

# Fact Finding Mission

On the Offsite Nuclear Emergency Exercise 'reportedly' conducted at Nakkaneri Village on 9 June 2012 by the Tirunelveli District Administration, for a severe accident in the first unit of Kudankulam Nuclear Power Project

## People's Union for Civil Liberties (PUCL)

191, Addis Sreet, Coimbatore – 641 018, Ph: 9443213501

255, Husaina Manzil, III-rd Floor, Angappanaickan Street, Chennai-600 001

Ph:9444231497, 9444145803

[balamuruganpucl@gmail.com](mailto:balamuruganpucl@gmail.com), [rightstn@gmail.com](mailto:rightstn@gmail.com), [prof.saraswathi@gmail.com](mailto:prof.saraswathi@gmail.com)

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# Executive Summary:

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The first reactor of the Kudankulam Nuclear Power Plant is being readied by the Nuclear Power Corporation of India (NPCIL) for loading its nuclear fuel. Conducting site and offsite emergency preparedness exercises are the legally mandatory norms that should be followed in order to get the license from the Atomic Energy Regulatory Board (AERB) for loading this fuel. The district authorities are responsible for conducting the offsite emergency exercises with the guidance from the KKNPP Environment Survey Lab.

The district authorities visited Nakkneri, a tiny hamlet 7 km away from KKNPP on 9 June 2012 morning along with AERB, DAE and NPCIL officials. They issued a press statement in the evening that the offsite emergency training comprising three stages had been completed successfully. However, there were news reports that countered this assertion.

Keeping the 11 March 2011 Fukushima nuclear accident in mind, People's Union for Civil Liberties (PUCL)<sup>1</sup> contemplated to conduct a fact finding mission that would shed light on the way the offsite emergency exercise was conducted at the village. The fact finding mission members travelled to Nakkneri village on two separate days (13<sup>th</sup> and 20<sup>th</sup> June). People of the village were interviewed. Signed written and video affidavits were obtained from them.

From the interviews with the local people, it is learnt that the district authorities did not inform the people or their representatives about the exercise that follows an offsite nuclear accident. They spent a few hours in the village but did not do any of the legally mandatory work. Then they left the village. They issued a press statement saying that the offsite emergency training comprising three stages had been completed successfully. PUCL investigation revealed that the main content of the press note released by the Collector following the event was indeed false. Also, it was found that the Environment Survey Lab of KKNPP authorities have made a very big mistake by identifying an upwind site as a downwind one.

KKNPP is located in a windmill region. The capacity of the rotating blades of the windmills to disperse the radioactive plume into the local micro environment has not been studied so far by the scientists of AERB.

Based on these findings, nine recommendations have been made. They include that the Governments of India and Tamil Nadu should declare the Offsite Emergency Preparedness Exercise 'reportedly' conducted on 9 June 2012 at Nakkneri village as null and void. As no exercise was conducted it was a mockery on all the national and international regulatory codes. This warrants an appropriate action against all concerned.

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<sup>1</sup> PUCL is a human rights and civil rights organization in India founded by the freedom fighter Jayaprakash Narayan in 1978.

# Preface:

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Kudankulam Nuclear Power Project (KKNPP) is the largest nuclear power project in India. It is readying itself to commission one of its two reactor units. These reactors belong to the Pressurised Light Water technology and are imported from Russia. This is the maiden experience for the Indian nuclear establishment with the pressurized light water reactor technology.

The first offsite emergency exercise for the KKNPP was ‘reportedly’ conducted at Nakkaneri hamlet of Tirunelveli district on 9 June 2012. It is an important legal procedure that needs to be completed successfully to obtain the operating license for the plant – here, loading of nuclear fuel into the Unit 1 of KKNPP. Also, this happens to be the most important existential exercise that reveals the capability of the administration and the people to face a future nuclear catastrophe. The local civil administration, namely that of the District, is responsible for conducting it. Scientific understanding of the issues linked to nuclear accidents guides this exercise.

This is the first off site emergency exercise ‘reportedly’ to be conducted in India after the March 2011 Fukushima Nuclear accident in Japan. A representative of the nuclear regulator of India namely the Atomic Energy Regulatory Board (AERB), members belonging to KKNPP operator namely the Nuclear Power Corporation of India (NPCIL) were also present for the exercise along with the officials of the Tirunelveli district administration.

The district administration chose not to inform this event to the public or the media beforehand. The event was not informed to the people even when the exercise was ‘reportedly’ conducted<sup>2</sup> at Nakkaneri on 9 June 2012 morning. The people came to know about the event only later through media reports. Also, only one village, instead of a couple of villages, was chosen for the exercise. This was rather very unusual. History of the offsite emergency exercises conducted at other reactor sites in India *differ* from this starkly<sup>3</sup>.

Hence, a doubt has arisen about the credibility of this exercise. An exercise of immense importance is now in the mire of a deep controversy. Whether it was conducted properly or was it just a letterhead exercise conducted in order to secure the required license to operate the plant somehow, is at the heart of the issue. As it is directly related to the lives of lakhs of people, animals and resources, collecting the

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<sup>2</sup> This is a mandatory task. The EIA for the PFBR reactor (2001) quotes the following passages from the Kalpakkam Emergency Preparedness Plan: “Care is taken to inform the public and the media that the event is only a planned mock exercise and not a real emergency”, (page 8-19); “The information to be given to the public by the Collector should be regarding the nature of the incident, the degree of activity release, the steps taken to control the situation, and the emergency countermeasures advised. The announcements shall both be in English and Tamil”, EIA/EMP Stud for 500 MWe PFBR Project, MECON Ltd., October 2000, (page 8-14).

<sup>3</sup> For example, See - *The Hindu*, 29 July 2001: The Offsite Emergency Exercise conducted for the Prototype Fast Breeder Reactor at Kalpakkam, on 28 July 2001; also see – *AERB Annual Reports for the years 2000, 2001*, Chapter 5.

real facts impartially and objectively to understand the way it was really conducted by the officialdom would guide us, it is hoped, to reduce the negative consequences of an unavoidable large scale nuclear catastrophe.

It is with this idea in mind, People's Union for Civil Liberties (PUCL) undertook a fact finding mission at Nakkneri village and its surroundings; it also under took steps to contact the many stakeholders related with the issue in order to obtain their views.

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Dedicated to

The fond memory of

Y.P.Chhibbar, K.G.Kannabiran and K.Balagopal

# The Nakkneri Fact Finding Mission (N-FFM):

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PUCL is an organization that had conducted hundreds of fact finding missions all over India in its 30 year history. The focus of these past missions have largely been on the issues of State atrocities, caste, gender, and racial discrimination and hatred etc., - in other words, violations related to natural human right. The current mission, though related to these past FFMs inherently, differs from them slightly as it tries to understand the relationship of humans to a technology that has an inherent capacity to cause long term harm to all life forms. The suffering due to the Fukushima nuclear catastrophe was the one that had initiated this undertaking.

The N-FFM was conducted on two separate days, namely 13 June 2012 and 20 June 2012.

## The Team

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Eight members of PUCL undertook this work.<sup>4</sup>

Advocate S.Balamurugan, General Secretary, PUCL, Tamil Nadu - Team Leader  
Mr.George Williams - Vice President, PUCL Kanyakumari  
Mr.Pon Chandran - District President, PUCL, Coimbatore  
Mr.Chandrasekar - District Treasurer, PUCL, Coimbatore  
Prof.Fathima Babu - Member, PUCL, Tuticorin  
Mr.Felix - Member, PUCL, Kanyakumari  
Dr.R.Ramesh, MBBS - Member, PUCL, Coimbatore  
Mrs.Dhanalakshmi - Member, PUCL, Coimbatore

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<sup>4</sup> It was supported by a back end PUCL team consisting of Prof.Saraswathi, President, PUCL Tamil Nadu, Advocate V.Suresh, National Secretary, PUCL, Mr.T.S.S.Mani, Advocate Nagashaila, Advocate Sundarajan, Mr.Saravanan from Chennai PUCL. Presence of Mr.A.S.Ravi, Mr.Koodal Bala and Mr.Sankaralingam of Kudankulam on 20 June at Nakkneri was useful. Thanks to them.

# Methodology:

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News reports on the Nakkaneri Offsite Emergency Exercise were collected from the English and Tamil newspapers and magazines. Controversial points related to the event were summarized from them.

An unstructured questionnaire anchored on the scientific facts related to offsite nuclear emergencies was prepared. People of Nakkaneri and the surrounding villages were interviewed using this unstructured questionnaire. Notes were taken by the team members when the interview was on, as well as the whole event was video graphed. The result of the 13 June 2012 work was discussed with the backend team and the inconsistencies in the data collection were appraised based on scientific literature on the topic. These inconsistencies were rectified during the second field visit on 20 June 2012.

In addition to the interviews, written and signed testimonies were obtained from the residents of Nakkaneri village. Written and signed testimony was also obtained from the Nakkaneri Panchayat President. Video testimonies were also obtained from the Panchayat counselor, ward member and the Auxiliary Nurse Midwife of the Nakkaneri village.

Interview was conducted with Mr.S.P.Udayakumar, Convener of People's Movement Against Nuclear Energy (PMANE) that is spearheading the movement against KKNPP, in order to know the group's view point on the Nakkaneri Offsite Emergency Exercise. People of Idinthakarai village (located within the 5 Km zone of the KKNPP site and where PMANE is headquartered) were also interviewed in order to know their knowledge on nuclear emergency preparedness and also to obtain their viewpoint on the offsite emergency exercise conducted at Nakkaneri village.

KKNPP Station Director Mr.R.S.Sundar (the Chairman of the Kudankulam Emergency Committee), Executive Director (Light Water Reactors) Mr.Kasinath Balaji were contacted over phone on 13 June 2012 afternoon and were requested for an interview. Mr.Kasinath Balaji refused to give an interview. However, Mr.R.S.Sundar stated over phone that " On 9 June 2012 the representatives from KKNPP attended the offsite emergency exercise at Nakkaneri village to technically support the district administration, which is responsible for conducting the event. I did not visit Nakkaneri village on that day. The district collector is the director of this offsite emergency exercise and I know that he has the necessary proofs for it<sup>5</sup>. For any more information, you should talk to him."

Dr.Selvaraj, the Collector of Tirunelveli and the Director of the Nakkaneri Offsite Emergency Exercise was approached over phone on 13 June 2012 afternoon. As he did not pick up his phone, his Personal Assistant (General) was contacted over phone. He replied that the Collector cannot meet the team on 13 June 2012 and also that he would be unable to get an appointment with the Collector the next day or any other day. He further said, if at all the team wishes to meet the Collector, it should personally meet him on its own.

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<sup>5</sup> Note: The Chairman of the Kudankulam Emergency Committee he is the leader of the whole operation; it is under his orders the District Collector works as the Offsite Emergency Director.

The team then called Mrs.Rohini Ramadas, Sub Collector, Cheranmahadevi (who led the district administration team responsible for the offsite emergency exercise at Nakkneri) by phone seeking an appointment with her. She replied, "I will not be able to meet you on this issue as the District Collector has released the press note on the event. The press note is our stand and so there is no need to meet me. If you require any further clarification, you should approach the Collector."

The team phoned up the Mr.Subramaniyam, Tasildhar of Radhapuram, who was a part of the district administration that had conducted the offsite emergency exercise and sought an appointment with him. He replied, "When there are so many higher officers above me, it would not be right for me to meet you. You should please approach them first."

On the second field visit day (20 June 2012), the team sent an SMS to the District Collector seeking his appointment and went to his camp office at Tirunelveli. The team waited at the entrance of the Camp Office for half an hour and at last talked to the Collectotr's PA(General) through the intercom. He said the Collector was busy and would not be able to meet the team and directed to approach the Sub Collector, Cheranmahadevi. The team then contacted the Sub Collector, Cheranmahadevi for an appointment for which she replied: " I have already talked to you about our stand. Even if you come and meet me I am going to state the samething. So there is no need to meet me."

As the district officials resisted meeting the team, with a heavy heart, it could use only their press statement as their version of the event.

