shipment requirements and better understand the kinds of problems that have been created so that mitigating action could be addressed by the various parties.

The meeting was held on April 17, 1998 at NRC’s offices. The meeting addressed DOE’s plans for future spent fuel shipments, program coordination between the involved Federal agencies and transportation contractors, and methods of facilitating communications between the affected parties. An overarching objective was to help NRC plan and schedule its resources to efficiently and effectively support the program. At the conclusion of the meeting all agreed that it had been very helpful. The NRC staff acknowledged that they were largely unaware of the scope of the FRR program and the uncertainties associated with the retrieval of spent reactor fuel from 41 countries worldwide. The meeting succeeded in providing NRC with a better appreciation for the scheduler difficulties faced by DOE and consequently, the difficulties affecting cask vendor and transportation contractor ability in anticipating need for regulatory action. Agreement was reached that such meetings should be periodic in nature to permit NRC to incorporate FRR requirements into their budget requests to Congress. At the conclusion of the meeting, NAC committed to DOE and NRC to examine the experience to date in light of the meeting agreements, and to make recommendations for improvement.

NAC completed its evaluation and in May, 1998 made recommendations to DOE and NRC for four program enhancements. The responsibility for one of the four lies entirely within NAC while the remaining three require the agreement of and some level of support by DOE. Each of the four are addressed below with a description of the problem, the program enhancement proposed by NAC, actions on the part of DOE and NAC, and the status of implementation.

NEAR TERM INITIATIVES

Communications Enhancement

The April, 1998 meeting among NRC, DOE, and transportation contractors was the first to address the long term program requirements. A conclusion reached at the meeting was that periodic reviews of the program and targeted technical sessions to address generic program issues would improve communications among participants. It was also agreed that representatives DOT and the U.S. Department of State would be a valuable addition. The presence of the transportation contractors at this and future meetings was considered a necessity for the accomplishment of the goals established for these meetings. However, a mechanism for assuring presence of the transportation contractors did not exist at the time of this first meeting.

NAC proposed that DOE issue a generic task order to both of the transportation contractors to support participation in participation in meetings on program status, technical problem resolution, or "command performances" before DOE or NRC. We also proposed that regularly scheduled meetings be formally established among program participants to review shipment schedules, certificate applications, program status, and lessons-learned from previous shipment campaigns. Both transportation contractors should be included in such meetings so that they can benefit from each others experience as well as sharing common lessons with the Federal agencies.

DOE has accepted this recommendation and in September, 1998 issued the task order which established the formal framework for its implementation. An October, 1998 meeting on DOE's technical position on transporting MTR fuel with breached cladding and a November, 1998 meeting on the cross-country shipment of TRIGA fuel from SRS to INEEL represent the initial exercise of this new capability.

Earlier Discovery of Licensing Issues

In the past, DOE and their support personnel have visited prospective reactor sites well in advance of the anticipated shipment date to discuss contract terms, collect "Appendix A" technical data, and collect general data needed by DOE to issue a request for proposals to the transportation contractors. Some number of months will pass before the DOE task order is awarded to the successful transportation contractor, preliminary planning is completed, and the transportation contractor can arrange a site assessment trip. The transportation contractor then reviews in detail with the site personnel the fuels data with which compliance with the cask certificate can be determined. All too often, some characteristic is discovered during this review that dictates some amendment to the cask certificate. Even moderately simple certification issues discovered at this time have proven very disruptive to the transportation contractors shipment preparations and to the NRC's regulatory review process. This frequently has been the cause of the "last minute" licensing actions which have been so frustrating to NRC. In some cases it has caused shipment rescheduling at considerable expense to DOE.

NAC proposed that DOE expand the participation in the initial country visits to include a representative of both transportation contractors. The role of the transportation contractors would be to concentrate on fuel parameters, site and reactor access, and fuel and cask handling requirements with the objective of identifying technical issues affecting

transportation well in advance of what now is possible. This information would be provided to DOE so that the request for proposals issued by DOE for specific shipments would accurately reflect the transportation requirements.

