The Melting Pot - Regulations for radiological emergency in India

GREENPEACE

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India's Nuclear Plans: Discretion or Desperation?

India plans to have 20,000 MW of nuclear energy by 2020 and 63,000 MW by 2032: ambitions that would translate into some 31 new nuclear reactors around at least eight states[1]. Most of the plants planned are in areas with heavy population density. However, India is not equipped to deal with the safety implications of the existing nuclear industry and certainly not with any further expansion. This document exposes the inadequacy in both the existing policy framework, and further, the gap between policy and reality.

The Atomic Energy Act of 1962 has not kept pace with the recent political developments in the field of civilian nuclear technology, and there is no distinction between civilian and military nuclear affairs. One of the motives for the secrecy that now surrounds the nuclear industry is the fear that a nuclear installation could be attacked, and so we as Indians have accepted a level of secrecy in return for the assurance of our safety. Yet, as the Mayapuri accident highlights, this trust has been abused. We would argue that the government and relevant authorities have been lacking in securing the safety of the population, especially in preventing the Mayapuri accident to happen. They can no longer hide their negligence in the sector under the garb of security.

The AERB as a regulatory body has failed on multiple fronts. The Mayapuri accident proves India does not have emergency preparedness and management for radiation-related incidents.. We demand the inclusion of all stakeholders in a full and transparent debate on the six-point policy recommendations contained herein, including the liability costs, and risk reduction costs, of such an expansion of our nuclear industry. This debate must also be considered by the parliamentary standing committee appraising the nuclear liability bill. Only then may we take an informed decision on whether we wish to follow the path of importing foreign reactors and technology.

Greenpeace India

1. http://www.planningcommission.gov.in/plans/planrel/fiveyr/11th/11_v3/11th_vol3.pdf

Emergency Preparedness and Stakeholders:

- **International Atomic Energy Agency (IAEA):** the arm of the United Nations that deals with nuclear technologies. The IAEA have extensive advisory documents on nuclear operations, including 'Methods to Identify and Locate Spent Radiation Sources'[2]

- **Department of Atomic Energy (DAE):** the nodal department in the case of nuclear affairs.

- **Atomic Energy Regulatory Board (AERB):** theoretically oversees the safety of all civil nuclear operations in India. The AERB reports to the Atomic Energy Commission (AEC)[3], a governmental organisation chaired by the same person who heads the DAE. The AERB creates its own regulations, often largely based on the IAEA's documents, and adherence to them is required by law. However, the AERB's library of emergency procedures and safety regulations – particularly relating to radiological facilities - is not nearly as comprehensive as that of the IAEA.

- **Crisis Management Group (CMG)**: coordinates with the local authority in the affected area. The CMG comprises senior officials from organisations such as NPCIL, BARC, and AERB amongst others. The CMG sit under the DAE.

- **National Crisis Management Committee (NCMC):** the apex body of high level officials of the government designated to deal with crisis.

- **National Disaster Management Authority (NDMA):** the body mandated to prevent and handle disaster in India. Its responsibilities span prevention, mitigation, preparedness and capacity building for dealing with the threat or realisation of disaster. The **National Disaster Response Force (NDRF)** comes under the NDMA's authority.

2. http://www-pub.iaea.org/MTCD/publications/PDF/te_804_prn.pdf), for example, and 'Radiation Safety of Non-Medical Irradiation Facilities' (http://www- ub.iaea.org/MTCD/publications/PDF/te_1367_web.pdf

3. The AERB should theoretically act as the (impartial) regulatory body for the DAE, yet this department is the source of their funding, and also technical personnel and facilities and therefore nothing “independent” about its functioning.

Disaster Management and Regulations:

As the Co-60 source that found its way into Mayapuri has been attributed to a research department in the University of Delhi, this briefing is written with respect to the regulations and emergency procedures relating to radiological facilities[4] in India.

The NDMA's 2009 guidelines on Management of Nuclear and Radiological Emergencies come closest to anticipating the accident at Mayapuri, even suggesting that in the case of loss or theft of a radiological device 'the possible location of the missing source could generally be metal scrap dealers'[5].
In contrast, the DAE's overview of emergency response plans refer to the likelihood of radiological releases in the public domain as 'highly unlikely' and even a 'hypothetical scenario'[6]. The Department is perhaps not familiar with the 16 cases of loss, theft or misplacement of sources from Indian radiological facilities in the last ten years alone (please see the attached document 'An Unusual Occurrence? Radiation Safety in India').

The NDMA divides the mainstays of nuclear emergency management framework into

- prevention
- compliance to regulation
- mitigation
- preparedness
- capacity/development
- response & relief
- rehabilitation and recovery.

In the Mayapuri case, we would argue that the government and relevant authorities have been lacking in most of these categories. In particular:

Prevention

While the University of Delhi is undoubtedly at fault in this case, the AERB as the regulatory body for nuclear safety has also failed to comply with its own regulations. In the Atomic Energy (Radiation Protection) Rules of 2004[7] they make clear that a licence to utilise radiological devices shall only be granted with the designation of a Radiological Safety Officer (RSO) and his/her approval by the Regulatory Body. Licences shall be valid for a period of five years unless otherwise specified. The University of Delhi had a licence to purchase and maintain radioactive

4. Radiation facilities are any installation/equipment or a practice involving use of radiation-generating units or use of radioisotopes in the field of research, industry, medicine and agriculture
5. http://ndma.gov.in/ndma/Management+of+Nuclear+&+Radiological+Emergencies.pdf
6. http://www.dae.gov.in/ni/ninov02/ecr.htm.
7. (http://www.aerb.gov.in/t/actsrules/RPR2004.pdf)

materials, but had no RSO in either its Department of Chemistry (the location of the gamma irradiator) or its Department of Physics and Astrophysics. The Vice Chancellor of the University insinuates they were not aware of the requirement[8]). Was the University's licence issued/ reissued by the AERB without this basic requirement?