After the data collection, published literature related to offsite emergency preparedness plans were collected and studied<sup>6</sup>. Nuclear catastrophes like the Three Mile Island, Chernobyl and Fukushima Accidents and their evacuation practices were also studied. Based on these, effort to understand the physical, cultural and economic geography of the offsite area of KKNPP was undertaken. Maps related to them were prepared. Effort to understand the consequence of an offsite nuclear accident in this region was made. Based on this understanding, the Nakkneri offsite emergency exercise is theoretically situated and presented in this report.

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<sup>6</sup> "Arrangements for Preparedness for Nuclear or Radiological Emergency- Safety Guide", IAEA, GS-G-2.1, 2007; "Preparedness of the Operating Organisation for Handling Emergencies at Nuclear Power Plants", AERB Safety Guide No. AERB/SG/O-6, March 2000; "Preparation of Offsite Emergency Preparedness Plans for Nuclear Installations" AERB SG/EP-2 , October 1999; "Role of the Regulatory Body with Respect to Emergency Response and Preparedness at Nuclear and Radiation Facilities", AERB / SG/G-5, August 2000 ; "Program Manual – Radiological Emergency Preparedness", Federal Emergency Management Agency, USA, May 2012; "The Environmental Impact Assessment and Environmental Management Plan for the 500 MWe Prototype Fast Breeder Reactor", MECON Limited, October 2000 – Chapter 8 "Emergency Preparedness Plan" pages 8-1 to 8-20 (See appendix).



# The KKNPP Emergency Planning Zone:

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KKNPP is located in the Radhapuram taluk of the Tirunelveli district of Tamil Nadu. It is a coastal site on the shores of the southern end of Gulf of Mannar. It is barely 20 kilometers away from Cape Comorin.

The United States Federal Emergency Management Agency (FEMA)'s "Program Manual – Radiological Emergency Preparedness" published in April 2012 is the latest and one of the most comprehensive emergency preparedness manuals available globally today. This manual agrees with the AERB code that the 16 kilometer zone around a nuclear reactor should be considered as the "**Emergency Planning Zone**" (EPZ). It states that this zone, called the **Plume Exposure Pathway EPZ**, in which the "plume" from the damaged reactor will be active. However, the manual goes on to state that the radioactive material escaping the reactor has the capacity to reach the human and animal ingestion pathways in an 80 kilometer zone around a nuclear reactor. This, it names as the **Ingestion Exposure Pathway EPZ**. By putting forward the concept of two EPZs, the manual warns that emergency planning should be readied not only for the 16 km zone but also for the places located within the 80 km zone<sup>7</sup>.

It should be noted that the 16 km Plume Exposure Pathway EPZ covers almost the entire Radhapuram taluk of the Tirunelveli district. The 80 Km Ingestion Exposure Pathway EPZ covers the entire Tirunelveli and Kanyakumari districts and a major portion of the Tuticorin district. It also covers the southern portions of Kerala state adjoining Neyyatinkara town.

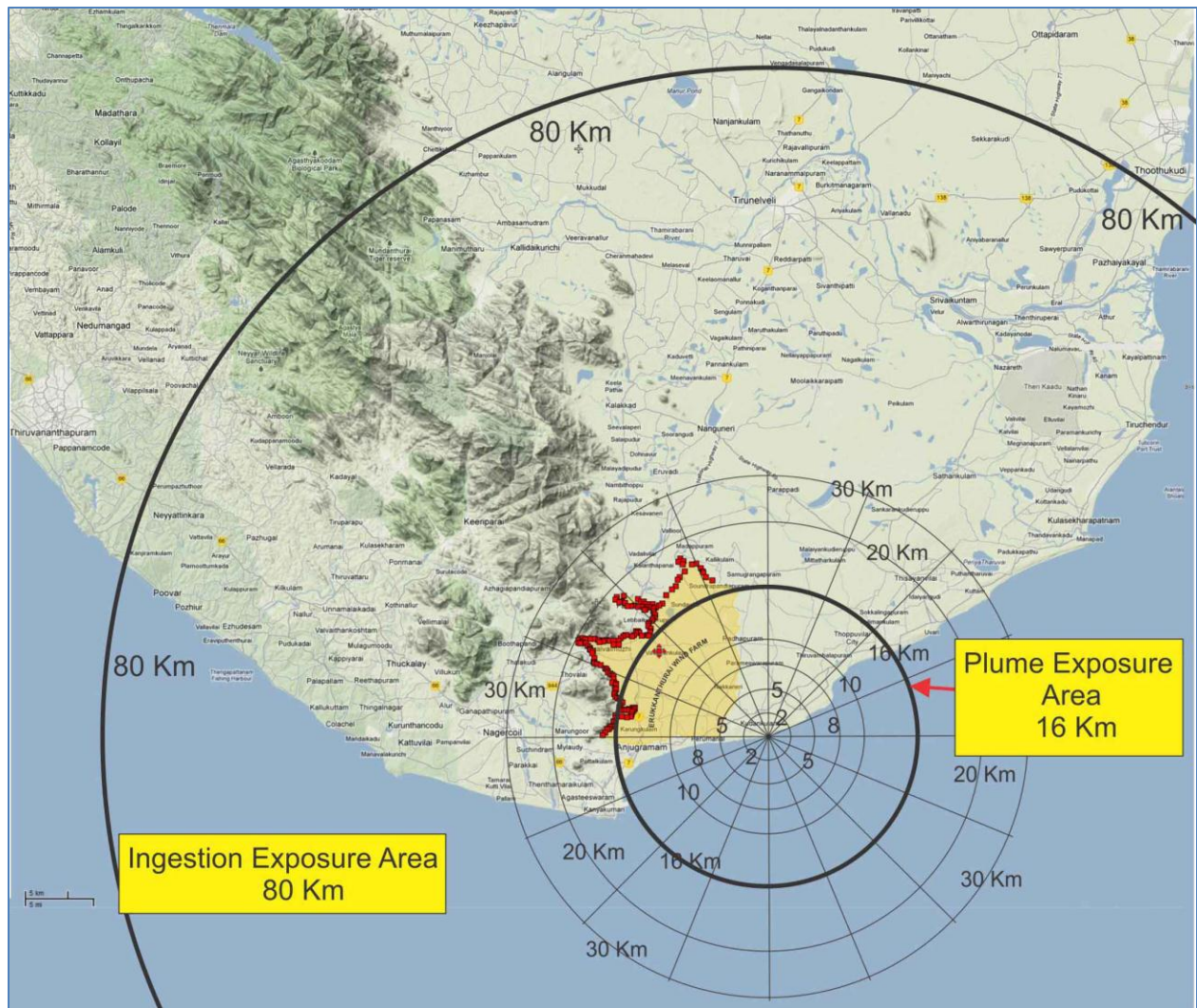
The Thamiraparani and the Kodayar River basins of Tamil Nadu fall in these two Emergency Planning Zones. Also, the entire portion of one of the largest wind farms in India namely the Erukkanthurai (Sankaneri) wind farm having an installed capacity of more than 1000 MWe fall within the 16 Km Plume Exposure Pathway EPZ. Also, the famous Muppanthal wind farm of the Aralvaimozhi pass is located within the 20 Kilometer zone from the reactor site. It should also be noted that the India's largest garnet mining industry is located well within the 20 kilometer zone around the reactor.

Presence of the two large wind farms and the two major river basins of Tamil Nadu make the KKNPP off site emergency planning zone unique.

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<sup>7</sup> *If an accidental airborne release of radioactive material occurs from an NPP, three main pathways exist for a person to receive a radiation dose during the release period: 1) External exposure to the released plume; 2) External exposure from any radioactive material deposited on the ground from the plume; and 3) Inhalation of radioactive material from the plume.*

*After the release stops and the plume dissipates, external exposure from deposited materials and ingestion of materials through the food chain represent the main pathways for a person to receive a radiation dose. Another possible source of exposure would be from inhalation of materials if the ground deposition is resuspended into the air.*  
- "Program Manual – Radiological Emergency Preparedness", FEMA, page 1-13

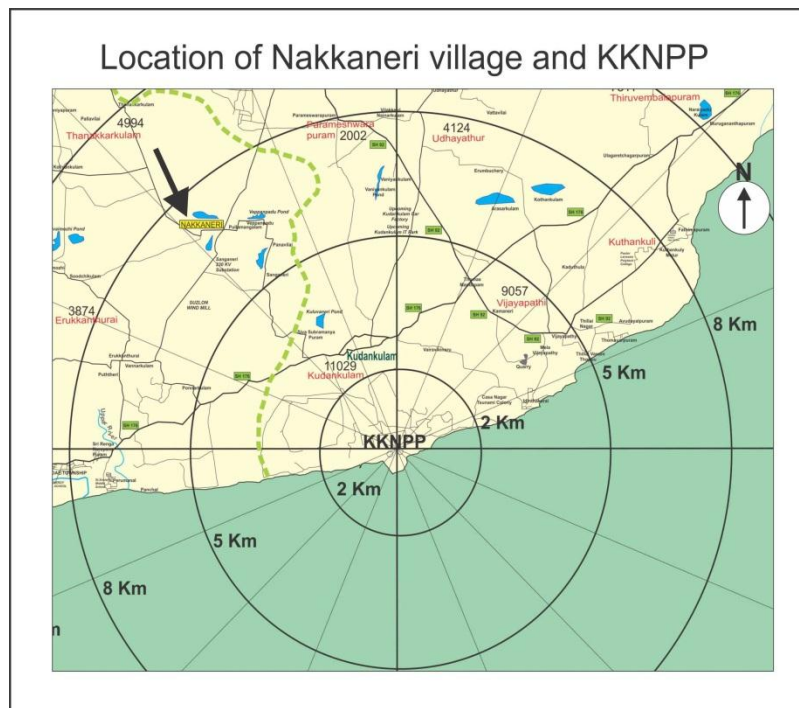


# Nakkaneri Village

Nakkaneri is a small hamlet having just about 150 houses most of which have tiled roofs. About 500 people live there. Almost all of them belong to the Dalit Parayar community<sup>8</sup>. They are manual laborers going for daily wages. Wind mills, farms, construction work, fish related works and the Central Government's 100 day work scheme<sup>9</sup> employ them. Many of them happen to be the descendants of the indentured laborers taken by the British to work in the tea plantations of the Western Ghats and Ceylon. A few houses of big landlords belonging to Reddiar community, who have since become very big traders in Kerala and Tamil Nadu, are also located at Nakkaneri<sup>10</sup>.

The village is situated at a junction where four roads cross each other. It is located on the western side of the junction. It has a middle school. It also has an Amman Temple<sup>11</sup> for which the annual festival is celebrated in the months of July-August (Aadi). The hamlet located on the eastern side of the junction is called Pullamangalam, also having about 150 houses. Both these villages are parts of the Thanakkarkulam Panchayat revenue village. The North-South road connects Radhapuram with Anjagramam. The East-West Road connects Kudankulam with Vadakkankulam.

Nakkaneri is thus located on one of the two roads (the other being the State Highway 176 between Levinchipuram and Thiruchendur) through which the workers of KKNPP can be evacuated.



<sup>8</sup> People belonging to Konar, Reddiar, Nadar and Maravar Castes also live here; but they are a minority.

<sup>9</sup> Under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)

<sup>10</sup> For example, the houses of the owners of Seematti Textiles, Aryas Hotels

<sup>11</sup> Mutharamman Temple

The village is surrounded by wind turbines. A 230 KV substation, dedicated for wind turbines and Suzlon's 715 MW Sankaneri windfarm<sup>12</sup> are located at the southern outskirts of Nakkaneri.



Mrs.Vijayalakshmi, is the Thanakkarkulam Panchayat President. Mrs.Esakki Ammal is the member elected from the Nakkaneri Village. Mr.Suyambulingadurai, is the Counsilor of the 8<sup>th</sup> Ward of the Valliyur Panchayat Union; Nakkaneri falls under this council.

The residents of Nakkaneri, since almost all of them are daily wage earners, leave for work at about 9 am and return only by 5 pm. The village looks deserted during this period. Only very old and disabled people and children can be seen in the houses during this period. Only during times of local festivals, people can be seen in the village at this time period of the day.

However, since it is located in a four road junction, and a bus shed along with a few tea shops are also located there, one can see travellers and youngsters sitting at the bus sheds and the tea shops almost at all times of the day. The junction also has an auto rickshaw stand. So, the tea shop owners, auto rickshaw drivers and the ones who are sitting in the bus waiting sheds are a ready source of information about the events that happen in the village.

