PROPOSED REASSESSMENT OF U.S. APPROACHES
PERTAINING TO COOPERATION WITH OTHER COUNTRIES IN THE
FIELD OF LIQUID METAL COOLED REACTORS

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There are several factors that suggests that the time may be approaching for the Department of Energy to reassess the approaches that it might wish to take relating to cooperation with other nations in the field of liquid metal reactors. Overall, DOE has favored a degree of active cooperation with other countries, and most notably Japan, but the arrangements that have been developed have tended to be ad hoc in nature rather than falling within the framework of a longer-term strategic policy or program goal. By and large Japan has been our clearly favored partner and DOE has had several exchange arrangements in effect with Japanese organizations, the most recent being an agreement between DOE and CRIEPI under which CRIEPI will contribute up to \$20 million over a five year period to the DOE-IFR program in return for having the ability to assign Japanese nationals to the Argonne East facility and to receive overall, periodic briefings on the U.S. IFR program. Relations with the members of the European LMR consortium have been far more limited than those that DOE has had in effect with Japan and have yet to become significant.

The U.S. has derived benefits from its case-by-case approach towards collaboration with Japan and responsible arguments can be made that this is a reasonable, pragmatic and flexible way to proceed, particularly at the present time when the U.S. and several other LMR programs are experiencing notable cut-backs and difficulties, and when it might not be a very auspicious time to undertake any major new and possibly visible cooperative initiatives. On the other hand, there are several considerations that suggest that this may be an auspicious time for DOE and the relevant U.S. institutions to take a new look at the subject of international collaboration in the field of LMR reactors. These include the following.

First the LMR programs in the U.S. and Western Europe (and to a far lesser extent Japan), clearly have run into difficulties because of a perceived sharp reduction in the urgent need for the breeder, because of cut-backs in R&D budgets and because of major anticipated delays in the schedules for the next LMR demonstration plants. More broadly, these activities have suffered because of stresses that have been placed on the nuclear power programs in these nations due to a variety of considerations. In Europe the schedule for proceeding with a large reactor demonstration reactor to follow Super Phenix has been stretched out in a significant way and the course and direction of the future European LMR program appears highly uncertain. Italy, Holland and Belgium have been compelled to cut-off financial contributions to the European LMR consortium, and the start up of the SNR-300 reactor in the FRG continues to be delayed due to political issues with no resolution in sight. Within the United States the positive interest and enthusiasm that has been centered around the metal fueled IFR program has been offset by some major uncertainties. In particular, the funding for the GE PRISM design effort has been reduced to such a modest level that the future of that particular program is now open to serious question. Also, there appears to be no likelihood that funding for a new demonstration liquid metal reactor project will be available for several years to come and in the nearer term it is expected that the Office of Management and Budget may undertake active efforts to terminate the operations of the FFTF.

Within this general context, it could be argued that no one nation in the Free World (with the possible exception of Japan) currently has the capability or the wherewithal to bring the LMR to the point of commercialization, that this should argue for the establishment of closer international links in the LMR field and that some type of new international initiative even might be necessary or desirable to help preserve the option of the breeder for future generations.

Second, at the recent General Conference of the IAEA the thought was expressed that possibly - through IAEA auspices - a new international design effort should be initiated in the advanced reactor field. An analogy has been formed between this proposal and the program now underway under IAEA auspices to design an International Thermonuclear Experimental Reactor (the ITER). If such joint reactor design program ever gets way under IAEA auspices it could be argued that this effort should be centered on the LMR reactors rather than on some other reactor concept. This relates to the fact that it might be easier to collaborate in the LMR area than on some other concept since we are years away from commercializing the LMR. Hence, there should be less of a parochial preoccupation with proprietary information than might be the case with some other reactor types such as the MHTGR or the advanced light water reactor designs. On the other hand, the U.S. has not yet decided (in a definitive manner) whether it wishes to participate in any such joint IAEA effort and it is rumored that Secretary Watkins may be cool to the idea. Nevertheless, there might be merit in considering the pros and cons of having the U.S. associate itself with such a possible IAEA effort - taking into account what the perceived U.S. objectives in such an effort might be.

Third, in the absence of some notable new development DOE may be compelled to terminate its support of the PRISM project due to the absence of adequate funding. This raises the question of whether there are alternate ways involving enhanced international cooperation, to sustain the PRISM effort or to help preserve the technical capabilities that have gone into that effort. Different options that might merit considerations might include DOE advocacy of a new international LMR design effort (possibly - but not necessarily under IAEA auspices) in which the GE PRISM team would be expected to play a role, or having DOE provide more aggressive support to GE's efforts to pull in additional

financial support for PRISM. The focus would be on the international design of a new passively safe, modular reactor concept. Such an international design effort could conceivably be pursued on its own or possibly within some broader overall conceptual framework contemplating a general intensification and relaxation of exchanges between the U.S., European and Japanese LMR efforts.

As a further point, DOE has, of course, given substantial emphasis to the contribution that the IFR program might be able to provide to the longer term resolution of the waste handling issue and, if anything, has singled out this feature of the program as one of the most distinguishing advantages. This would appear to suggest that any review or reassessment of U.S. international approaches to LMR cooperation should address the subject of actinide burning as part of the process.

It can be argued, for example, that there should be a commonality of interest between the U.S. IFR program and the Japanese OMEGA program which would argue for taking a new look at the U.S. approach to LMR collaboration. The development of closer ties between the U.S. and Japanese activities related to actinide burning might serve to enhance both efforts. The DOE Nuclear Energy Office has requested a modest amount of special funding from OMB in FY 1991 related to actinide burning. However, as yet the DOE has no program in place comparable to OMEGA, and to our knowledge no effort has been made to conceptualize a possible relationship between the appropriate U.S. laboratories that might be interested in OMEGA and the appropriate Japanese institutions.

Within the context of these observations it is recommended that an analytic paper be prepared reviewing the general options that might be available to DOE for enhancing international cooperation

with Western Europe, Japan and possibly other countries in the development of the LMR. This paper should review, in a general manner, the status of current relationships, the status and future prospects for LMR development in each of the major countries involved. It also should systematically assess the pros and cons of a range of options from various perspectives, including the following:

- whether a given approach (including adherence to the current U.S. approach) is apt to foster near and longer term U.S. energy interests;
- whether a given option is likely to be feasible and practicable in terms of likely acceptance by key organizations in the countries involved;
- whether the given approach is likely to make a significant contribution to the preservation of the LMR as a prospective energy option for the future.

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