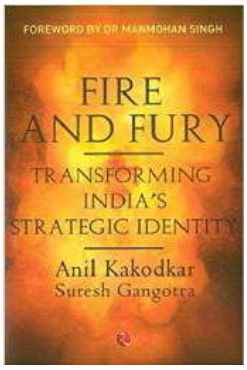
Fire and Fury – Transforming India's Strategic Identity



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The book, "Fire and Fury – Transforming India's Strategic Identity", traces the remarkable journey of Dr. Anil Kakodkar from his childhood days to the Head of India's Atomic Energy Commission and beyond that to his present day activities in the service of the community. Born in 1943 in Madhya Pradesh, into a family of modest means but committed to Gandhi's ideals, he imbibed the spirit of Gandhi's movement and the ongoing freedom struggle. His father, who struggled for the liberation of Goa was put in jail in Portugal for nine years, leaving his mother alone to raise the family. Her struggles, including getting educated and qualified as a teacher and opening a school in Khargone, Maharashtra left a deep imprint on young Kakodkar. As he recounts "my school and home taught me the virtues of self-service, discipline and being kind to others". After finishing school the family moved to Mumbai where he got his higher education and graduated in Mechanical Engineering from the prestigious Veermata Jijabai Technological Institute (VJTI). After a brief stint with a private company, he joined the Bhabha Atomic Research Centre (BARC) Training School of the Department of Atomic Energy (DAE), where as he puts it "found his wavelength". The challenges inherent in the atomic energy programme and the opportunities for learning new things drew in young Kakodkar who took to it like a duck to water.

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He recounts many incidents of his career in BARC and some of the difficult moments he faced. Through all this, he comes across as a person deeply interested in learning new science and technology, and adapting and applying this knowledge to solve problems however complex and difficult. His special interest was in reactor design and engineering, an area which involves several streams of knowledge from different disciplines, given the operating conditions inside a nuclear reactor. His account of various experiences during a long career in BARC make fascinating reading and give a valuable insider's account into the work and management culture and evolution of BARC. Kakodkar's spirit of "can do" in the face of challenges, and the ability to innovate and get over problems comes through. With typical modesty, he gives credit to his early mentors.

Another aspect is his management style, marked by openness, accessibility, cutting across disciplines, leading a team from the front, never shirking responsibility, and the spirit of service to the community and nation. At one point Kakodkar mentions that he wanted to do a degree in management but circumstances did not permit it. Given his skills acquired through experience in managing teams and projects within a complex Research and Development organisation, subject to labyrinthine government rules, processes and regulations and financial audits, it would seem that he could easily have taught courses in management or written textbooks, especially for R&D organisations.

The book is full of technical nuggets and details about the history of BARC's efforts to develop India's indigenous nuclear programme despite numerous pressures and constraints. He mentions several colleagues and is generous in giving credit and praise to them even in cases where he felt they had not agreed with him. He rightly observes that the detailed history of India's nuclear programme and BARC should be preserved and kept for posterity. India's nuclear programme with its civilian and strategic dimensions is certainly unique in the world. One story is the repair and rehabilitation of a nuclear Pressurised Heavy-Water Reactor (PHWR) at Madras Atomic Power Station (MAPS), where Kakodkar worked with his team to reverse the direction of flow of heavy water coolant/moderator to get the reactor to operate though at lower power output. This was an "out of the box" solution that surprised the Canadian experts. Several other technical problems were overcome, and this account highlights Kakodkar's reputation as a problem solver. Later on, during the run up to the Indian nuclear tests in 1998, he became known as the "Ho Jayega (It will be done)" man.

Kakodkar's account on the nuclear tests of 1998 makes several key points. One, the whole set of tests were designed to get the maximum possible data for future nuclear weapons design, including the thermonuclear test. The last was kept down to a minimum yield in order to avoid impact on the community living near the site. He praises the local community for their understanding, support and cooperation during the tests. There was also recognition that future testing might be difficult due to international pressure. He mentions that it was expected that Pakistan would also conduct nuclear tests soon after India, taking advantage of the international focus on India and using the

Indian tests as justification. Besides this, his experience of secret "cloak and dagger" operations makes interesting reading.

