

The Role of Industry in Fusion Development

Robert C. Iotti
President, CH2M Hill Nuclear Business Group

Abstract

The role of industry in US fusion development to date has been substantial, yet with few exceptions in which industry designed and built the entire facilities, the role has been limited to the supply of materials, components and systems for the various research reactors.

The development of fusion worldwide is proceeding along two main paths: national ones which focus on developing alternate concepts and explore different physics regimes that offer promise for improved operations and less costly commercial reactors, and the other the international effort on ITER and perhaps complementary facilities.

Industry must and can support both paths, but whereas the support of the national programs can continue more or less along the same lines as in the past, there is an opportunity for a substantially different role in ITER.

The role that U.S. industry can play in both the U.S domestic program and ITER is discussed. The latter is seen from the perspective of industry support to the U.S. contribution to ITER, through the recently established ITER support office, but also from the more complex role that industry can play as the integrator and project manager of ITER, regardless of where it is constructed.

To support the U.S contribution, U.S. industry must be prepared to provide the services and materials/equipment/components that the U.S will commit to provide as either in-kind contributions or pay for as part of their share of the ITER final design and construction. The presently contemplated contribution of the U.S, and the ability of industry to support those contributions are summarized.

ITER has a number of choices regarding how the entire project will be managed during the final design and construction phase. A number of activities that industrial experience has demonstrated as crucial for the success of major projects are rendered complicated by the international nature of the program. Detailed planning of the procurement, fabrication, inspection, delivery, assembly of the various components into systems, integration of the systems with the construction of the facilities, start-up and testing has only been done at a superficial level. Such project execution plan, which is an absolute necessity for ITER success would rely on established procurement systems, project planning and control systems. During the procurement cycle, expediting and vendor inspection, logistics, receipt inspection and warehousing play a vital role in assuring that the items are available when needed. Nevertheless the main leverage that the program manager normally has on the various contractors that supply the items and services will often be absent from ITER, since the majority of funding is likely to be controlled by the various national parties, and not by the central ITER organization. During the actual assembly and construction, changes will occur that will require decisions, and interaction with the various contractors affected by the changes, and these changes will have funding implications, with funding not in control of the overall program management.

How ITER may choose to use industry in solving these problems is discussed. Alternatives that range from ITER building the capability to do all of the management and integration in its central organization to delegating this responsibility to an industrial company or groups and the advantages/disadvantages of the multiple options are discussed. Finally a recommendation is made for what the author believes to be the most readily doable option.