

Flunking Atomic Audits

CAG Reports and Nuclear Power

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The recent Comptroller and Auditor General's report on the Atomic Energy Regulatory Board and, more broadly, on nuclear safety regulation has highlighted many serious organisational and operational flaws. The report follows on a series of earlier CAG reports that documented cost and time overruns and poor performance at a number of nuclear facilities in the country. On the whole, the CAG reports offer a powerful indictment of the department of atomic energy and its nuclear plans.

The new report (Report No 9 of 2012/13) of the Comptroller and Auditor General (CAG) on the activities of the Atomic Energy Regulatory Board (AERB) could not have come at a more appropriate time (CAG 2012). Concern about nuclear safety has naturally increased significantly since the multiple accidents at the Fukushima Daichi nuclear reactors. The response of the Indian nuclear establishment and, more generally the Government of India, to Fukushima can largely be characterised as an attempt to placate people's concerns about the potential for accidents at Indian nuclear facilities. One element in that strategy was to emphasise that safety regulation at the Nuclear Power Corporation's (NPC) facilities was impeccable. The CAG report has essentially demolished this claim.

Independence of Regulator

A basic tenet of regulation is that the safety regulator must be independent of industry and government. Article 8 of the international Convention on Nuclear Safety, which India has signed and ratified, calls upon signatories to "take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organisation concerned with the promotion or utilisation of nuclear energy" (CNS 1994). The absence of such separation has been identified as one of the factors that led to the Fukushima accidents by the Independent Investigation Commission.¹

India's nuclear regulatory regime suffers from the same lack of effective separation. Despite India's international commitments, awareness of best practices, and criticism by various outsiders, the CAG report pointed out, "the legal status of AERB continued to be that of an authority

subordinate to the central government, with powers delegated to it by the latter" (CAG 2012: vi).

At first glance the AERB does seem independent of the department of atomic energy (DAE) and the NPC. It reports to the Atomic Energy Commission (AEC) rather than the DAE. The problem, as the CAG observed, arises from the "fact that the chairman, AEC and the secretary, DAE are one and the same" and this fact "negates the very essence of institutional separation of regulatory and non-regulatory functions" (p 12). The chairman of the NPC is also a member of the AEC. Another significant constraint on the AERB's activities is that the organisation "is dependent on DAE for budgetary and administrative support" (p 13). What all this means, in effect, is that despite all pretences and claims to the contrary by the DAE and its attendant institutions, the AERB lacks power and independence. As common experience would indicate, it is hard to criticise one's boss or force action in ways that he or she does not want. Of the 3,200 recommendations by the AERB's Safety Review Committee for Operating Plants, the DAE had not complied with 375, with 137 recommendations dating back to earlier than 2005 (p 42).²

The lack of separation is not an accident, but a choice made by the nuclear establishment. As early as the 1970s, Ashok Parthasarathi, a senior bureaucrat and science adviser to the prime minister, had suggested that the

inspection of all nuclear installations from the point of view of health and environmental safety should be administered by a body with a suitable name and located in department of science and technology, as that department had been assigned the national responsibility for ensuring the preservation of environmental quality (Parthasarathi 2007: 131-32).

But even the idea of having an external agency monitor its environmental record was not acceptable to the AEC, let alone having someone monitor safety in its facilities.

In the subsequent decades, many have emphasised the importance of having an effective and independent

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regulator, in particular, A Gopalakrishnan, the chairman of AERB from 1993 to 1996 (for example, Gopalakrishnan 1999). Gopalakrishnan has also recounted many instances where the DAE and NPC have actively interfered with the safety activities of the AERB. Others from AERB have tried to defend the board, its independence, and its ability to monitor safety (for example, Parthasarathy 2011). Unfortunately, the situation for any regulatory agency is like that of Pompeia, Julius Caesar's wife, of whom, Caesar is supposed to have said, "Caesar's wife must be above suspicion". Now, the CAG report adds to public suspicion of the independence of the AERB and it is not going to be easy for the AERB to be seen as capable of effectively regulating nuclear power.

From the AERB to the NSRA

The situation described by the CAG might change with the Nuclear Safety Regulatory Authority (NSRA) Bill of September 2011 being introduced in Parliament by the Government of India. Indeed, the DAE did state to the CAG "that the process of improving the existing legal framework for introducing greater clarity in respect of separation of legal responsibilities concerning promotional and regulatory functions had already been taken up", mentioning the NSRA Bill (p 11). Essentially, the same argument has been offered by AERB secretary R Bhattacharya in response to the CAG report (Jog 2012).