On longer term and strategic matters, Kakodkar analyses the issue of Uranium fuel for India's nuclear programme, the constraints and how they were overcome, the impact in Nuclear Power Corporation of India Limited (NPCIL) and India's long term energy future. He also goes into the implications for climate change and argues that nuclear energy must remain an essential baseline power component of India's energy mix in order to stabilise the power grid. This, he rightly observes is because even though renewable energy has huge potential in India and should be exploited, the intermittent nature of this source makes it essential to have a strong baseline power source for the national grid. However, new technology could change the entire game if low cost and efficient energy storage devices such as batteries are developed.

Kakodkar discusses at length the international sanctions against India in the wake of the 1974 peaceful nuclear explosion and the May 1998 nuclear weapons tests. The DAE bore the brunt of the impact of international sanctions arising from these two events. The Nuclear Suppliers Group (NSG) was set up as a direct result of India's peaceful nuclear explosion in 1974 precisely to control and restrict access to nuclear materials and technology. These sanctions became more intense after the 1998 nuclear weapons tests. The most important effect was the cut-off of imports of natural and enriched Uranium for India's reactors especially after 1998 which resulted in Indian nuclear power plants operating at low capacity and delays in building more reactors. He describes the intense efforts to maintain the fuel supply and the efforts to stretch out the available Uranium resources. This required adjustment of the fuel cycle and reprocessing of spent fuel which posed formidable technical problems. The financial situation of NPCIL deteriorated sharply. During this extended crisis, operating capacity of India's civilian reactors had to be cut down and there was a real prospect of NPCIL going bankrupt with adverse consequences of the growth of India's nuclear power. The DAE embarked on a hunt for domestic Uranium deposits, but the exploitation of the large but poor quality deposits posed technical challenges in addition to local opposition to Uranium mining. By 2012, DAE scientists had developed a new alkaline leaching technology to enable extraction of Uranium from the low quality 0.2 % pitchblende content ores found in Telangana and Andhra.

During 2004-2008 the US and India conducted serious and intensive discussions on India's nuclear programme. This was due to US recognition that India was a useful strategic partner in the region, an emerging economy with a liberal democracy, and a responsible custodian of strategic and civil nuclear technology. Rather than have the entire Indian nuclear programme out of international safeguards under the existing regime, would it not be better to get India into the international nuclear regime, with a substantial part of its programme under safeguards? Especially since the programme had developed its autonomy and seemed to be going ahead despite the fuel constraints. Faced with this dilemma, the US administration under President Bush made a change in policy and serious discussions with India began,

despite the presence of a strong pro-NPT and doctrinaire lobby within the US and abroad. The rising role of the Indian American community, its presence among the top echelons of corporate America, and its role in funding both political parties was another factor. This was the background against which India-US relations took off on a new trajectory.

Kakodkar describes his role in shaping the India-US nuclear agreement and eventual removal of nuclear related sanctions. He recounts the well known story of the "600 pound gorilla" that stood rock firm on safeguarding the autonomy of India's strategic nuclear programme despite internal and external pressures. In this, he acknowledges the support and trust he enjoyed from Prime Minister Dr. Manmohan Singh at the crucial moments. This whole episode has been the subject of books and articles by numerous participants in the negotiations including those from MEA. This author has also heard personally about Kakodkar's key role from one of the key negotiators who has not published his account. But Kakodkar's account of what happened, even though it must have been sanitised is riveting. This is a good example of science diplomacy, in which the technical and scientific agencies, various stakeholders, and the foreign ministry worked together and seamlessly, with the highest level political support in order to secure the national interest during the difficult international negotiations. India's science in diplomacy effort succeeded in producing a win-win India –US nuclear deal. India is indeed fortunate to have such a team including Kakodkar during this crucial period (2004-2008).

Kakodkar covers much ground in his book. His ideas on science, education, rural and urban development, India's energy future, and the sound management of organisations and governance are wide ranging and well considered, and reflect a Gandhian influence and deep commitment to service to the family, community, nation and the world. Many of these ideas are well worth expanding and developing, and I have no doubt that he will do so in the future. Apart from the biographical details enriched by chapters written by his wife and his sister, and by the co-author, the book has rich content in terms of thinking on social, management, and governance issues. It is written in an easy and direct style reflecting the personality of the author.