On 13 June 2012, the PUCL team reached Nakkaneri village at 10 am. One of the villagers was dead that morning and so most of the residents were at home to attend the funeral. So, even at that odd hour, when during the normal days one can find only children and old people, the team could meet a few residents and obtain their video testimonies regarding the offsite emergency exercise that was said to have been conducted on 9 June. Apart from them, the tea shop owners at the road junction, the auto drivers and also the travellers waiting at the bus shelters were ready to give their video testimonies. On 20 June 2012, the team visited the village for the second time. During this visit, it met the Panchayat

<sup>12</sup> "Suzlon Energy Limited – FY12 Earnings Presentation, 25<sup>th</sup> May 2012", page - 31

President and obtained a video interview and also a written testimony from her at her home at Koliyankulam. Besides this, an interview was conducted with the Counsilar of the 8<sup>th</sup> Ward of the Valliyur Panchayat Union. The interview was video graphed. The team also met Mrs.Manonmani, the village health nurse of the Nakkaneri village and the interview with her was also video recorded.

# Offsite Emergency Exercise conducted at Nakkaneri Village:

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## Press Releases and Reports:

A short press release by the District Collector (the Director of this off site emergency) following the event stated:

*“Today, early morning the shift charge engineer declared a Plant Emergency and subsequently the Site Director reached the plant, declared start of Site Emergency Exercise. Alert messages were sent to all the relevant officials including the NPCIL, DAE, AERB and District Collector and other District Officials. Based on inputs from Environmental Survey Lab team, District Collector declared an “OFF-SITE EMERGENCY” and exercise of counter measures were carried out in three stages, as prescribed in the Emergency Plan. Nakkanery village which is situated at a distance of about 7 km from KKNPP was selected as locally affected area, as per the developed scenario, for the purpose of exercise. The exercise was observed by the representatives from AERB, NPCIL HQ and other officials of NPCIL.”*

A newspaper report the next day elaborated:

*“As the first reactor of the Kudankulam Nuclear Power Project (KKNPP) is ready for receiving enriched uranium fuel rods and the AERB nod expected any time now, the district administration ran the drill to fulfill the IAEA and AERB stipulations.*

*According to Collector R. Selvaraj, the shift engineer of the KKNPP declared a plant emergency early in the morning. Subsequently the Site Director, R.S. Sundar<sup>13</sup>, reached the site to declare the beginning of the ‘site emergency exercise.*

*All associated departments, including the Nuclear Power Corporation of India Limited, Department of Atomic Energy, Atomic Energy Regulatory Board and the District Collector, who will be the offsite emergency director during the crisis, were alerted.*

*After declaring emergency, the Collector reached the Anu Vijay township at 9.30 a.m. to occupy the offsite emergency control room along with Deputy Inspector-General of Police, Tirunelveli Range, V. Varadharaju, and Superintendent of Police Vijaendra S. Bidari to coordinate the exercise.*

*On receiving instructions from the offsite emergency director, men and material from the departments of Police, Transport, Revenue, Fire and Rescue Services, Health Services, Public Works, Agriculture, Fisheries and Animal Husbandry were mobilised at Nakkaneri where Sub-Collector*

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<sup>13</sup> Note: Station Director of KKNPP is the Chairman of the “Kudankulam Emergency Committee”. (Source: “Emergency Preparedness Plan”, “EIA/EMP for the 500 MWe PFBR Site”, Chapter 8, October 2000,

*Cheranmahadevi, Rohini Ramdas and Deputy Superintendent of Police Valliyoor N.K. Stanley Jones camped to coordinate the government agencies participating in the drill and guide the residents.*

*Even before the officials could arrive at the spot, the Environment Survey Laboratory vehicle of the KKNPP gauged the wind direction, wind velocity, possible spreading of radiation, level of radiation in various areas around KKNPP. The data was immediately conveyed to the Collector at Anu Vijay Township to enable him issue proper instructions to various teams formed in the wake of the crisis.”<sup>14</sup>*

Another newspaper reported:

*“This exercise went on for four hours. NPCIL Chairman Purohit, Light Water Reactor CMD Kasinath Balaji, Kudankulam Station Director Sundar were present at Anu Vijay Nagar in the Offsite Emergency Control Room along with the Indian and Russian scientists.... The exercise was conducted on behalf of the village panchayat, district administration and government departments under the leadership of the district collector Selvaraj. District SP Vijayendra Bidari and District Revenue Officer Uma Maheshwari also participated.... Police vehicles, riot control vehicles, ambulances, vehicles from Fire, Health departments and emergency evacuation vehicles from Home department were brought; Disaster preparedness training was given to about 500 people. As the first part of the training, workers and engineers were evacuated from the reactor site; following this, village people were asked to go into their homes and shut the windows and doors, and vacate the houses to safe places outside the village after hearing the announcement from the authorities, and consume iodine tablets in the due process.”<sup>15</sup>*

However, there were other magazine reports that said no such training was given to the Nakkaneri village people on that day:

*“When the officials came to the village on that day, most of its residents have gone out for their daily work. Those who were present at homes were only a few women and children. The officials talked to them for an hour and left. “They talked to the people about the prevailing dengue fever, the projects that are necessary for their village”, said the village panchayat president. When the people were enquired about the event, they said that the officials had told them that “consuming a little iodine tablets will protect them from radiation”. This is the essence of the offsite emergency training given at Nakkaneri village.”<sup>16</sup>*

People’s Movement Against Nuclear Energy (PMANE), the group that spearheads the anti Kudankulam struggle stated in its press release on 10 June 2012:

*“Why was Nakkanery village with hardly 300 people chosen for this absurd drama when Koodankulam, Idinthakarai, Vairavikinaru, Chettikulam, Sriranganarayanapuram, S.S.Puram, Perumanal and Koottapuli with thousands of people are much closer to the nuclear plant? Is Nakkanery chosen because most of the daily wage laborers would have gone to work and there would be hardly 100 illiterate women and infants at Nakkanery during the drill and they could be easily manipulated? If 100 Nakkanery villagers are trained, how do millions of other people in*

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<sup>14</sup> “Offsite Emergency Exercise Conducted near Kudankulam Site”, The Hindu, 10 June 2012

<sup>15</sup> Malaimalar, 10 June 2012

<sup>16</sup> Kalki, 16-6-2012

*the 16 km or 30 km radius and beyond get the necessary information and experience to face a nuclear disaster? If the Collector claims in the Press Release dated 9.6.2012 that “exercise of counter measures were carried out in three stages, as prescribed in the Emergency Plan” how come the Press Release does not even list the “three stages”? Is it because the authorities want to hide the stages from the larger public and keep us all in continued ignorance and avoid any further debate? If “the Emergency Preparedness Plan (EPP) Manual of KKNPP-1&2 has been reviewed/concurred/approved as appropriate by AERB and District Authorities...in June 2011” (according to Mr. R. Bhattacharya of AERB in his letter No. AERB/SEC/46/2012/1643 dated April 17, 2012) why did the Collector, Dr. R. Selvaraj, IAS, not give us a copy of the emergency manual when Dr. S. P. Udayakumar of PMANE applied for it under RTI on April 2, 2012? Why did the Collector’s PA (General) forward that RTI request to the Public Information Officer at KKNPP, Koodankulam for suitable reply? Why haven’t we received a copy of the Manual even after writing to the Assistant Public Information Officer, KKNPP? According to the Collector’s Press Release, the “exercise was observed by the representatives from AERB, NPCIL HQ and other officials of NPCIL.” Why were the local public representatives such as MP, MLA, local civil society members, prominent citizens and the local media not invited? Why was the whole exercise a quick and hush-hush affair that lasted only for an hour? Do nuclear disasters affect a large area around the plant or just one or two specific villages? How come the exercise is carried out in an isolated village and not throughout the project affected area?”<sup>17</sup>*

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<sup>17</sup> “The Absurd “Offsite Emergency” Drama and Unanswered Questions”, PMANE, 10 June 2012



# Questions formulated for N-FFM

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1. What happened on 9 June 2012 at Nakkaneri village? When did the officials arrive and leave? Who were the officials and from which departments? What did they do? How did they interact with the Nakkaneri people? Did they go to Pullamangalam? Apart from interacting with the people, did they conduct any other work? What were the places in the village and the area the officials went?
2. Were the people of Nakkaneri informed about a nuclear emergency at KKNPP? Were they informed that the officials are here to train them to protect themselves from the consequences of the accident?
3. Were they asked to remain indoors with the windows and doors of their houses shut? Were they provided with Iodine tablets? Were they asked not to consume the locally available water and vegetables grown locally and the locally available milk? Were they provided with water, food and milk brought from elsewhere? Were they told to come out of their houses after sometime and asked to board buses in order to get evacuated? Were they assured by the officials that their belongings at their homes would be safeguarded by the Police during the period they remain evacuated? Was there any water Lorries sprinkling water over vehicles or other structures? Did they see anyone carrying some machine in their hands that was giving clicking sounds? Were they taken to any hospital (at Radhapuram, Vadakkankulam, Valliyur or Nagarcoil) for treatment?
4. What was the wind like on that day? What was the direction of the wind when the officials arrived? Were the wind turbines operating when they came? Were the wind turbine operators asked to mechanically lock them, as they would complicate the radioactive plume dispersion?

## List of the testimonies obtained from the people of Nakkaneri

No	Name	Designation	Residence	Date/Place of Interview	Type of record obtained
1	Mrs. V.Vijayalakshmi / 29 yrs	President, Thanakkarkulam Panchayat	6/29, Indira Nagar, Koliyankulam	20 June 2012/ House, Koliyankulam	Written, Signed Testimony with office seal / Video Record of the Testimony
2	Mrs.Esakki ammal / 40 yrs	Member / Ward 8, Nakkaneri Village	5/86, Nakkaneri - Pullamangalam	20 June 2012 / House, Nakkaneri - Pullamangalam	Written, Signed Testimony / Video Record of the Testimony
3	Mr.Suyambulinga durai	Union Councilor – 8 <sup>th</sup> Ward – Valliyur (Nakkaneri falls under his council)	Sivasubramanya puram	20 June 2012 / House of Mrs.Vijayalakshmi, Panchayat President, Thanakkarkulam	Video Testimony
4	Mrs. Manonmani	Village Health Nurse (incharge of Nakkaneri)	Koliyankulam	20 June 2012 / Anganwadi building, SS Puram	Video Testimony
5	Mr.U.Balasubramaniyam, 47 yrs	Document writer, Radhapuram	Nakkaneri	20 June 2012, Tea Shop, Nakkaneri Junction	Written, Signed Testimony / Video Record of the

					Testimony
6	Mr.H.Ayyappan, 31 yrs	Auto Driver, Nakkaneri Junction	Nakkaneri	20 June 2012, Bus waiting shed, Nakkaneri Junction	Written, Signed Testimony / Video Record of the Testimony
7	Mrs.V.Selvi, 48 yrs, w/o (Late) Mr.Veerabadran	Tea Shop Owner, Nakkaneri Junction	Nakkaneri	20 June 2012, Ather Tea Shop, Nakkaneri Junction	Written, Signed Testimony / Video Record of the Testimony
8	Mr.E.Chellaya, 64 yrs, s/o Mr.Eanamuthu	Farm Laborer, Nakkaneri	Nakkaneri	20 June 2012, At his home, Nakkaneri	Written, Signed Testimony
9	Mr.Velu, 50 yrs, s/o Mr.Sudalai	Tea Shop Owner, Nakkaneri	Nakkaneri	20 June 2012, At his Tea Shop at Nakkaneri Junction	Written, Signed Testimony / Video Record of the Testimony
10	Mr.R.Arunachalam, 46 yrs., s/o Mr.Ramadas	Manual Laborer, Pullamangalam village	Pullamangalam	20 June, At Tea Shop, Nakkaneri Junction	Written, Signed Testimony / Video Record of the Testimony
11	Mrs.Bhavani, 45 yrs	Manual Laborer, Nakkaneri	Nakkaneri	20 June, At her home	Video Testimony
12	Mrs.Sellamma, 75 yrs	Not Working, Nakkaneri	Nakkaneri	20 June, At her home	Video Testimony