DOE has also accepted this recommendation. In the same task order discussed above, DOE formalized the mechanism for including the contractors on the initial country visits. The first exercise of this provision will occur this week when a team visits the Argonaut reactor in Rio de Janeiro.

LONGER TERM INITIATIVES

Cask Utilization

The FRR program has utilized a variety of casks, many of which are of foreign ownership and are unfamiliar to NRC. Since DOT routinely asks for NRC's recommendation prior to issuing a Certificate of Competent Authority, a certification action involving such casks requires staff attention much like a domestic action would. FRR shipments have often involved three or more different cask types, even when transporting similar fuel, multiplying the likelihood of one or more required certification actions either in the form of certificate renewals or amendments. The multiplicity of cask types and certification actions increases program costs to DOE, for economically disadvantaged countries, or to reactor operators for the remainder.

NAC determined that it could improve this situation by increasing cask standardization within a specific shipment. For NAC, this implies increasing the size of the NAC-LWT cask fleet. DOE has established a limitation in the EIS on the number of casks in any shipment. By expanding the NAC fleet size to this limit, NAC would be able to accommodate an entire shipment with a single standardized cask design. This, in turn would reduce not only NRC's and DOT's work load but that of each country requiring a COCA. NRC's ability to plan and affect a timely review of the NAC-LWT is greatly enhanced by their familiarity with the cask. Furthermore, NRC audit of NAC's quality assurance program, completed in June, 1998, awarded NAC exceptionally high marks for licensing quality, all program elements meeting regulatory requirements and about half evaluated as exceeding regulatory requirements. This quality underpinning facilitates timely NRC regulatory action by providing confidence in the technical merit of the NAC applications. This combination of NRC confidence in NAC and staff familiarity with the NAC-LWT cask, combined with enhanced cask standardization offers potential for significant streamlining of regulatory actions. NAC is in the process of implementing these enhancements and will report in future meeting on their success.

Incremental Receipt of Certification Actions

The nature of the FRR spent fuel transportation history has been that choice of transport cask often occurs in close proximity to the shipment date. There have been several reasons for this. First, DOE wished to reach agreement with the reactor operator and be close to establishing a contract for acceptance of foreign research reactor spent fuel prior to committing effort to shipment planning. Second, DOE has entered into transportation service contracts with two private sector transportation companies, NAC and Edlow International. A bidding and award process must be followed before it is known who will perform the

transport. Often the assignment of transportation cask will be dependent upon the outcome of the award. As a result, the initial approach to NRC identifying the fuel form and cask has occurred with little time to spare. This has required DOE to request NRC priority review, often with adverse affect on other NRC licensing actions.

NAC's suggestion for program modification is based on a recent NRC willingness to entertain what they call "smart certificates." The objective of a "smart certificate" is to define the safety envelope of the transportation cask as broadly as possible so that many fuel forms, enrichments, and physical characteristics could be approved in one certification action. Such an action would be more costly and time consuming than a single fuels certification action but far less expensive and time consuming than the incremental approach to multiple fuel forms. However, because of the time requirement, it has to be pursued independent of a specific shipment since it would take far longer than experience has shown exists in the typical planning cycle.

NAC proposed that it undertake a data collection and categorization of the fuels characteristics at the 41 foreign reactors so that cask vendors could establish "smart certificates" as appropriate. NAC offered to cost share the data collection and certification project in order to facilitate near term progress. An enveloping certificate is the ultimate long range solution to the regulatory approval dilemma. At present, DOE is still studying the NAC proposal but has authorized SRS site personnel to expand their data collection efforts in support of this approach.

CONCLUSION

The planning that goes into execution of each shipment of foreign research reactor shipment is critical to timely and cost effective transport. Experience to date has demonstrated that earlier attention to transport requirements, particularly those involving cask certification, is needed. DOE set the stage for such improvements when it held the initial program review with NRC and the transportation contractors in April, 1998. Additional recommendations made by NAC to facilitate cask certification have been favorably received by DOE and have been formally accepted through issuance of task orders in September, 1998. Longer term solutions have been identified to DOE and are currently under review. When fully implemented, the short and long term program enhancements should significantly improve the confidence in shipment planning and reduce the costs inherent in last minute replanning or in completing restricted duration licensing actions.