Technically, that may be a valid defence, but just because the AERB is to be replaced by the NSRA – assuming, of course, that the government manages to get it through Parliament – should we be confident of the safety of the DAE's nuclear facilities? The underlying problem highlighted by the CAG is not just the legal status, but one of effectiveness. And looking at the content of the bill and the context under which the NSRA has been created, it seems unlikely that it will create an effective separation between the regulatory authority and the nuclear establishment.

In the NSRA as has been envisioned, many of the key processes involved in ensuring effective regulation will continue to be controlled by the AEC. The power

for crucial steps like the appointment of members is vested with the central government. But for most purposes, the authority empowered to act on behalf of the central government is the AEC. The AEC chairman will also be one of the key members of the Council of Nuclear Safety that will set the policies with respect to radiation and nuclear safety that will fall under the purview of the NSRA.

There is another problem that the CAG did not discuss. The AERB suffers from a lack of technical staff and technical facilities, and this lacuna has been exploited by the DAE (Ramana and Kumar 2010: 53). Further, there is little expertise outside the nuclear establishment on technical issues relating to nuclear facilities, and no proposed method of enhancing such independent expertise. For these reasons, there will continue to be cause for concern about nuclear safety in the country.

Plan Not, Care Not?

A different structural and institutional problem highlighted by the CAG report has to do with protection of workers from radiation. Earlier, each nuclear plant had a Health Physics Unit that was part of the Bhabha Atomic Research Centre (BARC). However, in 2009, these units were transferred from BARC to NPC. This "meant that the functions of monitoring of radiological exposure as well as the responsibility of radiological surveillance" is now with NPC – the operator of the reactors (p 45). In other words, "AERB had no direct role in conducting independent assessments and monitoring to ensure radiological protection of workers despite being the nuclear regulator of India" (p vii).

The CAG report also shows that the AERB has not exactly been particularly zealous about promoting nuclear safety, illustrating this through a plethora of examples. One is that it never fulfilled an official requirement from 1983 to prepare an overall nuclear and radiation safety policy, which would have given structure to practical radiation safety planning at lower levels. The AERB has not been proactive in participating in emergency planning exercises; the CAG notes that these exercises have highlighted

inadequate emergency preparedness (p 61). Nor does the AERB have the mandate to take follow-up action with district or state authorities when it detects deficiencies in emergency preparedness (p 60).

The AERB has also not paid any attention to planning for decommissioning nuclear reactors. Nor has NPC. All nuclear plants in the country were operating without any decommissioning plans, including plants that are over 30 years old (p 65). The AERB did put out a safety manual on decommissioning in 1998, but neither the plants that were operating then nor the ones that were commissioned subsequently have produced a decommissioning plan. Now, on paper, each reactor that started operations after 1998 was required to submit such a plan before the AERB issued a construction or operating licence. This leaves two possibilities: The AERB did not insist on NPC following its regulations – or NPC did not bother to comply with the requirement, and there was not much AERB could do about it. Neither of these possibilities is comforting.

The CAG vs the DAE

Though this is the first time the CAG has looked at nuclear regulation, the agency has exposed various other problems with the DAE in its audits from earlier years. It is perhaps the most prominent government body to openly criticise several aspects of the DAE's functioning. The few examples listed below should illustrate the agency's ongoing monitoring of various facets of the DAE and how the nuclear establishment has fallen short on so many dimensions.

The trend started with the 1985-86 report, which included for the first time an audit of a nuclear power project (Chandrasekharan 1990: 1024).³ In what was to become a pattern, this first report documented cost and time overruns in the case of the Madras Atomic Power Station (MAPS). Approved in 1965 at a cost of Rs 60 crore each, the capital cost more than doubled for each of the reactors, with substantial increases in 14 of 20 expenditure heads, and the projects were delayed by over eight years for each reactor. These "constituted inadequacies

in planning of the projects rather than wages of development of indigenous technology” (Chandrasekharan 1990: 1026). Even with inadequate provisions for decommissioning, repairs, waste management, and so on, the CAG found that the rate of return on capital was only 3.5% and not the 12% expected of power projects.

A couple of years later, the CAG found a similar pattern of cost and construction time increases with the Narora reactor, noting that in 10 major heads of expenditure there had been cost overruns of 188% or more (CAG 1988). This was well before the reactor was commissioned, and the final cost figures were significantly higher. What was important was that the CAG’s conclusion that the revision of costs indicated that the project got “approved on unrealistic cost estimates” and its censure of the DAE saying, “Unrealistic cost estimates and optimistic time schedules make financial allocations and controls less meaningful” (CAG 1988).