13	Mrs.Bhuvaneshwari, 38 yrs,	Manual Laborer, Nakkaneri	Nakkaneri	20 June 2012, At her home	Video Testimony
14	Mr.Arumugam, 82 yrs	Not Working, Nakkaneri	Nakkaneri	20 June 2012, At his home	Video Testimony
15	Mr.E.Subbayya, 52 yrs, s/o Mr.Esakkimuthu	Manual Laborer, Nakkaneri	Nakkaneri	13 June 2012, At Nakkaneri Junction Bus Waiting Shed	Video Testimony
16	Mr.Nasareyan, 50 yrs	Fisherman, Nakkaneri	Home at Nakkaneri Junction	13 June 2012, At his home	Video Testimony
17	Mrs.Anthoniammal, 80 yrs, m/o Mr.Nasareyan	Not working	Home at Nakkaneri	13 June 2012, At her home	Video Testimony
18	Mr.Nayinar BSc., 32 yrs,	Farming, Pro Nuclear	Nakkaneri	13 June 2012, At Nakkaneri village roadside	Video Testimony
19	Mr.K.Suparaj, 24 yrs,	Manual Worker Nakkaneri	Nakkaneri	13 June 2012,At Nakkaneri village roadside	Video Testimony
20	Mr. Paramasivam, 48 yrs,	Manual Worker, Nakkaneri	Nakkaneri	13 June 2012, At Nakkaneri village roadside	Video Testimony
21	Mr.Bebujana Perumal, 68 yrs	Not Working	Nakkaneri	20 June 2012, At his home	Video Testimony
22	Mrs.Mallika, 65 yrs	Not Working	Nakkaneri	20 June 2012, At the Nakkaneri village roadside	Video Testimony

# Summary of the testimonies obtained

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1. The respondents (excepting one) were neither pro nor anti-nuclear. One (Mr.Nayinar, 32yrs of Nakkaneri) was pro nuclear. However, his response was the same as the other respondents.
2. All the respondents have made the following unanimous statements:
  - a) The officials did not inform them that they have come to the village to train the people to respond to a nuclear accident at KKNPP. Even the Panchayat President, Panchayat Council representative, member representative of the Nakkaneri village and the Auxiliary Nurse Midwife for the Nakkaneri village were not informed about the event.

“I was not informed anything about this training”, said Esakkiammal, the elected representative of the Nakkaneri village.

“No offsite emergency exercise was conducted in our Panchayat area. I do not know anything about the protective steps that the people of this area should take during a nuclear reactor accident” said the Thanakkarkulam Panchayat (Nakkaneri village falls under this panchayat) President Mrs.Vijayalakshmi.

“No proper training was conducted at Nakkaneri. Proper emergency training involving the people and their representatives so that they can protect themselves should be arranged. Also, the authorities should provide all the equipment necessary for making this real” said Mr.Suyambulingadurai, Union Councilor of 8<sup>th</sup> ward Valliyur Union, under which Nakkaneri village falls.

“I was at Nakkaneri on 9<sup>th</sup> June morning when the officials came. I was applying larvicide in water tanks as a part of dengue prevention. I heard that the health officials had also come. I did not know that the officials have come for an emergency training. Nobody told me about it. Also, I was not asked to distribute the Iodine tablets to the village people... We had been taken to Kudankulam Power Station six months back for training and there we were told about Iodine tablets. But after that we have not been taken there or to store Iodine tablets.... no villager told me that day or the days after, that they were given Iodine tablets by the officials who visited that day...”, said Mrs.Manonmani, the Village Health Nurse, incharge of Nakkaneri village.
  - b) The people of the village, excepting the old and the children, had left for work when the officials came into the village.
  - c) Those who remained at the village junction and at homes were not asked by the officials to go indoors and shut their windows and doors.
  - d) All the respondents (including the people’s representatives) stated that no one had distributed Iodine tablets to the villagers.
  - e) The officials did not ask the people of the village to stop consuming locally available water and vegetables. They did not supply the people with water and food brought from elsewhere.

- f) The officials did not inform the people that they can come out of their houses now and board the buses and get evacuated to a distant predetermined place.
- g) The officials did not inform the people that their belongings would be taken care of by the Government, when they remained evacuated.
- h) In other words, "Training to protect oneself during a nuclear accident" was not given to the Nakkneri people by the district administration on 9 June 2012.
- i) The people of Nakkneri were surprised to know the next day that the officials had come to their village for an offsite nuclear emergency training after seeing the television news stories and the next day's newspaper reports.

3) The villagers who were present at their homes when the officials came to Nakkneri were curious to know the reason for the large entourage of officials visiting their village. The reasons told by the officials did not include "nuclear emergency training". The various reasons shared by the officials to the villagers as narrated by them are as follows:

- a) "We have come here to know your requirements. We will be sanctioning the road for the village soon" said the officials. (Mr.Bebujana Perumal, 68 yrs, Nakkneri, Video Testimony)
- b) "When I asked the two policemen standing a little away from my house and photographing the road the reason for their presence I was asked by them to go away. So I had to leave them without getting an answer.... When I went to the next street I saw two policemen again photographing the empty road; I asked them the same question and they said they have come here for sanctioning the road. When I replied that "the road laying is the job of the Panchayat, why is that the police is involving itself in this?".... they asked me to go away. So I had to move away again". (Mr.Arumugam, 82 yrs, Nakkneri, Video Testimony).
- c) "The officials did not talk to us. We thought that they had come for sanctioning the village road. My son approached them and requested them that they should provide us adequate drinking water facilities. " (Mrs.Mallika, 65 yrs, Nakkneri, Video Testimony).
- d) "We were inside the house when the police came. We were curious to know as to why such a large number of police persons have come into the village. Nobody explained. I thought that they should have come here for surveying for a new road that will go towards Kudankulam. I thought we would be asked by the Government in the future to clear our houses and make way for the new road." (Mrs.Sellamma, 73yrs, Nakkneri, Video Testimony).
- e) "When I asked the police people why they have come, they said, we have come here for your security. They did not explain any further." (Mrs.Anthoni ammal, 80 yrs, Nakkneri Junction, Video Testimony).

4) What happened on that day?<sup>18</sup>

- f) "40-50 police persons along with other officials had come at about 9.30 in the morning. Many came to my tea shop to have tea and vadai. However, they did not tell me anything about the training for which they had come." (Mrs.Selvi, 48 yrs, Tea Shop Owner, Nakkaneri Junction).
- g) "About 40-50 police people and many officials arrived at the Nakkaneri junction at about 9.30 to 10 in the morning. Traffic police was also present. Barricades were set up in the Radhapuram - Anjugramam road and the vehicles were checked as they usually check on roads. They did not carry any specific instruments. Then the sub collector madam came. They went inside the Nakkaneri village. I heard that they were taking photos. They came out through the Thanakkarkulam road. They were speaking to themselves. They did not speak to any one of us. They left the place by about 12 o'clock." (Mr.H.Ayyappan, 31 yrs., Auto Driver, Nakkaneri Junction, Video Testimony)

5) Why was Nakkaneri chosen for the offsite emergency training exercise? – Valliyur Union Councilor's view:

- h) "We know why they chose Nakkaneri village. The population there is low. Most of the people leave their homes for work in the morning itself. The one who stays back at home will usually be an old member of the family. Children would have left for school. Men and women would have gone for farm, wind mill or Government's So there will be no one in the village when the officials come by 10 o'clock. Supposing they had chosen my village (SS Puram) for this exercise....If there are 600 houses, at least 300 houses will have its inmates in the daytime. So that would not be conducive for them." (Mr.Suyambulingadurai, Union Councilor – 8<sup>th</sup> Ward – Valliyur - Nakkaneri village falls under his council).

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<sup>18</sup> It was stated by a few respondents that the District Collector Mr.Selvaraj had visited the village on 8 June 2012 evening. However, he did not talk about the emergency training to be conducted in the village the next day. He was seen discussing about laying a road for the village.

# Reconstruction of the event from the testimonies of the people of Nakkaneri

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“At about 9.30 – 10 o’clock in the morning of 9 June 2012 a group of 40-50 policemen, officials including the subcollector came to Nakkaneri. The policemen that included the traffic police formed a barricade in the Radhapuram –Anjugramam road. Then they started checking the vehicles that were passing. The vehicle checks was conducted in the usual way as they check anywhere else. They did not carry any specific equipment. (H.Ayyappan, Auto Driver, Nakkaneri Road Junction; Selvi, Tea Shop Owner, Nakkaneri Road Junction; Velu, Tea Shop Owner, Nakkaneri Junction). The elected representative of Nakkaneri - Esakkiammal, Panchayat President Vijayalakshmi, Valliyur Councillor Suyambulingadurai were informally aware of the officials visiting the village. However they were neither informed about the purpose of their visit nor were invited to accompany them. (Esakkiammal, Vijayalakshmi, Suyambulingathurai testimonies).

The officials and a few policemen went into the Nakkaneri village. They came out of the Thanakkarkulam road after sometime (H.Ayyappan). Some of the policemen went to the teashops at the road junction and consumed tea and vadai. They were talking about some robbery in the nearby village. They did not tell the people in the teashop or its owner that they had come to train them for an offsite emergency preparedness plan for the KKNPP (Selvi).

They were asked by the people living in houses located at the junction about the cause of their visit. They replied to them that they had come for providing them safety. They however did not reveal that they had come for the offsite emergency exercise. (Anthoniammal, Old woman at the house located at Nakkaneri junction).

The village has about 150 houses with about 500 people. Most of them belong to the Dalit Parayar Caste and are manual laborers working in wind mills, farms, fish work, construction work and central government’s 100 day work program. They leave the village for work by 9 am and return by 5 pm. So, when the officials and policemen came to the village at about 9.30-10 am, almost all the people excepting the very old men and women have left for work. The village was literally empty. (Balasubramaniyam, Arumugam, Selvi).

However the few elders present at homes were curious to know the reasons for the officials’ visit. They were deeply frightened about the presence of a large number of policemen, some of whom were found taking photographs of the empty road. They had felt that these officials had come to survey the village in order to make way for a large road that will go to Kudankulam. (Sellamma).

While at the main road of the Nakkaneri hamlet, the policemen and the officials were talking only among themselves. They did not interact voluntarily with the old people who were present. Some of the policemen were seen taking photos at a few places of the village. They were seen taking photos of the empty village road with no people around. The men and women enquired them the reason for their



presence. They either did not answer and chased them away or they said they have come to sanction the roads for the village. When one old man, on hearing this reply said, why should the police be entrusted with laying of roads when in fact it was the duty of the Panchayat, he was immediately chase away. (Arumugam, old man, present at his house when the officials and policemen came to the village).

The village health nurse Mrs.Manonmani was present in the village when the officials had come. She was applying larvicide in water tanks as a part of prevention of the mosquito that is responsible for dengue fever. However, she was not informed about the officials' visiting the place. She heard from the people that the health officials had also come. She was not called by the officials to accompany them. Even though the Kudankulam Power Plant officials had given training and had told them about the importance the Iodine tablets, she was not asked by them or others that she should have a stock of them. She also said that the villagers were not distributed with Iodine tablets." ( Manonmani, VHN).