Compliance to Regulation

To enforce its own safety regulations, the AERB must undertake regulatory inspections.

In 2008, AERB inspected 110 of the 2409 listed radiation facilities. This is 4.5% of facilities, if India's estimated 40,000 institutions utilising diagnostic X-ray are not included. In 2007, 119 of 2982 radiation facilities were inspected: 4%. If the 80 inspections conducted of the then 40,000 institutions with diagnostic X-ray are included, the percentage of facilities submitted to regulatory inspection falls to just 0.5%.

Ironically, in both 2008 and 2007, 100% of all listed gamma irradiators (15 and 12, respectively) were reported as inspected. It is not clear whether Delhi University's gamma irradiator was listed in the AERB's records. According to H. S. Kushwaha, head of the health and safety group at BARC, although the AERB was not established at the time of the University's purchase of the gamma irradiator in 1968, it would have received all papers from by the Directorate of Radio Protection, which was the nodal agency in that period. An embarrassing contrast can be made to The Atomic Energy of Canada Limited (AECL), the Canadian company from which Delhi University purchased the gamma irradiator. Once the source of the radioactive material was found to be the University of Delhi, the AERB were reportedly forced to contact AECL to ask how much material they might be searching for in the capital. Despite the time lapse of 42 years, AECL were able to provide the information in only a number of hours[9].

Preparedness

All radiological facilities must have an 'emergency preparedness plan'[10], which the AERB is responsible for approving; reviewing, ensuring remains updated and is in force. The plan must also prepare for off-site emergencies, and include site characteristics such as demography, protective measures, environmental monitoring and assessment, periodicity of conducting drills/exercises and public awareness programmes, amongst others. However , though all nuclear power plants have a “emergency preparedness plan” all the radiological facilities do not have such a plan, the current case , clearly shows that, Delhi University did not even have a radiation safety officer to deal with the radioactive equipment.

8. http://www.hindustantimes.com/Radiation-safety-officers-A-rare-tribe-of-monitors/Article1-537760.aspx
9. http://www.deccanherald.com/content/67069/atomic-board-scours-missing-cobalt.html.
10. AERB Safety Guide AERB/SG/G5

Capacity/Development

The NDMA writes that the number of Emergency Response Centres (ERCs) in India is, at 18, 'far too inadequate' (2009 observation), and that it is the responsibility of state governments to establish more in three years at the outer limit. They recommend that a database of RSOs be 'prepared/maintained and made available at the DDMA [District], SDMA [State] and national levels by the AERB', and the raising and training of specialised response teams who will be fully equipped at the state and central levels. They also advocate 'at least one mobile radiological laboratory unit in each district and two units in each metropolis to support detection, protection and decontamination procedures', to be set up by the Ministry for Health and Family Affairs. However, at present, only a few such mobile radiological laboratories are available with DAE and Defence Research and Development Organisation (DRDO).

Response & Relief

The authorities only began scanning the Mayapuri area two days after the first victim was admitted to hospital. The first set of radioactive material is removed another four days after that (5th -9th April). The AERB then declared the area safe and remove the cordoning, only to return to retrieve more Co-60 another 4 days later (13th April).

The NDMA's regulations suggest that the radius of Inner Cordoned Area (safety perimeter) for radiological emergencies for unshielded or damaged potentially dangerous sources (such as that found in Mayapuri) is 30m around, with expansion based on radiological monitoring, and wherever the ambient dose rate is 100μSv/h.

Section 8.9 explicitly states: 'For recovering the source, assessment for contamination and external radiation exposures will be made prior to taking control of the source and transporting it for safe disposal. Fire service personnel need to wear personal protective gear such as masks, aprons, gloves and gum boots and will be guided by radiation protection officers for instituting appropriate radiation protection procedures in case of unsealed/destroyed sources'.

Yet from press photos it appears the waste was lifted into an open-top truck by a worker clad in ordinary clothing. The truck contained eight metal cylinders – presumably one for each of the eight samples found – yet some of the containers did not have lids fitted[11].

11. See attached Appendix 3 of NDMA guidelines for further specification.

Policy recommendations

In light of the shambling and harmful manner in which the Mayapuri accident was handled, and a review of the inadequacy of India's established systems for dealing with radiological emergency, Greenpeace makes the following policy recommendations:

1. Government should propose short term and long term solutions to restore the health of the local population and help them to deal with this accident. Also, various health tests done during the survey should be released and government should disclose its reading to public.
2. Government must publicly recognize the level of contamination and the estimated radiation exposure of both members of the public and emergency workers. Indian citizens have a right to know the truth about the impacts and the risks to people and environment. Contamination and radiation exposure should be compared to the maximum allowed contamination thresholds and dose limits.
3. Government should take a step back and strengthen the regulatory authority in India before even considering to develop such a massive nuclear programme.
4. There should be full accounting and information disclosure. India's nuclear industry and government must publish a full spectrum of information relevant to nuclear risk and nuclear insurance, including:
   (a) an assessment of the risk of operating each nuclear power plant (NPP) and other nuclear installation; and
   (b) the insurance coverage of offsite and onsite damage that is provided for each NPP and other nuclear installation, premiums paid for this coverage, and reinsurance arrangements.
5. The Indian Government should continuously monitor all identified routes of radiation exposure, including water contamination, deposits of radio nuclides, and radioactive dust. Those should be incorporated in the dose estimates for workers and the population. All this information should be made public.
6. There should be transparency in handling of nuclear affairs in India. Nuclear should no more enjoy 'exemption from disclosure', as specified in the Right to Information Act of 2005.
7. The government should compensate the loss of livelihood to the victims.

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