Some years later, in 1993, the CAG studied yet another reactor – the Fast Breeder Test Reactor (FBTR) – and found again not only the pattern of cost increases and time overruns, but also that its performance was wanting (CAG 1993). The CAG documented that by the time the reactor first became critical in 1985,⁴ the net time overrun had become 220% and the corresponding increase in cost had gone up by 164%. The CAG also described several of the incidents and accidents involving the FBTR during just the first five years of operation. These included a nitrogen leak in 1987, followed by “a complex mechanical interaction due to fuel handling error in the reactor damaged certain ‘in-vessel’ components” that took two years to rectify; and the failure of the load cell and damage to the Capsule Transfer Gripper (CTG) in 1989.

Over the years, the CAG has also documented cost increases, time overruns, and/or poor functioning with a number of other nuclear facilities. These include the Tuticorin (Chandrasekharan 1990: 1028-29), Baroda (CAG 1988), and Manuguru heavy water plants (CAG 1994),⁵ Dhruva research reactor (Chandrasekharan 1990: 1029), Waste Immobilisation Plant (WIP) and Solid Storage Surveillance Facility (SSF) at Tarapur (CAG 1996), the Nuclear

Fuel Complex (CAG 1998), and the Nuclear Desalination Demonstration Plant at Kalpakkam (CAG 2008).

In 1999, the CAG audited another aspect of the DAE’s functioning: its propensity for making large-scale expansion plans. Such grandiose projections have been a staple of the DAE’s strategies to garner political and financial support (Ramana forthcoming). In 1984, the DAE drew up a plan to set up 10,000 MW of nuclear power by the year 2000. What actually materialised from the profile was shocking:

Against the targeted additional power generation of 940 MW by 1995-96, gradually increasing to 7,880 MW by 2001 AD, the actual additional generation of power under the profile as of March 1998 was nil in spite of having incurred an expenditure of Rs 5,291.48 crore” (CAG 1999: 20).

The implications of this abject failure to deliver for current projections of nuclear expansion are profound.

This impressive, if depressing, series of reports by the CAG points to an even more depressing reality: the DAE cannot be easily forced to change its ways. For example, despite the CAG’s warning after its Narora case study not to get projects approved on “unrealistic cost estimates and optimistic time schedules”, the DAE continues with this practice till today. Its flagship project – the Prototype Fast Breeder Reactor – was initially expected to be commissioned in 2010 (Subramanian 2004), but has been delayed by more than three years; the update from January 2012 was that the reactor would go critical in early 2013 but that would be followed by “a year of testing” before it is declared commercial (IANS 2012). Its cost estimate has gone up from Rs 3,492 crore to Rs 5,677 crore, as of November 2011, when approximately 80% of the work on the reactor had been completed (Srikanth 2011).

Conclusions

Many have written about the nuclear establishment’s safety problems, problems with radiation exposure, accounting problems, and so on (some examples are Bidwai 1978; Subbarao 1998; Gopalakrishnan 1999; Gopalakrishnan 2000; Subbarao 1999; Dias 2005; Ramana 2007; Ramana and Kumar 2010). The

CAG’s advantage has been in its access to various documents that would be unavailable to members of the public.⁶ Put together, the CAG reports, including the latest one, amount to a pretty damning assessment of the DAE and its activities. The CAG has done its bit. It is up to Parliament, and to the population at large, to hold the DAE accountable.

NOTES

- 1 As the Fukushima Nuclear Accident Independent Investigation Commission’s Official Report to Japan’s Diet put it, “The TEPCO Fukushima Nuclear Power Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties. They effectively betrayed the nation’s right to be safe from nuclear accidents” (Fukushima Nuclear Accident Independent Investigation Commission 2012: 16).
- 2 There are other ways in which the DAE has marginalised the AERB. In the case of the Kalpakkam Atomic Reprocessing Plant, AERB approval for construction was sought only in 1994 when “construction of the plant was already in progress” (Sundararajan, Parthasarathy and Sinha 2008: 26). What, one wonders, were the odds that AERB would disapprove of the project even if it had found a problem with the design?
- 3 Earlier reports had, in the words of an official history of the CAG, not included any “worth-while comments” on the AEC or the DAE “despite the massive expenditure incurred in the development of nuclear energy and connected research and development” all of which was “virtually kept shrouded in mystery and secrecy, except the publicised benefits leaked out to the media by the Department/Commission” (Chandrasekharan 1990: 1024).
- 4 Even then, the reactor was not fully functional and the steam generator, essential for producing electricity, began operating only in 1993 (Hibbs 1997).
- 5 We have already written about the case of the CAG and heavy water plants in the pages of this journal (Ramana 2007).
- 6 The CAG “scrutinised records relating to issue of consents, authorisations, licences, and regulatory inspections; minutes of various committee meetings; utility correspondence files; project reports, etc, during the period September to November 2010 and September to October 2011” (p 5).

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