# Wind at Nakkaneri – The heart of the controversy

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## ESL's act of black comedy:

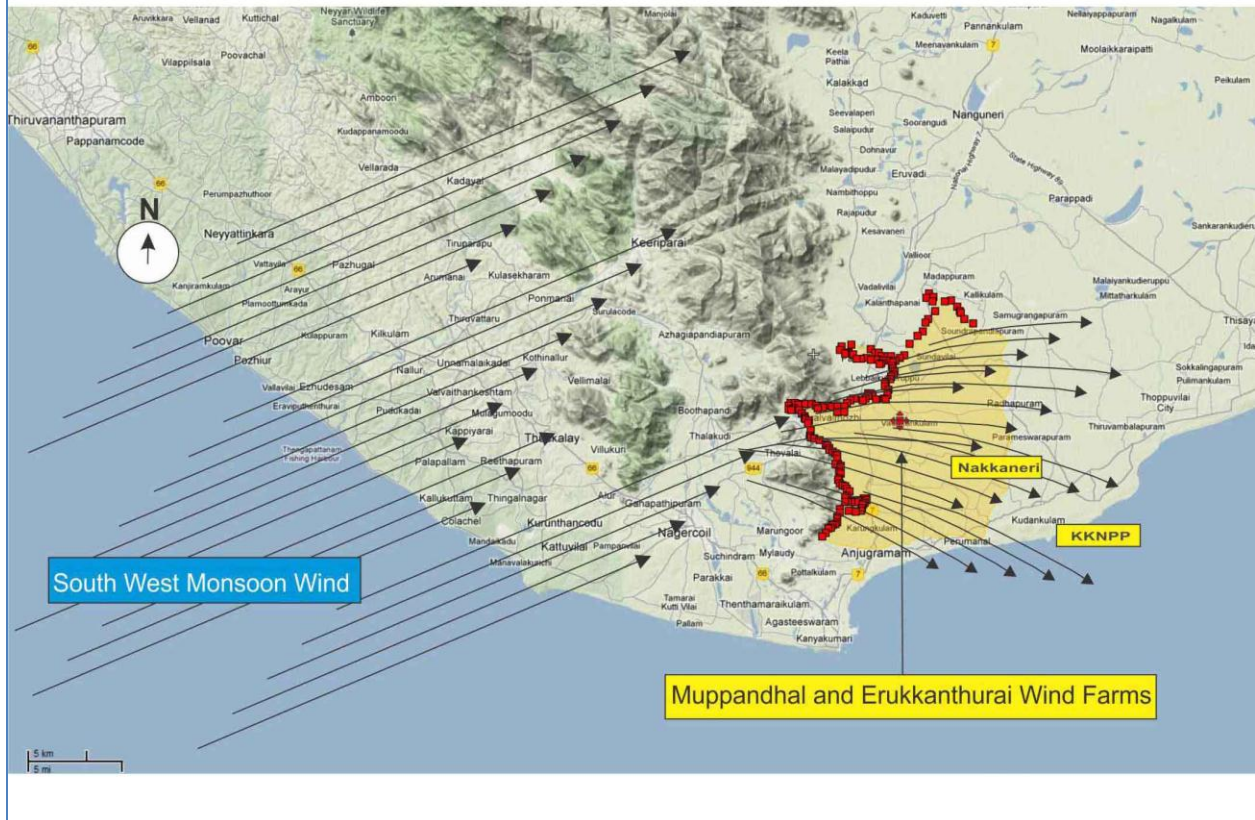
*“Even before the officials could arrive at the spot, **the Environment Survey Laboratory vehicle of the KKNPP gauged the wind direction**, wind velocity, possible spreading of radiation, level of radiation in various areas around KKNPP. The data was immediately conveyed to the Collector at Anu Vijay Township to enable him issue proper instructions to various teams formed in the wake of the crisis.” – The Hindu, 10 June 2012*

*“**With the setting of the much awaited westerly winds**, sweltering heat and power cuts have almost vanished to a great extent in Tirunelveli and the neighbouring Kanyakumari district. **The giant metallic turbine blades of nearly 3,000 windmills of Muppandal have started rotating** to generate clean and green energy to effectively bridge the gap between demand and supply. **Though the installed capacity of the wind turbines here is around 1,500 MW, the wind mills generated only 320 MW on June 1 as the wind velocity had not reached the optimum level. With the wind gaining momentum every day, power generation gradually rose to 675 MW on June 6 and 839 MW on Thursday (June 7) to obliterate the unscheduled power cuts.**“*Though we expected this level of generation only after June 15, the quantum of power generation from the wind turbines of Muppandal during the first week of June itself is quite encouraging.” - The Hindu, 8 June 2012**

The South West Monsoon for the year started blowing from 29 May 2012. The wind blows from South West to North East for the next three months. The wind farms located in the southern tip of India and Tamil Nadu, namely the Muppandal and the Erukkanthurai Wind Farms, generate maximum electricity during this period.

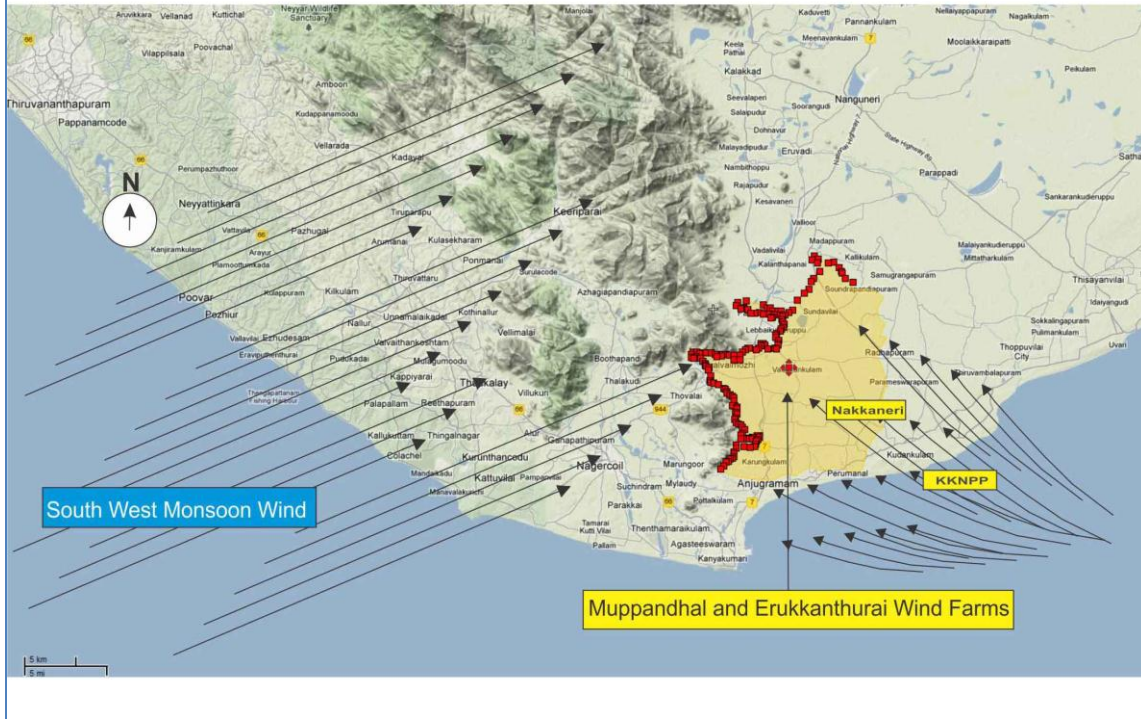
The Muppandal wind farm is located in the Aralvaimozhi pass that has a width of 3 kilometers and a length of about 5 kilometers. This pass is bounded by the Mahendragiri peak (3500 feet) in the north and a mountain peak having a maximum height of 2652 feet in the south. Westerly and South westerly monsoon winds that blow in the period between June and September months hit these mountains from the west and get themselves funneled toward east and south east. The topography of the Aralvaimozhi pass thus causes a change in the wind direction. The wind that was westerly and south westerly till it hit the Mahendragiri mountains, changes its direction to become predominantly north westerly from the Aralvaimozhi pass. The physical structure of the pass causes a lot of wind turbulence and the wind direction while it remains predominantly north westerly in direction, sometimes become westerly or even north easterly. It should be noted here that the Erukkanthurai wind farm that is located in the south east direction of the pass receives this north westerly wind blowing from the pass during the June – August period. It should also be borne in mind that both these wind farms are located within the 20 kilometer zone of the KKNPP.

## Usual Wind Direction in the June-August period

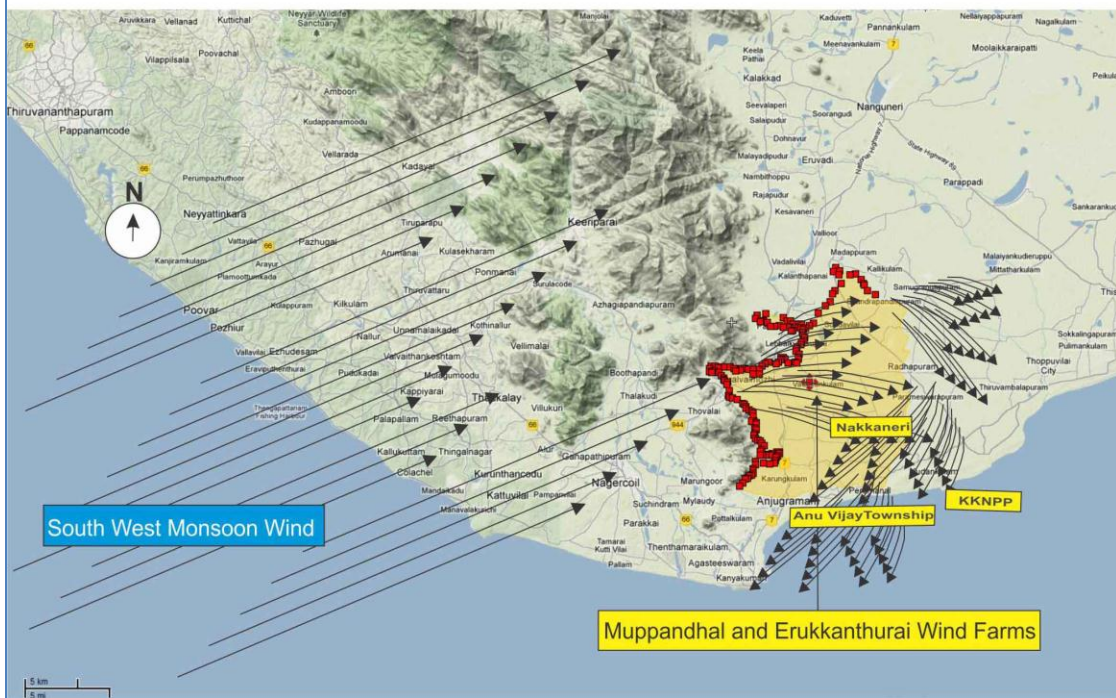


Now about the wind direction on 9 June 2012 morning, when the offsite emergency exercise was 'reported' to have been conducted at the Nakkaneri village: The first point to be noted here is that this village is located south east of the Aralvaimozhi pass and northwest to the KKNPP. Hence, the wind that day should have been blowing from the north west to south east direction. This is vouched by the newspaper report dated 8 June 2012. However, a small discrepancy was noted in this finding when an informal enquiry with the centers that record the wind direction in the area was conducted to know the exact wind direction on 9 June 2012 morning; instead of the assumed north west to south east direction, it was north east to south west direction, that is, the wind was north easterly that day. However, the Environment Survey Lab of KKNPP had claimed that the wind on 9 June 2012 morning was blowing from the South East to the North West direction. Because of this claim, it had to announce that the Nakkaneri village was in the downwind direction and hence an offsite emergency exercise had to be conducted there. However, in reality, it was Anu Vijay Township [located at about 8 kilometers south west of KKNPP where the District Collector along with NPCIL Chairman Purohit, Light Water Reactor CMD Kasinath Balaji, and the Kudankulam Station Director Sundar had formed the Offsite Emergency Control Room to direct the offsite emergency exercise] that was in the downwind direction and need to be evacuated.

### Wind Direction on 9 June 2012 morning, as claimed by ESL, KKNPP



### Wind Direction on 9 June 2012 morning\*



\* obtained through informal enquiry at the wind recording stations in the area

This is a point that has to be discussed in depth as this is concerned with the scientific and technical competency of the ESL, KKNPP to implement its professional duties.

### **Windmills around Nuclear Reactors and the possible complications during an Offsite Nuclear Emergency:**

A detailed literature survey has revealed that the possible complications to an offsite nuclear emergency due to the wind mills located around the nuclear reactors have not been taken up for study anywhere in the world so far. However, the issue is very real. The rotating blades of the wind mills have the capacity to disperse the radioactive plume released from the damaged reactors into the local environment. Any offsite emergency exercise conducted for a nuclear reactor located in a wind farm region has to start by informing the windmill operators to mechanically lock their turbines – as they have the capacity to disperse the radioactive plume into the local micro environments. The Nakkneri offsite emergency exercise did not consider this issue.

