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## KNOWLEDGE MANAGEMENT IN A NUCLEAR RESEARCH CENTRE

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Indira Gandhi Centre for Atomic Research is an R&D Organization under the Department of Atomic Energy, India, with a mandate “To conduct a broad based multi disciplinary programme of Scientific Research and Advanced Engineering development directed towards the establishment of technology of sodium cooled Fast Breeder Reactors and its associated fuel cycles”. The Centre has been operating a Fast Breeder Test Reactor with a unique Pu-U carbide fuel for more than 20 years and a Kamini Reactor based on U<sup>233</sup> fuel. To fulfil the mandate, the Centre has developed over the years a strong and world class R&D base in the areas of material development and characterization, non destructive inspection and evaluation, fuel and material chemistry studies, reactor engineering and development with advanced computer aided design, analysis and 3D modelling followed by detailed experimental studies for validation, sodium technology, safety instrumentation, safety engineering studies and analysis etc. The Pu-U carbide fuel of 100,000 MWd/t burn up from Fast Breeder Test Reactor has been successfully reprocessed using innovative indigenous technologies. All these developments have enabled creation of various innovations and rich knowledge base that have led to indigenous design of 500 MWe Prototype Fast Breeder Reactor and an Integrated Fast Reactor Fuel cycle Facility. Also, the knowledge gained at the Centre is disseminated to the other strategic areas of importance to the nation.

The paper gives a few examples of how the knowledge acquired in the Fast Breeder Test Reactor has been successfully used and disseminated resulting in non recurrence of any of the incidents (that occurred earlier) in the successful operation of 20 years. The innovative ideas and experiments in the metallurgy and material developments, non destructive testing and inspection technology are highlighted to communicate examples of achieving breakthroughs based on knowledge management and innovative environment. The knowledge flow from extensive design and computer analysis backed up by experimental validation for the Prototype Fast Breeder Reactor are explained. The paper also covers knowledge management in sodium technology, an area of high relevance to sodium cooled fast reactors. The various dimensions of Knowledge Management like people, process, technology and content and the R&D required for successful application of Knowledge Management are described in the paper.

The new millennium has ushered in a new era of economy and development which is being referred as “Knowledge Economy”, in which knowledge is described as the critical competitive asset of any organization. In this era, it is possession and application of valuable knowledge that supports long term superior organizational performance. It is well argued and accepted that for R&D Organizations involved in emerging and challenging technologies, knowledge is key asset.

To us in the Centre with a vision to achieve world class leadership in the fields of fast reactor technology and associated fuel cycles, knowledge management is a capability of an organization to create new knowledge, disseminate it throughout the organization and associated collaborative research and academic institutes, industries etc. Infact considerable knowledge is getting created and disseminated through collaborative programmes with these institutes.

Like any highly technological endeavour, the use of nuclear technology relies on the innovative creation, storage and dissemination of knowledge. Also the nuclear energy sector is characterized by long time scales and technological excellence. Development of innovative technologies for nuclear power and its associated fuel cycles is essential for addressing the concerns of the public at large and to make significant contribution to world energy in the immediate future.

Many nuclear experts with rich design, operation and maintenance experience are retiring from service taking with them valuable expertise. All this necessitates a good knowledge management policy to capture, store and disseminate the knowledge to the right people, at the right time.

This paper illustrates a few success stories as well as the inadequacies in knowledge management to emphasize the need of R&D and innovation in knowledge management.

The Centre has framed and adopted a Knowledge Management Policy that nurtures creation, capture, storage and dissemination of knowledge with the complete participation of the employees. Towards this, a web based Information Management Server has been commissioned with a search facility. This collates the distributed information management servers of various groups (disciplines). These servers contain the explicit knowledge generated in the Centre in the form of Design Reports, Internal Reports, Publications, Drawings etc. These servers are enriched with scientific information on a continuing basis. Appropriate security mechanisms are built in to provide the information on need to know basis and access to confidential information.

The tacit knowledge is being captured from the retiring employees through exit reports, interviews, audio and video presentations. The tacit knowledge of the serving employees is converted to explicit knowledge through periodic seminars, lectures and internal reports. The way we do not know which branch bears fruit in a tree, in an organization, from which level the innovation comes from is not known. Hence in our Centre, the quality circles are nurtured which many a time come out with innovative ideas based on practical knowledge base. All this information is ported to the Information Management Servers. Proper framework is devised for the employees to come forward and realize the paradigm shift that “Knowledge is Power” to “Knowledge sharing is Power”.

This policy is enabling innovation & development. Knowledge management is also used for nurturing innovation especially among the young personnel of the department. We believe that the knowledge management and innovation quotients are interwoven & interrelated.