KKNPP construction began in the year 2002. The erection of the numerous windmills in the Erukkanthurai Windfarm (or Sankaneri Windfarm) region had gained momentum only after 2004. The installed capacity of one single operator namely Suzlon at the Erukkanthurai region is 715 MW in May 2012. The total installed capacity of the windmills in the 20 km zone around KKNPP would even cross 2000 MW.

KKNPP's Environmental Impact Assessments for the 1-2 as well as the 3-4 reactors have not mentioned anything about the presence of the windmills in the region and their capacity to complicate an offsite nuclear emergency. The Emergency Preparedness Plan (EPP) that is said to have been prepared by the AERB and the Tirunelveli district administration in June 2011 should thus be scrutinized based on this very real issue.

In the event of evacuating the 16 km zone (or 20 km zone as happened in Fukushima, or 30 km zone as happened in Chernobyl) for a few years, it should be noted that all the windmills in this region should be mechanically locked and be abandoned as no one can remain in the evacuation zone to operate or maintain them. The loss due to this abandonment should also be factored in the Emergency Preparedness Plan. Hence, it becomes necessary to critically evaluate the already prepared EPP. The EPP should therefore be kept in the public domain for an unbiased, open review.

# Findings of N-FFM:

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1. The press note dated 9.6.2012 of the Tirunelveli district administration stating that “during the offsite emergency exercise conducted at Nakkaneri village, the exercise of counter measures were carried out in three stages, as prescribed in the Emergency Plan” was indeed a **lie**.
2. The whole event has revealed that the Kudankulam Emergency Committee (that includes the Tirunelveli district administration) was not serious about the exercise to be conducted and treated the entire EPE in a token manner unmindful of the consequences on people’s safety if an emergency does actually take place. The actual performance of the officials mandated to discharge their roles during the EPP raises serious doubts about whether they have the necessary skills to scientifically respond to an offsite nuclear emergency. What is worrying is that they had no intention of educating the people living inside the Emergency Planning Zone of protective measures in the event of a nuclear accident.
3. The Offsite Emergency Preparedness Exercise (EPE) ‘reported’ to have been conducted for the Reactor 1 of KKNPP at Nakkaneri village had not followed the stipulated guidelines of AERB, IAEA or any other nuclear regulatory agency around the world.
4. It is clear that on the 9<sup>th</sup> of June, 2012, first policemen and then in late morning some revenue officials led by Sub-Collector, Cheranmadevi visited Nakkaneri village. All the local villagers reported in unequivocal terms that not one of the officials explained to villagers about the conduct of EPE and they came to know only from next days’ newspapers / media.
5. Medical personnel have not been readied or trained on how to respond at times of Emergency. Hospital facilities for about two lakh people living in the 16 kilometer Emergency Planning Zone is minimal. In the event of a nuclear accident, the present health infra-structure will not be able to protect the population effectively.
6. Specific emergency shelters to be used by the population during the offsite emergency in the 16 kilometer zone have not been identified at all. Road conditions in most parts of the 16 km zone is not adequate. Villages like Sivasubramanya Puram (11 km northwest of KKNPP) do not have the bridge over Hanuman Nathi/river making evacuations difficult during monsoons/floods.
7. The meteorological input provided by the Environment Survey Lab (ESL) of KKNPP which is said to have guided the purported Offsite Emergency Exercise at Nakkaneri village seems to be a faked one. The professional competence and the ethical base of the ESL are questionable.
8. The complications to an offsite nuclear emergency from the windmills have not been considered by the district administration, DAE, NPCIL and the AERB.
9. The district administration, DAE, NPCIL and the AERB (in other words the Kudankulam Emergency Committee) have all colluded in promoting a lie to the people of India that an emergency preparedness

exercise was conducted successfully conforming to all the necessary national and international norms, when in fact no such exercise was conducted by them in the first place. This is an outright illegal activity that attempts to make a mockery of constitutional values and rule of law.

# Recommendations:

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1. The Governments of India and Tamil Nadu should declare the Offsite Emergency Preparedness Exercise 'reportedly' conducted on 9 June 2012 at Nakkaneri village as null and void.
2. The Kudankulam Emergency Committee (comprising officials of the district administration, DAE, NPCIL and the AERB who were part of the 'reported' offsite emergency exercise at Nakkaneri) has made a false statement about compliance with mandatory provisions of the EPE and thus has played with the lives of the people. A judicial enquiry need to be ordered forthwith and the officials should be brought under justice.
3. The professional capacity of the ESL team of KKNPP is now under question. The ESL team that declared Nakkaneri village wrongly as the one located in the downwind direction and failed to identify and declare the real downwind area requiring emergency evacuation, should be departmentally and legally prosecuted
4. The role of the members of AERB in making this fake drama possible should be investigated. If found guilty, they should be punished.
5. A health infra-structure setup within the 16 kilometer Plume Exposure Emergency Planning Zone which has the capability to protect the people from nuclear accidents should be established immediately.
6. Specific emergency shelters to be used by the population during the offsite emergency in the 16 kilometer zone should be declared openly. Also, the condition of the road in the 16 kilometer zone should be improved immediately.
7. The Emergency Preparedness Plan (EPP) based on which it was 'reported' by the district administration that the Nakkaneri offsite emergency exercise was conducted, should be placed in the public domain immediately. Any future offsite emergency preparedness exercise in the area should be fair and open and should not be permitted without making this EPP publicly available.
8. A critical review of EPP with the idea that the windmills around the nuclear power plant have the potential to complicate offsite nuclear emergencies should be conducted.
9. After a thorough review of the EPP, fresh offsite emergency preparedness exercises should be planned based on the revised EPP. These exercises should be given to all the villages located within the 16 Km Plume Exposure Emergency Planning Zone. Emergency Preparedness Plans should also be prepared for the 80 Km Ingestion Exposure Emergency Planning Zone. Training the people living in this zone to cope with a nuclear emergency is also a must.
10. Extensive media awareness programs regarding the emergency exercises should be conducted by the operator of the reactor before it is given the license to operate.
11. Local elected body, local civil administration and the people should be involved fully in the monitoring, planning and implementation of the offsite emergency exercises.



12. AERB should desist from giving the license for the loading of the first reactor of KKNPP with uranium fuel rods till all the above recommendations are met.

# Annexure:

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1. Written Testimonies of the Nakkaneri people
2. Video Testimonies of the Nakkaneri people
3. “Emergency Preparedness Plan” for Kalpakkam” – EIA/EMP for 500 MWe PFBR Reactor, Oct’2000 – pages 8-1 to 8-20
4. Photos

## Annexure 3

# EMERGENCY PREPAREDNESS PLAN

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( Source: "EIA/EMP for the 500 MWe PFBR Site", Chapter 8, October 2000, pages 8-1 to 8-20)

## Introduction

In the course of normal operation of an NPP, large quantities of radioactive fission products are generated in the core. But these are effectively contained within the fuel matrix, with the coolant and reactor vessel providing additional levels of containment. The worst feared situation in a reactor is a breakdown of this primary containment mechanism, which would result in large-scale release of radioactive substances into the surroundings. A transient runaway nuclear reaction, for instance, would produce enough heat to melt the core and vaporise the coolant, and the rapidly expanding vapour may damage the reactor vessel, leading to containment failure. (This burst of nuclear reaction is generally referred to as a power excursion and is not to be mistaken for a nuclear explosion, which can never occur in a reactor.) There could also be other types of events that may result in the release of radioactivity, although to a lesser degree.

Every possible safety precaution is taken in siting, design, construction and operation of a nuclear reactor, rendering the occurrence of such events extremely unlikely. Simultaneous failure of several redundant and independent plant protection features - each of which is a low probability event - can only lead to such a situation.

While an untoward circumstance involving substantial release of radioactivity is a rare possibility, it is prudent to prepare an Emergency Preparedness Plan in advance to serve as a guideline at the time of emergency. It would help prevent or reduce the consequences of the disaster. This chapter discusses the Emergency Preparedness Plan for PFBR.

## Emergency Preparedness Plan in DAE

In the wake of the severe accident at Chernobyl in 1986, Government of India reviewed the emergency response plans at DAE nuclear facilities. In November 1986, Minister of State (S&T) convened a meeting of the Secretaries of Atomic Energy, Environment, Home, Agriculture, Defence etc. to discuss the issues and to develop coordinated approach to handle serious radiological emergencies at various nuclear sites. It was recognised that it is not practical to develop a completely detailed response procedure for every conceivable type of emergency situation. Therefore, the emphasis in advance planning was placed on creation of a high order of preparedness, which would allow early action to be taken to provide adequate protection to the population and property against any possible adverse effects and to mitigate the consequences of emergency.

Accordingly, the DAE in cooperation with the local district authorities has drawn up emergency response plans for each of its major sites. Kalpakkam site, where the proposed Prototype Fast Breeder Reactor is to be located, has two operating reactors, a reprocessing plant, a test reactor and a centralised waste management facility in addition to several R&D laboratories. A well drafted, comprehensive emergency preparedness plan already exists for the Kalpakkam site. This is a pioneering document and has become a model for the rest of the nuclear institutions in the country to follow.

It must be noted here that the preparation of an EPP - commonly referred to as the Emergency Preparedness Plan - and its approval by AERB are mandatory before an NPP is permitted to commission and operate any reactor.

### Scope and Objective of the Plan

For the purpose of emergency management planning, the area around the site is designated as the following zones:

1. Exclusion Zone: Covers a distance of 1.5 km around the centre within which there is no habitation. This zone is physically isolated by a fence.
2. Controlled Zone: Area around the centre extending from 1.5 km upto 5 km radius where human activities are regulated in accordance with the Tamil Nadu Nuclear Installation Act so as to check undue increases in population.
3. Emergency Planning Zone (EPZ): 16 km radius around the centre is considered in the preparation of Emergency plan.

EPZ is also divided into 16 angular sectors, each covering 22.5 degrees and centered on the corresponding wind direction. Nine sectors cover the land area and they are labelled as follows:

Sector	Wind Direction
A	North North East
B	North
C	North North West
D	North West
E	West North West
F	West
G	West South West
H	South West
I	South South West

Fig 8-01 gives the site map indicating the various zones and sectors for the Kalpakkam site. The scope and objectives of the EPP are restricted to the EPZ only.

The initial consequences of the release of radioactivity due to an accident would be radiation exposure to occupational workers and to members of the public living in the neighborhood of the plant (mainly those living in the direction of plume), and the possible contamination of several areas.

Later, there may be possible health consequences of varying degrees to persons who have been exposed to high levels of radiation. In the case of a severe accident, the plant may become inoperable for some time. The emergency response plan has to take these and other possible consequences into consideration. It is generally agreed that the following objectives have to be met.

- minimizing or avoiding radiation exposures
- restricting the extent and spread of contamination
- providing medicare for acutely exposed personnel, and
- decontaminating affected areas

The first two objectives are preventive in character and assume major importance in emergency response plans, since appropriate steps have to be taken rather immediately. The methods to be employed for meeting these objectives are almost common to all nuclear plants and are not too specific to accidents. Bringing the plant under control and restoring normalcy, thereby cutting down further releases is also an essential preventive step, but the solution would be too problem specific to be dealt with in a general way in a EPP.

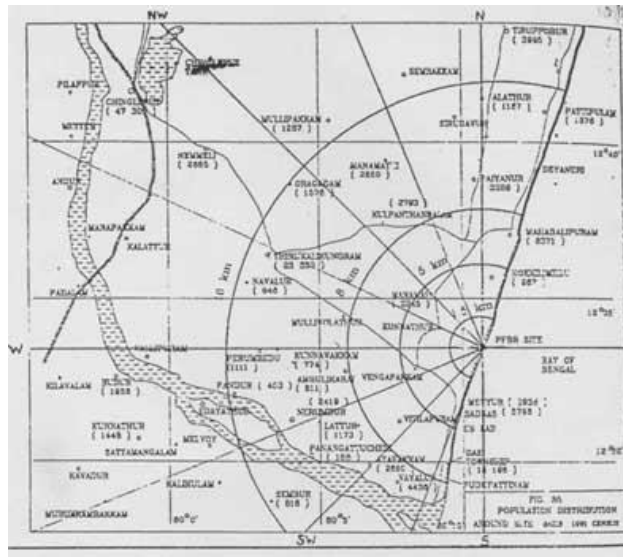


Fig 8-01 SITE MAP INDICATING VARIOUS ZONES AND SECTORS FOR  
KALPAKKAM SITE

The **major** elements that are needed in the Emergency Preparedness Plan are

- a) *Emergency Organisation*, responsible for assessing the situation, deciding the effective counter measures and getting them implemented,
- b) *Resources and facilities including an Emergency Control Centre (ECC)*, from where the operations will be directed, and which will keep stock of all emergency kits in a state of readiness,
- c) *Training* of all emergency response personnel with respect to action plans and also training of the public to ensure smooth cooperation,
- d) *Tests / Drills / Exercises*, to test the readiness of the organisation to cope with emergencies and to check the effectiveness and adequacy of the plans, and
- e) *Emergency Preparedness Manual*, a document outlining the responsibilities of the members of Emergency Organisation and other emergency response personnel.

## Types of Emergency

Emergency situations arising in the nuclear facility are classified in to personnel emergency, plant emergency, and site emergency and off site emergency based on the magnitude and the severity of the incident / situation.

## Personnel Emergency

The personnel emergency conditions involve radiation-related accidents on site, which involve an individual or a group of individuals. The consequences are limited to a small number of persons. The protective measures are also restricted to those persons. This may include personnel injuries, complicated by or resulting from contamination or radiation exposure.

### *Examples of personnel emergency*

1. Sudden failure of ventilation in a hot facility resulting in increased levels of air activity and consequent internal exposure.
2. Events leading to radiation exposure to a worker beyond annual limits.

## Plant Emergency

This category of emergency involves events/incidents confined to a section of the plant only. Prompt action to confine / control the situation by the operator might be necessary in this situation. Evacuation of personnel from the plant may not be necessary unless the situation deteriorates. Some restriction on the movement of people and over exposure of a few people could be possible.

### *Examples of plant emergency conditions*

1. Actual or suspected occurrence of loss of core cooling during operation or shutdown.
2. Closure of reactor building isolation damper on high activity release or high pressure in reactor building.
3. Major fire in reactor building.
4. Earthquake measuring more than 6.0 in Richter's scale or major damage observed due to earthquake.
5. Failure of a structure inside reactor building which may incapacitate the core cooling or Reactor Protection System or Reactor Regulating System.

## Site Emergency

This class of emergency arises due to situation, which seriously affect plant operations involving high radiation field in accessible areas and release of

radioactive materials extending beyond the plant and into the site environment. Kalpakkam being the site with many operating radioactive facilities, an emergency situation in one plant leads to an emergency alert situation in the other operating facilities. In such cases all the other facilities, as a precautionary measure, bring their operations to a safe shutdown. The protective measures may involve evacuation of non- essential persons from all the facilities of the site. Sometime, the magnitude of release may warrant alerting the off-site emergency organization.

*Examples of site emergency conditions*

1. Fire affecting safety systems.
2. Severe natural phenomena being experienced or projected with plant not in cold shutdown condition.
3. Major explosions at the site or release of toxic gases.

## **Off-site Emergency**

An off-site emergency situation exists when the release of radioactive materials or other toxic substances from the plant is of a magnitude necessitating protective action to be taken in the public domain for the members of the public in the neighbourhood of the plant.

A core melt accident in a reactor associated with release of radioactivity in the environment is an example of off site emergency

## **Emergency Organisations**

To deal with different emergencies that originate from the power plant, three types of organisation are defined. They are SHIFT EMERGENCY ORGANISATION (SEO), PLANT EMERGENCY ORGANISATION (PEO) and KALPAKKAM EMERGENCY COMMITTEE (KEC).

The SHIFT EMERGENCY ORGANISATION is the first agency responsible for dealing with emergencies since it will always be available at the plant site during operation and maintenance of the plant.

Shift Charge Engineer (SCE) on duty shall be the head of the shift emergency organisation. He shall be assisted by the Asst. SCE and the engineer-in-charge of the various groups. This Committee shall hold the responsibility till the plant emergency organisation takes control of the situation. The duties of the SCE as head of shift emergency organisation shall include the following:

- Confirmation of the incident



- Rapid assessment of the potential for its escalation
- Initial announcement
- Prompt information to all the plant emergency organisation members.

Once the plant emergency organization takes over, the SCE shall resume his/her normal duties of the plant operation and maintenance.

The organisation that is totally responsible for dealing with personnel emergency and plant emergency is the PLANT EMERGENCY ORGANISATION. This committee is a higher-level agency and will make itself available at plant site at short notice. (During normal office hours most of these personnel will be available at plant site). The Plant Emergency Organisation consists of the following members with the Station Superintendent as the Plant Emergency Director:

- Station Superintendent - Director
- Superintendent, Operations
- Superintendent, Maintenance
- Superintendent, Training
- OIC, Health physics unit
- OIC, Industrial safety
- OIC, Security services
- OIC, ESL
- Industrial Relations Officer
- Superintendent, Tech. services - Secretary

The PEO shall be assisted by the various service groups in executing intended actions during the emergency. The details of the responsibilities of the PEO will be described in the plant emergency procedure manual of PFBR. The Committee also keeps the KEC informed of the status of the emergency from time to time.

The KALPAKKAM EMERGENCY COMMITTEE is the highest body available for dealing with site emergency and off-site emergency. However, the PLANT EMERGENCY ORGANIZATION will handle the emergency situation till the KALPAKKAM EMERGENCY COMMITTEE is activated. Once the Kalpakkam Emergency Committee has taken over, the Plant Emergency Organization takes care of the activities related to the plant and such other aspects as directed by the Kalpakkam Emergency Committee. Station Director, MAPS will be the Chairman of KEC. The Kalpakkam Emergency Committee consists of the following members:

- 1. Station Director, MAPS - Chairman**
- 2. Director, IGCAR**
- 3. Director, Reactor Group, IGCAR**
- 4. Director, SHINE Group, IGCAR**
- 5. Head, RSS, HASD, IGCAR**

6. **Facility Director, BARC Facilities, Kalpakkam**
7. **Chief Superintendent, KARP**
8. **Chief Superintendent, MAPS**
9. **Station Superintendent, FBTR, IGCAR**
10. **Head, Centralised Waste Management Facility**
11. **Officer-in-charge, ESL**
12. **Chief Administrative Officer, GSO**
13. **Commandant, Central Industrial Security Force(CISF)**
14. Collector, Kancheepuram District
15. Superintendent of Police (West), Kancheepuram
16. Sub-Collector/RDO, Chengalpattu
17. DSP, Chengalpattu
18. DSP, Mahabalipuram
19. DSP, Mathuranthagam
20. Member Secretary } Nominated by KEC
21. Joint Secretary, KEC, IGCAR }
22. Joint Secretary, KEC, MAPS } KEC

Chairman, KEC is the Site Emergency Director (SED). In the absence of the designated Chairman of KEC, the Officer next in line (as indicated above) would take charge as Chairman KEC and perform the functions of the SED.

The responsibility of the KEC is to collect information from the plant about the emergency situation and recommend implementation of site/off-site emergency as the situation warrants. KEC shall be assisted by two service groups, one consisting of members from the DAE and another consisting of members from the district and State departments (Table **8-01**) while the service group consisting of DAE personnel implement the emergency actions within the site, emergency actions beyond the site i.e. in the public domain are carried out by the district level sub-committee. District Collector, who heads the district level sub-committee, is designated as the off-site emergency director. The information from the DAE authorities flow to the District officials only through the Off-site Emergency Director (District Collector)

The action plans for all the subcommittee members highlighting their duties and responsibilities are well described in the "Emergency Preparedness Manual".

## Emergency Response: Sequence of Actions

### Potential Emergency Situation and its Assessment

Person discovering any personnel, having been involved in a "PERSONNEL EMERGENCY", shall inform the supervisor immediately for assistance and first-aid and then notify the duty SCE. The health physicist, the first-aid attendant and one operator trained in first-aid, shall then proceed to the scene of emergency and take appropriate action. If need be, the Medical Officer/Hospital Superintendent should be consulted or called to the site as the case may be.

### DISTRICT LEVEL SUB COMMITTEE

No.	Sub committee member
1.	District Collector, Kancheepuram
2.	District Revenue Officer, Kancheepuram District (at Chengalpattu)
3.	Superintendent of Police, Chengalpattu (West)
4.	Deputy/Assistant Superintendent of Police, Chengalpattu and Deputy/Assistant Superintendent of Police, Madurantakam.
5.	Dean, Chengalpattu Medical College, Chengalpattu.
6.	Revenue Divisional Officer (RDO)/Sub Collector, Chengalpattu.
7.	District Medical Officer, Kancheepuram.
8.	District Health and Family Welfare Officer, Kancheepuram.
9.	Joint Director of Animal Husbandry, Kancheepuram.
10.	Joint Director of Agriculture, Saidapet, Chennai-15.
11.	District Forest Officer, Chengalpattu Range in Chennai.
12.	Divisional Manager, State Transport Corporation, Chengalpattu.
13.	Divisional Fire Officer, Kancheepuram.
14.	Personal Assistant (General) to Collector, Kancheepuram.
15.	District Supply Officer, Kancheepuram.
16.	Area Commander, Home Guards, Ellappa Nagar, Kancheepuram.
17.	District Transport Officer, Kancheepuram.
18.	Tahsildar, Chengalpattu.
19.	Vice-Chairman, Mahabalipuram.
20.	Panchayat Union Commissioner, Thiruporur
21.	Executive Officer, Mahabalipuram Township.
22.	Executive Officer, Town Panchayat, Thirukalikundram.
23.	Panchayat Union Commissioner, Thirukalikundram.
24.	Panchayat Union Commissioner, Lattur.
25.	Public Relations Officer, Collectorate, Kancheepuram.
25.	Station Director, All India Radio, Chennai.
27.	Station Director, Doordarshan, Chennai.

28.	Assistant Director of Fisheries.
29.	Divisional Engineer, Rural Highways, Chengalpattu.
30.	Superintending Engineer, Tamil Nadu Electricity Board, Chengalpattu Electricity System, Kancheepuram.
31.	Divisional Officer, Indian Oil Corporation, Chennai
32.	Officer-in-Charge, Environmental Survey Laboratory, Kalpakkam.
33.	Plant Superintendent, Centralised Waste Management Facility. Kalpakkam.
34.	Engineer In-Charge, Telephones, Chengalpattu

Persons noticing abnormal plant conditions which have the potential to escalate into an emergency condition shall immediately inform the Shift Charge Engineer (SCE) on duty or any responsible person in the Plant Control Room, by the most expeditious means available. The duty SCE, on careful analysis of the situation/incident, announces the location and nature of the emergency conditions on public address system and sounds the emergency siren. SCE shall take appropriate action to correct or control the situation. Persons in vicinity of the location shall take action to limit the extent and/or- magnitude of the accident or move to a safe location and await help and further instructions.

Immediately after the "PLANT EMERGENCY" is declared and announced, personnel among shift crew who have been assigned specific task during emergency shall report to duty SCE. All other personnel shall proceed to the nearest assembly area. If necessary, The SCE will seek the services of other personnel to co-operate with emergency situations. SCE will also direct the plant CISF to prevent entry of unauthorised personnel in to the operating island.

Once the possibility of incident within the plant developing into "SITE EMERGENCY" or beyond, is recognised, the SED shall be apprised to enable him to take charge of the situation.

## Declaration and Termination of Emergency

Declaration of emergencies shall be made by the duty SCE/PED/SED based on the information from the plant.

### i) Plant emergency

A siren will be sounded as described below for declaring "PLANT EMERGENCY". Following the siren there should be an announcement, both in English and in the local language about the emergency, through personnel address system.

*Declaration of emergency:* - Short intermittent siren 5 seconds **ON**, 5 seconds

**OFF** for a period of 2 minutes.

On hearing the siren, the staff on duty shall terminate the ongoing works in a safe state and quickly assemble in the pre-designated assembly areas. Evacuation of the non-essential staff, if necessary, will be initiated.

*Termination of emergency:* - A continuous siren for 2 minutes. Following the emergency siren, there shall be an announcement on public address system terminating the emergency. In the case where evacuation has not been carried out, the staff assembled in the assembly areas can return to their respective work areas and resume normal operations.

The announcement shall be made as follows :

"ATTENTION ALL PERSONNEL - THERE IS PLANT EMERGENCY"

THE INCIDENT AREA IS .....

THE ASSEMBLY AREA IS.....

THE EMERGENCY CONTROL CENTRE IS .....

PERSONS PRESENT AT ..... SHOULD AVOID  
GOING TO.....

This announcement shall be repeated thrice in English and Tamil.

**ii) Site Emergency:**

***Declaration and Termination:***

The declaration and- the termination of the site emergency shall be done only by the KEC. The declaration is done through sounding a network of sirens. Once the KEC decides to declare site emergency, the first action by the SED shall be to personally call all the siren coordinators through phone, requesting them to sound the sirens. Similar procedure is followed for announcing the termination of the emergency. The siren will be **ON 15** seconds and **OFF** for 5 seconds. This will continue for 5 minutes.

The persons on duty at various facilities of Kalpakkam shall respond to the announcement as in the case of plant emergency.

Decision for termination of the emergency will be taken by SED after ensuring that following conditions have been met:

- a) The plant is under control and the sources of radiation within the plant have been located and contained.
- b) The effluent releases from the plant are within the acceptable limits.

- c) All persons have been accounted for and the rescue operations for the missing persons have been carried out.
- d) The employees have been checked for contamination and cleared before returning to their work locations.

The termination of the emergency shall be done through a continuous siren for 5 minutes.

### iii) Off-site Emergency

Once the emergency situation leading to the site emergency escalates and the consequences are likely to spread beyond the site boundary, the declaration of off site emergency is done.

#### *Notification of Off-site Emergency*

The Collector, Kancheepuram District shall be notified of the occurrence of emergency condition by SED. The notification shall be sent only to Collector, Kancheepuram District or to his alternate. Even in the case of Plant Emergency the Collector shall be intimated by the Chairman, KEC, so that communications can be established and initial preparations started to provide immediate response should the situation develop in to an off- site emergency.

The initial message to the Collector/alternate shall include the following details:

- The identification of S.E.D. by name.
- The name of the affected plant, date and time of the accident.
- Type of emergency
- Details concerning the extent of emergency and the probable affected areas.
- Clear distinction shall be made between an actual emergency and a drill.

Acknowledgement of this information from Collector shall be in writing and in the following format:

1. This is to acknowledge the receipt of information from  
Shri \_\_\_\_\_ SED regarding the start of an OFF-  
SITE emergency due to an incident at FBTR, IGCAR / MADRAS ATOMIC POWER STATION  
UNIT #1 / UNIT#2 /PFBR
2. Action required is SHELTERING / SHELTERING & PROPHYLAXIS / EVACUATION in  
  
SECTOR -----  
  
ZONE -----

### *Notification by the Collector*

Once the KEC decides to declare off-site emergency, the District Collector shall instruct the police to carryout the initial warning and advice to the affected areas. Advice to the public must be unambiguous, reliable, and rapid. Following methods will be used:

-Sirens / Public address system. {Vehicle mounted)

The information to be given to the public by Collector should be regarding the nature of the incident, the degree of activity release, the steps taken to control the situation and the emergency countermeasures advised. The announcement shall be both in English and Tamil. A sample of such a message is given below:

The analysis of air / water borne effluents released from the Kalpakkam nuclear station indicates that they contain radioactive material beyond the specified normal level. Detailed analyses and steps to control the situation are in progress. In the mean time, to minimise radiation exposure you are advised to

- > stay in-door; refrain from going outside until further advice,
- > refrain from taking water from outside pools and open reservoirs,
- > refrain from taking fresh milk,
- stop the cattle from grazing outside.

If there is any need felt to evacuate the people from your area, you will be so informed. When the announcement is made, lock your houses and be prepared for evacuation to the nearest evacuation centre for a stay of 2-3 days. Buses will come and pick you up. Police will guard your house and belongings.

### *Termination of emergency*

The decision about the termination of the emergency shall be made only by SED, in consultation with KEC, after ensuring the following conditions have been met:

- > The plant is under control and the sources of radiation within the plant have been located,
- > the activity releases from the plant are within the specified limits and
- > off-site radiation levels, contamination levels etc.,are well within the specified limits.

The termination shall be announced by police through sirens / public, address systems, on instructions from the District Collector.

## Protective Measures

The counter measures to be implemented in the public domain are classified as immediate countermeasures and late countermeasures. It is worth noting that the exposure occurs via various pathways namely, inhalation, and immersion in the radiation cloud, exposure to contaminated ground surfaces and ingestion of contaminated food items. The radiation dose received via inhalation and immersion routes is short term in nature since they are potential pathways as long as the release of radioactivity continues. The dose from these routes ceases the moment the release is arrested. Hence implementation of countermeasures should be done as soon as the release is suspected. But the other two pathways namely the ingestion and the external exposure from the contaminated ground surfaces can continue to contribute even after the accidental releases are controlled. The following are the three major protective measures (counter measures) recommended for implementation during any radiation emergency. The decision to suggest the counter measure is based on the projected radiation levels at the location and the decision-making authority is the KEC. The major countermeasures are,

- > Sheltering - remaining in doors for a small period of time
- > Prophylaxis - blocking of radioiodine entry in to the body by stable iodine tablets
- > Evacuation -shifting the population from the affected villages, temporarily to pre designated shelters beyond Emergency Planning Zone.
- > Banning of consumption of food items from the affected area.

These countermeasures are implemented by the off-site emergency director (district collector) through his district level sub committee. The channel of communication, line of authority and the plan of implementation are well described in the emergency prepared manual.

## Resources and Facilities

Prompt implementation of emergency response plans calls for readily accessible resources and facilities. As the site and off-site emergency plans are common to Kalpakkam site as a whole, PFBR will naturally share the existing facilities, supplementing them wherever required. The present status of some of the essential facilities is as follows:

- Sirens to be used for the annunciation of Site Emergency have been installed in various buildings at IGCAR and at MAPS. One will be installed in PFBR at the time of commissioning. All these units are remotely controlled from a common centre.



- Two way radiocommunication sets (10 nos.) with a range of 20 km. are available.
- Battery operated mega phones are made available to the police for carrying out warning and advice to the general public.
- A survey vehicle fitted with necessary radiation monitoring instruments, radiation signboards, wireless communication set, etc. will be at the disposal of SED.
- A network of continuous radiation monitors, around the periphery of the site is functional since several years. During emergency, data from these stations will be communicated to ECC. The data relate to field gamma exposure rates, particulate air activity, noble gas release levels, site micro-meteorological data etc.
- The department procures adequate stocks of the stable iodine tablets and distributes them in the five primary health centres in the EPZ. Periodic replenishment of the stock is also being carried out by DAE.
- Kits for handling contaminated persons, which include items like contamination monitors, dosimeters, radiation signboards, gloves, polythene bags, detergent power, respirators etc., are kept in ready to use condition.
- First-aid centre with trained personnel is operational at MAPS. A second one is functional at IGCAR.
- A crew of trained staff to handle contaminated patient is available at DAE Hospital in the Township.
- An ambulance fitted with medical equipment will be at the disposal of ECC.
- Public buildings, marriage halls, schools, etc., in the area between 16km - 32 km, which can serve as emergency shelters have been identified in each sector.
- Adequate manpower for services like radiological monitoring both on site and off-site, fire fighting, first -aid, decontamination, medical assistance etc., can be mobilised on short notice by pooling from all the facilities at the site.

### Emergency Control Centre

In the case of a plant emergency, the PEO functions from within the plant itself. However, in the case of a site emergency, it is operationally convenient to have a designated place as a control centre from where KEC functions. The office of the Director, IGCAR is the place identified for this purpose.

In case of an off-site emergency, with the possibility of contamination near and around the affected facility, access to the site may become restricted. Moreover, nuclear plants are located in protected areas with restricted movement. In view of these, it is desirable to have

the Emergency Control Centre (ECC) located outside the exclusion zone. In Kalpakkam, the ECC is located in the Township near ESL. It is a common facility for the entire site, including PFBR.

The ECC at ESL has:

- Good communication facilities, with mobile phones to contact field staff and wireless link with Command Centre at Collector's office.
- Decision support system, comprising wall maps of site and surroundings, planned survey notes with designated survey spots, ready reference databases, data processing aids etc.
- A store for emergency equipment and casualty kit.
- In the event of an off site emergency, the District Collector, who is in charge for all the activities in the public domain, functions from a second Centre, called the Command Centre. Office of the Sub-Collector, Chengalpattu is the Command Centre for Kalpakkam. Uninterrupted communication links exist between this center and ECC through wireless sets and telephone lines.

## Training and Exercises

Imparting training to staff members and the public regarding the emergency response plan is an essential prerequisite for it to be implemented smoothly and successfully. The objective of the training should be to explain in simple terms the need for such a plan and maintaining preparedness, the contemplated protective measures, the role of the individual in implementing the scheme, how the annunciation about the emergency would be made and so on.

There is a well organised periodic training program being conducted at Kalpakkam. The training is at three different levels, viz. villagers and high school students from the emergency planning zone, staff members who do not have a significant role in carrying out the emergency action plan, emergency response personnel consisting of staff members and service groups and district officials of the state agencies responsible for taking protective and remedial actions.

Batches of villagers and +2 students are brought to MAPS for a one day training (run every week for three months in a year) comprising simple explanatory lecture (in Tamil) and visit to reactor and ESL. The idea is to give them a feeling of how safe the reactor is and what kind of care is being taken in giving radiation protection. Pamphlets in Tamil containing do's and don'ts are distributed. Training to non-essential staff is some what alike, but no visits are included as they work in such places. A notice giving a step by step instruction of what they are

supposed to do in an emergency is posted in all the office rooms as a ready reference.

The emergency response personnel are given a detailed briefing about their respective action plans. For service personnel such as police, who are liable to frequent transfers and cannot afford too much time to learn, the instructions are given in the form of a greenbook.

Besides the training programs at Kalpakkam, DAE also organises every year an intensive two week training programme at the national level for officials of the state agencies and senior level staff from various reactor units.

Drills and mock exercises form a complementary component of the educative process. They are also useful in noting the deficiencies in the plan and correcting them later. Presently, these exercises are mandatory as per AERB guidelines. Offsite emergency mock drills are conducted once in two years. Detailed checklist (of action) for each category of service group has been formulated and their smooth functioning evaluated. Care is taken to inform the public and the media that the event is only a planned mock exercise and not a real emergency. The high level of cooperation received from the public around Kalpakkam site during such exercises is a good testimony to the effectiveness of training. Mock drills for site emergency exercise is conducted once every year. Plant emergency exercises are carried out more often, viz. once a quarter. A record of the simulated exercise and its action sequence is made, which is also submitted to AERB as a compliance report. Similar practice will be adopted for PFBR too.

Emergency equipment such as sirens, communication kits etc. are periodically tested for proper functioning, in order to assure a state of preparedness.

## Records

### *Records on maintenance of emergency preparedness*

The schedule for checking the availability status of the emergency equipment is given in the emergency manual. The Secretary, KEC shall maintain the records received from various agencies responsible for the above checking.

### *Records following an event*

A chronological log of events during the entire period of emergency shall be maintained. Aids such as prepared forms, tape recorders, and data loggers would facilitate data collection and record keeping. The following important data shall be recorded:

- > Description of the event, radiological situations (radiation fields, surface and air activity levels), personnel injuries, equipment damages etc. Reading of the plant instruments and site monitoring network

- > Response time of various service groups like hospital, transport and civil authorities.
- > List of affected areas and countermeasures taken.

Similar records shall be maintained during drills / exercises.

## **Emergency Preparedness Manual**

Each radioactive facility in the Kalpakkam site has a plant **emergency;** procedures manual, highlighting all the aspects of the radiation emergency discussed hitherto. A similar plant emergency manual will be prepared for PFBR before the commissioning of the plant.

In addition, a manual on Emergency preparedness for Kalpakkam DAE centre covering site emergencies, off site emergency and general information is also available which is approved by DAE, Govt, of India as well as by Govt, of Tamil Nadu.

Periodic review and updating of the contents of the manuals shall also be carried out every year.

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